## ECO 209Y MACROECONOMIC THEORY AND POLICY

# SOLUTIONS

### Term Test # 3

	LA	AST NAME		
		RST NAME		<u> </u>
Indi	icate	your section of the course:		
	Monday, 2-4 – L0101			Tuesday, 2-4 – L0201
	We	esday, 2-4 – L0301		
<u>INS</u>	1. 2.	CTIONS:  The total time for this test is 1 hour a Aids allowed: a <u>simple</u> , non-program Use <u>pen</u> instead of <u>pencil</u> .		
		DO NOT WRITE IN THI	S SP	ACE
Part I		/35	Р	art II 1/10
				2/10
				3/10
TOTA	<b>AL</b>	/75		4/10

#### PART I (35 marks)

#### Instructions:

- Enter your answer to each question in the table below. Table cells left blank will receive a zero mark for that question.
- Each correct answer is worth 2.5 marks. **Note that no deductions will be made for incorrect answers.**

1	2	3	4	5	6	7
В	С	D	A	С	Е	В
8	9	10	11	12	13	14
В	D	E	D	A	В	Е

- 1. 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 this alleged currency undervaluation on the Chinese economy?
  - A) The prices of imported goods would be artificially low for Chinese consumers.
  - B) The Chinese money supply would tend to increase.
  - **C)** Inflationary pressure would tend to decrease in the Chinese economy.
  - **D)** China will experience greater net capital inflows.
  - **E)** None of the above is correct.
- 2. Consider an open economy with a fixed price-level, flexible exchange rates, and 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.

- **3.** Consider an open economy with a fixed-price level, flexible exchange rates, and perfect capital mobility. If autonomous exports increased, which one of the following would be true in the new equilibrium?
  - A) The rate of interest would increase.
  - **B)** The balance in the capital account would improve.
  - C) The balance in the current account would improve.
  - **D)** Both the rate of interest and the level of income would remain unchanged.
  - **E)** None of the above is true.
- **4.** Consider an open economy with a fixed-price level, flexible exchange rates, and imperfect capital mobility. An increase in the money supply will cause
  - A) output and exchange rate to increase, and interest rate to decrease.
  - B) output, interest rate, and exchange rate to increase.
  - **C)** output and interest rate to increase, and exchange rate to decrease.
  - **D)** output and exchange rate to decrease, and interest rate to increase.
  - **E)** output to decrease, and exchange rate and interest rate to increase.
- **5.** Consider an open economy with a fixed-price level, flexible exchange rates, and perfect capital mobility. A lower tariff on imports will
  - A) raise exports but leave imports unchanged.
  - B) raise imports but lower exports.
  - C) raise both imports and exports.
  - **D)** lower both exports and imports.
  - E) raise imports but leave exports unchanged.
- **6.** Suppose there was monetary equilibrium in the economy. If now the banks' desired reserve ratio increased while the public's desired currency-deposit ratio remained unchanged, which one of the following would be true in the new monetary equilibrium?
  - A) The monetary base would decrease.
  - B) The money supply would rise.
  - C) The money multiplier would increase.
  - D) Banks will give more loans to the public.
  - **E)** Currency in hand of the public would decrease.

- 7. The monetary base is \$20 billion, currency 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. The money multiplier is equal to
  - A) 2.5.
  - **B)** 4.0.
  - **C)** 3.0.
  - **D)** 5.0.
  - **E)** none of the above.
- **8.** Suppose there was monetary equilibrium in the economy. If now the public's desired currency-deposit ratio increased while the banks' desired reserve ratio remained unchanged, which one of the following would be true in the new monetary equilibrium?
  - A) The monetary base would decrease.
  - B) Banks' reserves would decrease.
  - **C)** The money supply would rise.
  - **D)** The money multiplier would increase.
  - **E)** Banks will give more loans to the public.
- **9.** Suppose that households and firms always keep 20 percent of their money holdings in the form currency and that the money multiplier is 3. If the government borrows \$100 million from the central bank to finance a new expenditure, the demand deposits of the public will
  - A) remain unchanged.
  - **B)** increase by \$20.
  - C) increase by \$300.
  - D) increase by \$240.
  - E) increase by \$100.
- **10.** Consider an economy currently in monetary equilibrium. The money supply is \$80 billion. The public likes to hold one-quarter of their money holdings in cash (CU<sub>P</sub>). Banks like to hold one-sixth of their customers' deposits (D) as reserves (R). Which of the following statements is correct?
  - A) The money multiplier (mm) is 2.5
  - B) The reserves of the banks (R) are \$10 billion.
  - **C)** The public's desired currency-deposit ratio (cu) is 0.25.
  - **D)** The monetary base (B) is \$30 billion.
  - E) Both B) and D) are correct.

- **11.** All else equal, if people decide to hold less currency,
  - 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 decrease and the money supply will contract.
  - **D)** the money multiplier will increase and the money supply will expand.
  - **E)** the money multiplier will decrease but the monetary base will not change.
- **12.** If the money multiplier is 2 and the Bank of Canada buys \$1.5 million of bonds on the open market at the same time that it sells \$1 million of foreign exchange, then the M1 money supply will
  - A) increase by \$1 million.
  - B) increase by \$0.5 million.
  - C) fall by \$5 million.
  - **D)** increase by \$2.5 million.
  - **E)** fall by \$1 million.
- **13.** An increase in government spending will have the greatest expansionary impact on equilibrium income when it is financed by:
  - A) selling bonds to the general public.
  - **B)** selling bonds to the central bank.
  - **C)** selling bonds to the commercial banks.
  - **D)** increasing sales taxes.
  - **E)** increasing income taxes on the rich.
- **14.** In order to stimulate the economy and avoid deflation, some central banks have been implementing unconventional monetary policies, a combination of quantitative easing and negative policy rates. Which of the following best describes the outcome of such policymix?
  - **A)** Commercial banks have switched to larger currency reserves.
  - **B)** Yields on some sovereign bonds have turned negative.
  - **C)** Overnight rates have remained relatively unchanged.
  - **D)** Some banks have started charging interest on their corporate clients' deposits.
  - E) Both B) and D).

#### PART II (40 marks)

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

1. Based on the case study discussed in class, critically evaluate the following statement: "As a result of strong macroeconomic-policy coordination, all developed and most emerging market countries achieved single-digit inflation and low interest rates during the first half of the 2000s."

As Alan Greenspan pointed out, this situation was quite unusual — not so much in that any of these countries was experiencing low rates of inflation and low rates of interest, but rather in that they all were experiencing this situation at the same time. Was this generalized low rates of inflation/interest the result of strong macroeconomic policy-coordination as the statement suggests? The evidence appears to suggest otherwise.

The reason that the rate of inflation was so low worldwide was that, in all these countries, wages were not increasing as fast as in the past. Indeed, if costs of production are not rising, then there is no pressure on prices to increase. But what was restraining the increase in wages at that time? As suggested by **Greenspan**, it appears that it was due to the undergoing **process** of **globalization**, most particularly the process of integration into the world economy of countries such as China and those of the former Soviet bloc. These countries had large **labour surpluses**, and these labour surpluses started to exert downward pressure on wages worldwide. How was this so?

**On the one hand**, developed countries' workers employed in the tradable sector (both the export and the import-competing sectors) were facing the dilemma of either accepting smaller wage increases (and even absolute decreases) or having their sources of employment move to lower-wage developing countries (and losing their jobs altogether). As a result, average wages in most developed countries have stagnated during the last 30 years (despite significant productivity increases).

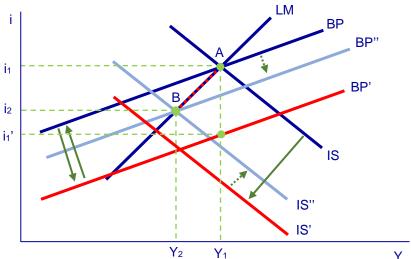
**On the other hand**, many consumer (and intermediate) goods became less expensive due to the fact that they were now imported from low production-cost (i.e., low-wage) countries — thus directly contributing to decreasing the rate of inflation while increasing real wages, thus indirectly further reducing any upward pressure on domestic nominal wages.

Regarding the low rates of interest, there are two main views. On the one hand, Greenspan contends that excess liquidity in world financial markets was responsible for the low interest rates — where the excess liquidity was the result of large accumulation of foreign exchange reserves by many countries. A large fraction of these foreign reserves were then invested in the bonds markets of the developed countries, thus pushing their yields down.

Bernanke also espouses a similar view, adducing that a "global saving glut" was responsible for the low rates of interest — where the "saver" countries were the ones accumulating foreign exchange reserves.

On the other hand, Rogoff believes that low interest rates were the result of the implementation of expansionary monetary policy by the Federal Reserve. He believes that the fact that low policy rates did not translate into high inflation is not reason to discard the role of the monetary authority in the determination of short-term interest rates.

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 output will rise, its rate of interest will increase, 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 explain the economics. Consider the model of an open economy with a fixed-price level, flexible exchange rates, and imperfect 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 would be 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 would shift down to BP'). However, since the economy is at point A and there is a surplus in the balance of payments, the Canadian dollar will appreciate and the balance in the current account will deteriorate (i.e., NX will fall) by the same absolute amount as the improvement in the capital account. The appreciation of the Canadian dollar will cause both the BP' and IS curves to shift. Indeed, the BP' curve will shift back to BP— and thus the external sector will now be again in equilibrium at point A— while the IS curve will shift down 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 will decrease 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 is represented by 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, both the *BP* curve and *IS'* curve shift. The *BP* shifts gradually downwards as the Canadian dollar gradually 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* gradually 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 excess supply in the goods market is eliminated and thus the money market, the external sector, and the goods market are all in equilibrium (point *B* in the diagram).

The statement is thus incorrect: while the balance in the capital account will improve and the balance in the current account will deteriorate, the level of output and the rate of interest will both fall.

3. Based on the case study discussed in class, critically evaluate the following statement: "Before rewriting rulebooks and cranking up government spending, Canadians need to recall that central banks are far and away our best hope to cushion the downturn and hasten the recovery." (William Robson, The Globe and Mail, 25/09/2008)

Robson made this statement in September 2008, at the outset of the Great Recession in Canada. He espoused a view against the implementation of expansionary fiscal policy while praising the use of expansionary monetary policy to mitigate the downturn and speed up the recovery. Regarding the use of expansionary fiscal policy, he questioned the relative speed, power, neutrality and reversibility of such policy while pointing out the negative impact that unsustainable fiscal deficits could have on consumers' and businesses' confidence. Regarding the use of expansionary monetary policy, he was of the view that it could rapidly and powerfully affect the level of AD without introducing economic distortions among the different sectors and regions (i.e., the same lower rate of interest for all).

Why was Robson against the use of fiscal policy? He argued that it takes time to design and implement new fiscal expenditures, and thus by the time their impact could be felt the economy might already not need them. Nevertheless, it's not difficult to think of numerous infrastructure projects that are "shovel-ready", i.e., just waiting for financial resources to become available for the project to be undertaken — and this, of course, has the additional benefit of increasing the level of *potential* GDP as well. Robson was also against the use of temporary tax reliefs since, he argued, they would only have an ephemeral impact on AD. Here it could be argued that, rather than ephemeral, their impact might have been almost non-existent given that households would have more likely used any increase in their disposable income to pay off debt rather than to finance new expenditures. Further, Robson claimed that "unsustainable" fiscal policy would have had a negative impact on the economy by hurting household and business confidence. This point, however, appears to be at odds with the fact that despite record fiscal deficits both the U.S. and Canadian governments continued borrowing long-term at record-low interest rates.

Why did he favour the use of monetary policy? In his view, expansionary monetary policy can rapidly and powerfully affect the level of AD without introducing economic distortions among the different sectors and regions (i.e., the same rate of interest for all). However, this apparent "neutrality" of monetary policy can also be seen as a "weakness" — for instance, an increase in the rate of interest aimed at reducing inflationary pressure coming from one geographical region (e.g., Alberta) can cause the appreciation of the domestic currency and affect negatively another geographical region (e.g., Ontario). In addition, Robson pointed out that monetary policy has the advantage (over fiscal policy) of being easily reversible when the economic situation changes. However, it could be argued that an increase in infrastructure spending can as easily be reversed as monetary policy since this expenditure ends as soon as the investment project is completed.

But it could be argued that the main shortcoming of Robson's position rests on his failure to properly identify the type of recession we were facing then, and are still facing now: It's not a typical recession but a so-called "balance-sheet" recession. A typical recession caused by an increase in the rate of interest to curb inflation, the process can easily be reversed by reducing the interest rate. But in a balance-sheet recession, the use of expansionary monetary policy is quite ineffective since it cannot reactivate the economy when households and firms are trying to reduce their liabilities (and thus are not in the mood for increasing expenditure through greater indebtedness). And that was indeed the case in 2008-09 even though the nominal rate of interest was reduced to historically low levels (i.e., the economy reached a situation resembling the classical "liquidity trap").

4. Comment on the following statement: "A sale of gold by the commercial banks to the Bank of Canada, a transfer of the Government of Canada's deposits from the Bank of Canada to the commercial banks, a sale of bonds by the general public to the commercial banks, and a decrease in the Bank Rate will all result in a decrease in the money supply." In your analysis, assume a fixed currency-deposit ratio of the public and a fixed desired cash-reserve ratio of the commercial banks.

Assuming a fixed currency-deposit ratio and a fixed desired cash reserve ratio (i.e., a fixed money multiplier), the money supply decreases if and only if the monetary base (i.e., the stock of high powered money) decreases, where the final decrease in the money supply is equal to the decrease in the monetary base times the money multiplier. Let's recall that the monetary base consists of the total currency in the economy plus the deposits of the commercial banks at the Bank of Canada. Therefore, assuming no change in the total currency in the economy, a change in the monetary base will imply a change in the deposits of the commercial banks at the Bank of Canada. Finally, let's also keep in mind that the monetary base decreases whenever: 1) the Bank of Canada sells an asset; and 2) Government of Canada's deposits at the Bank of Canada decrease.

What will be the impact of each of the situations described above on the monetary base and, as a result, on the money supply?

a) Sale of gold by the commercial banks to the Bank of Canada.

The Bank of Canada pays the commercial banks for this transaction by increasing the deposits of the commercial banks at the Bank of Canada by the amount of the purchase. Therefore, the monetary base (B) increases and so does the money supply (M), where  $\Delta M = mm \Delta B$ .

b) Transfer of the Government of Canada's deposits from the Bank of Canada to the commercial banks.

The deposit of the Government of Canada at a commercial bank represents a transfer from the Bank of Canada to the commercial bank, i.e., it represents a change in the liabilities of the Bank of Canada from the form of Government of Canada's deposits to commercial banks' deposits.

Therefore, the monetary base (B) increases and so does the money supply (M), where  $\Delta M = mm \Delta B$ .

c) A sale of bonds by the general public to the commercial banks.

This transaction implies an initial increase in the public's deposit's at the commercial banks. Therefore, the cash reserve ratio of the commercial banks falls below the desired level and the banks recall loans to restore the reserve ratio to the desired level. Therefore, the money supply (M) does not change since the monetary base (B) does not change.

d) A decrease in the Bank Rate.

As the Bank Rate falls, the prime rate and all short-term commercial rates of interest decrease as well. As a result, the demand for loans increases and so do the deposits of the public at the commercial banks. The cash reserve ratio of the commercial banks decreases now below the desired level as a result of the increase in deposits of the public. Therefore, the banks sell Government Bonds to the Bank of Canada and increase their deposits at the Bank (i.e., its reserves). Therefore, the monetary base (B) increases and so does the money supply (M), where  $\Delta M = mm \Delta B$ .

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