ECO 209Y MACROECONOMIC THEORY AND POLICY

Term Test #3

February 15, 2019

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INSTRUCTIONS:

- The total time for this test is 1 hour and 45 minutes.
- The only aid allowed is a *non-programmable* calculator.
- Write your name and identifying information above but keep this test paper closed until the start of the test is announced.
- There are three parts to the test: *Part I* consists of 10 multiple-choice questions (20 points); *Part II* consists of one quantitative problem (10 points); and *Part III* includes 3 short-answer questions (30 points). The *total* point-value of the test is *60 points*.
- The answers to the 10 multiple-choice questions of *Part I* must be recorded in the *bubble sheet* provided on **page 10** of this test paper. Only the answers recorded in the bubble sheet will be marked. Cells left blank will receive a zero mark for that question. No deductions will be made for incorrect answers.
- In *Parts II and III*, write your answers clearly and concisely in the space provided immediately after each question. *Your entire answer must fit in the designated space.* No extra space/pages are possible and you cannot use blank space for other questions.
- It is best to write in PENCIL and use an ERASER as needed. This way you can make sure to fit your final answer in the appropriate space.
- Please write legibly. If I can't read your handwriting, I can't award you any marks!

PART I (20 points)

Instructions:

Enter your answer to each of the 10 multiple-choice questions in the *bubble sheet* provided on **page 10** below. Each correct answer is worth 2 *points*. *Note that no deduction will be made for incorrect answers.* Table cells left blank will receive zero points. **Do NOT guess your answers! Manage your time properly!**

- 1. Last January the yield on 3-month Treasury Bill (T-bill) was about 1.63% in Canada and 2.37% in the US. That month one Canadian dollar could buy about 0.75 US dollars. According to the interest parity condition, in January the financial markets were most likely expecting
 - A) the yield on Canada's T-bills to increase by about 0.74 percentage points and the exchange rate for the US dollar to remain unchanged.
 - **B)** the yield on US's T-bills to decrease by about 0.74 percentage points and the exchange rate for the US dollar to remain unchanged.
 - **C)** the nominal interest rate differential between the U.S. and Canada to remain unchanged and the exchange rate for the US dollar to appreciate by about 0.74%.
 - **D)** the nominal interest rate differential between the U.S. and Canada to remain unchanged and the exchange rate for the US dollar to depreciate by about 0.74%.
 - E) both the nominal interest rate differential between the U.S. and Canada and the exchange rate for the US dollar to remain unchanged.
- 2. Consider a model of an open economy with fixed-price level, flexible exchange rates, and perfect capital mobility. Given an increase in the level of U.S. income, which one of the following statements is true with respect to its impact on the Canadian economy?
 - A) Net exports will increase and equilibrium income will rise.
 - B) Net exports will increase, the Canadian dollar will appreciate, and the balance in the capital account will deteriorate.
 - **C)** Exports will increase, the Canadian dollar will appreciate but both the balances in the current and the capital accounts will remain unchanged.
 - D) Exports will increase while imports will decrease, and thus the balance in the current account will improve while the balance in the capital account will deteriorate.
 - E) Net exports will increase, the Canadian dollar will depreciate, and the balance in the capital account will deteriorate.

Use this space for rough work

- **3.** Consider a fixed-price level model of an open economy with flexible exchange rates and imperfect capital mobility. If the government wishes to increase interest rates without changing 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.
- 4. Consider a fixed-price level model of an open economy with flexible exchange rates and imperfect capital mobility. An increase in the interest rate that prevails in the rest of the world will cause
 - A) the domestic interest rate to rise, the level of output, to fall and the exchange rate to rise.
 - B) the domestic interest rate, the level of output, and the exchange rate all to rise.
 - C) the domestic interest rate to rise, the level of output to rise, and the exchange rate to fall.
 - **D)** the domestic interest rate to fall, the level of output to rise, and the exchange rate to fall.
 - E) none of the above.
- **5.** Assume that the currency-deposit ratio is 25%, the desired reserve-deposit ratio is 15%, and total money supply is \$1,875 billion. What is the amount of high-powered money if there are no excess reserves in the banking system?
 - A) \$500 billion
 - B) \$600 billion
 - **C)** \$700 billion
 - D) \$800 billion
 - E) none of the above
- 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.

Use this space for rough work

- 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 currencydeposit 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_P). 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.

Use this space for rough work

PART II (10 points)

Note: This question is taken literally from Problem Set 11.

Consider the following Post-Keynesian Structuralist model of a closed economy:

- There are three rates of interest in this model: 1) the loans rate of interest (*i*_L) set by the commercial banks; the bank rate (*i**) set by the central bank; and the bond rate of interest (*i*) determined by the demand and supply of money.
- The equation of the demand for loans is i_L = -0.1 L + 0.019 Y, and banks are willing to supply any amount of loans at i_L = 1.5 i^{*}.
- There is no currency in this model, so the money supply consists only of bank deposits.
- Banks' reserves (R) are kept constant at 5% of the money supply (i.e., bank deposits).
- Banks' assets consist only of loans (*L*) and reserves (*R*), and banks' liabilities only of clients' deposits. Banks' equity is 16.
- The supply of money is $M^{S} = M$ and the demand for money is $M^{D} = 0.3 \text{ Y} 10 i 130$.
- a) If the bank rate is set at i* = 4, what is the level of bank loans (L) as a function of real income (Y)? (2 points)

If $i^* = 4$, then $\frac{i_l}{i_l} = 1.5 i^* = 1.5 (4) = 6$.

Since banks are willing to supply any quantity demanded of loans at $i_L = 6$, the equation for the supply of loans is $i_L = 6$.

Given that the equation of the demand for loans is $i_L = -0.1 L + 0.019 Y$, the equilibrium quantity of bank loans as a function of Y is:

 $6 = -0.1 L + 0.019 Y \rightarrow 0.1 L = 0.019 Y - 6 \rightarrow L = 0.19 Y - 60.$

b) As a function of real income (Y), what is the equation for the money supply (M^S) ? (2 points)

Banks' equity (E) is equal to the difference between banks' assets and liabilities, where:

1) Assets consist of loans (L) and reserves (R), where R = 0.05 M;

2) The only liabilities are bank deposits which are equal to *M* (since there is no currency);

Therefore,

L + R = M + E

 $0.19 \ Y - 60 + 0.05 \ M = M + 16$

0.95 M = 0.19 Y - 76

M = 0.2 Y - 80

c) What is the equation for the *LM* curve? (2 points) Since $M^{D} = 0.3 \text{ Y} - 10 \text{ }i - 130 \text{ and } M^{S} = 0.2 \text{ Y} - 80$, then $M^{D} = M^{S}$ 0.3 Y - 10 i - 130 = 0.2 Y - 8010 i = -50 + 0.1 Yi = -5 + 0.01 Y.

d) If the equation for the *IS* curve is i = 15 - 0.01 Y, what are the equilibrium values of income and the bond rate of interest? (2 points)

To find the equilibrium Y and i, we must equate the IS and LM curves:

 $15 - 0.01 \ Y = -5 + 0.01 \ Y \rightarrow 0.02 \ Y = 20 \rightarrow Y = 1000.$

And plugging this value for Y into the IS or LM curve we find that the equilibrium rate of interest is:

 $IS \rightarrow i = 15 - 0.01 (1000) = 15 - 10 = 5$

 $LM \rightarrow i = -5 + 0.01 (1000) = -5 + 10 = 5.$

e) In equilibrium, what are the values of bank loans and the money supply? (2 points)

From the equation for *L* in a) above we get:

L = 0.19 Y - 60 = 0.19 (1000) - 60 = 190 - 60 = 130.

And from the equation for either the M^{D} or M^{S} in c) above we get:

 $M^{D} \rightarrow M = 0.3 \text{ Y} - 10 \text{ } i - 130 = 0.3 (1000) - 10 (5) - 130 = 300 - 50 - 130 = 120$ $M^{S} \rightarrow M = 0.2 \text{ Y} - 80 = 0.2 (1000) - 80 = 200 - 80 = 120.$

PART III (30 points)

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

 Critically evaluate the following statement: "If the central bank engages in an open market purchase, the short-run impact will be an increase in the level of income, an appreciation of the exchange rate, a deterioration of the current account, and an improvement of the capital account." (Show your answer with the help of a diagram and <u>explain</u> the economics. Consider the fixedprice level model of an open economy with flexible exchange rates and imperfect capital mobility.)

Initially the economy is in equilibrium at point *A* (see diagram below). An open market purchase increases the money supply and thus the domestic rate of interest decreases. Graphically, the increase in the money supply is represented by a shift of the *LM* curve to *LM*' and the rate of interest falls to *i*₁. The decrease of the domestic rate of interest causes the capital account to deteriorate ($\Delta CF < 0$) and thus now BP < 0 at point *A*. The excess demand for foreign currency in the exchange market (due to $\Delta CF < 0$) causes the exchange rate to appreciate. Ceteris paribus, the appreciation of the exchange rate makes foreign goods relatively more expensive than domestic goods and the current account improves ($\Delta NX > 0$). The increase in *NX* is represented graphically by a rightward shift of the *IS* curve to *IS*'. A situation of excess demand arises in the goods market (i.e. AE > Y) and Y starts to increase. The increase in *NX* is also represented graphically by a downward shift of the *BP* curve to *BP*' since the deterioration in the capital account and the improvement in the current account have cancelled each other out (i.e., PB = 0). Therefore, the economy is now at point *B* where the money market and the external sector are both in equilibrium while there is an excess demand in the goods market.

As *Y* starts to increase to eliminate the excess demand in the goods market, the real demand for money also increases and the domestic rate of interest starts to rise along the *LM*' curve. The increase in the rate of interest causes the capital account to improve ($\Delta CF > 0$) and the exchange rate depreciates (somehow reducing its initial appreciation). In turn, the depreciation of the exchange rate causes a deterioration of the current account ($\Delta NX < 0$) and both the *IS*' and the *BP*' curves start shifting back to the left. This process continues until the excess demand in the goods market is eliminated at point *C*.

Note that the latter improvement of the capital account somehow reduces its initial deterioration and that the latter deterioration of the current account also somehow reduces its initial improvement. Also note that the adjustment path is represented by a movement up along the LM' curve, the economy being always at a point of intersection of the (static) LM' curve and the (shifting) BP' curve until the excess demand in the goods market is eliminated. The statement is therefore false: the level of income rises and the exchange rate appreciates, but the current account improves and the capital account deteriorates.



2. Critically evaluate the following statement: "If political instability reduces consumers' confidence, then income will fall, the rate of interest will rise, the exchange rate will appreciate, the balance in the current account will deteriorate, and the balance in the capital account will improve." (Show your answer with the help of a diagram and <u>explain</u> the economics. Consider the fixed-price level model of an open economy with flexible exchange rates and imperfect capital mobility.



A decrease in consumers' confidence reduces autonomous consumption expenditure — and thus the *IS* curve shifts to *IS*' as shown in the diagram. The decrease in autonomous consumption creates a situation of excess supply in the goods market since AE < Y now.

Since at Y_1 there is now an excess supply in the goods market, firms will experience involuntary increases in inventories. Firms, therefore, will adjust production downwards. As output (Y) starts to decrease, the demand for money also starts to decrease and the domestic rate of interest falls. Note that the money market is always in equilibrium (by assumption), and thus the adjustment path is a movement down along the *LM* curve.

As the rate of interest decreases, the balance in the capital account deteriorates, thus causing the overall balance of payments to move towards a deficit situation (i.e., excess demand for foreign currency in the exchange market). The exchange rate, therefore, appreciates. This appreciation of the exchange rate, in turn, prompts an increase in net exports (*NX*) and the *IS* curve starts shifting back to the right. The gradual appreciation of the exchange rate also causes the *BP* curve to shift down gradually, thus maintaining equilibrium in the external sector at all times — i.e., at all levels of *Y*, the improvement in the current account is matched by a similar deterioration in the capital account. Therefore, both the money market and the external sector remain always in equilibrium — i.e., the economy is always at a point of intersection between the static *LM* curve and the moving *BP* curve — while the excess supply in the goods market is being reduced.

This process continues until the excess supply in the goods market is eliminated. Graphically, this is achieved at the level of income Y_2 as shown on the diagram. At the level of income Y_2 and rate of interest i_2 , the goods market, the money market, and the external sector are again all simultaneously in equilibrium.

Therefore, it is true that at the end of the process the level of income will fall and the exchange rate will appreciate. But, contrary to the statement, the rate of interest will fall, the balance in the capital account will deteriorate, and the balance in current account will improve. Therefore, the statement is false. 3. Consider the Neo-Keynesian monetary model where the central bank implements monetary policy following an interest-rate rule. Suppose that the central bank increases the target for the overnight rate of interest. What will be the impact of such a policy on equilibrium income, equilibrium rate of interest, and equilibrium real money stock? (Show your answer with the help of a diagram and explain the economics. Consider the fixed-price level model of a closed economy.)

If the central bank implements monetary policy following an interest-rate rule, then it will set a target for the overnight rate of interest to affect the decision of the banks about the rate of interest they will charge when lending money to their customers (i.e., the prime rate is assumed to be a function of the target for the overnight rate of interest). In turn, it is assumed that banks will supply any quantity demanded at this rate of interest, i.e., that the supply of money is perfectly elastic (i.e., the money supply curve is horizontal) at this rate of interest. Therefore, the money market is in equilibrium only at this rate of interest, which means that the *LM* is also horizontal at this rate of interest. This can be observed in the following diagram.



At the initial target for the overnight rate the banks set the prime rate at i_1 , and thus the real money supply curve (MS_1) is horizontal at this level (see left-hand-side diagram above). The *LM* curve is thus horizontal at i_1 as well, i.e., the money market is in equilibrium only at i_1 (see right-hand-side diagram). Given the *IS* curve, the economy is in equilibrium at Y_1 (i.e., at point *A*). At this level of *Y* the corresponding real demand for money (i.e., liquidity preference curve) is $L(Y_1)$ and the real quantity of money is M_1 .

As the central bank increases its target for the overnight rate, the banks soon enough also increase the prime rate to i_2 to reflect the increase in their borrowing costs. The real money supply curve (MS_2) is now horizontal at i_2 and the LM cure also shifts up to LM'. The economy moves from point A to point B (right-hand-side diagram), the money market being in equilibrium (B is a point on the LM' curve) but the goods market showing an excess supply (B is a point above the IS curve). Note that at Y_1 the stock of money decreases to M_2 due to the increase in i (left-hand-side diagram).

Y starts to decrease to reduce the excess supply in the goods market, and thus the demand for money also decreases (i.e., the *L* curve starts shifting to the left as *Y* decreases). Equilibrium in the money market is being kept at all times but the rate of interest does not change because the supply of money is perfectly elastic. The adjustment path is thus a movement along the *LM* curve, i.e., maintaining equilibrium in the money market at all times while reducing the excess demand in the goods market as *Y* decreases. The new equilibrium for the economy is reached at point *C* when *Y* decreases to *Y*₂ (now both the money market and the goods market are simultaneously in equilibrium). Note that at *Y*₂ the stock of money decreases further to M_3 due to the decrease in *Y* with no change in *i* (left-hand-side diagram).

The increase in the target for the overnight rate increases the market rate of interest and has therefore a contractionary effect on the economy: the increase in the rate of interest causes *AE* to decrease, thus creating an excess supply in the goods market, i.e., the condition for Y to contract. The real demand for money in turn decreases due to both the increase in the rate of interest and the decrease in the level of real income, and thus the real stock of money falls in the economy.