ECO 209Y
MACROECONOMIC THEORY AND POLICY

Term Test #2

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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 (25 points); ***Part II*** consists of one quantitative problem (15 points); and ***Part III*** includes 3 short-answer questions (30 points). The ***total*** point-value of the test is ***70 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 (25 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 ***2.5 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. Consider a fixed price level model of a closed economy. An increase in savings at each level of disposable income will
- **A)** shift the *LM* curve down.
- **B)** shift the *LM* curve up.
- **C)** shift the *IS* curve to the left.
- **D)** shift the *IS* curve to the right.
- **E)** leave both the *IS* and the *LM* curves unchanged.

2. In a fixed-price level model of the economy, expansionary fiscal policy is very effective in increasing national income when
- **A)** money demand is very responsive to income changes.
- **B)** money demand is very responsive to interest rate changes.
- **C)** consumption is very responsive to interest rate changes.
- **D)** the marginal propensity to import is very large.
- **E)** investment is very responsive to interest rate changes.

3. In a fixed-price level model of the economy, expansionary monetary policy is very effective in increasing national income when
- **A)** investment is very responsive to interest rate changes.
- **B)** money demand is very responsive to income changes.
- **C)** the marginal propensity to import is very large.
- **D)** money demand is very responsive to interest rate changes.
- **E)** the income tax rate is very high.

4. Suppose that income per capita in Brazil is 42,000 reals and that the nominal exchange rate for Brazilian reals is 0.35. Further suppose that a given consumption basket of goods and services costs $2,250 in Canada and 5,000 reals in Brazil. Using the PPP exchange rate, income per capita in Brazil is
- **A)** $14,700.
- **B)** $16,100.
- **C)** $17,600.
- **D)** $18,900.
- **E)** None of the above.

5. In an IS-LM-BP model with fixed exchange rates and perfect capital mobility, expansionary fiscal policy will cause:
- **A)** a depreciation of the exchange rate.
- **B)** both the IS and the LM curves to shift up.
- **C)** output and the interest rate to increase.
- **D)** a decrease in investment.
- **E)** a decrease in net exports.

6. 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) The balance in the capital account would improve for China.
E) None of the above is correct.

7. If capital mobility is imperfect and import demand is completely insensitive to changes in the level of domestic income, which one of the following statements is correct?

A) The *BP* curve is horizontal.
B) The *BP* curve is vertical.
C) The *BP* curve is downward sloping.
D) The *BP* curve is upward sloping if the international rate of interest is greater than the domestic rate of interest.
E) The slope of the *BP* curve is not determinable.

8. Consider a small open economy with a fixed price level, 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, the money supply, and income will all remain unchanged.
B) net exports, the money supply, and income will all be lower.
C) net exports, the money supply, and income will all be higher.
D) net exports will remain unchanged, the money supply will be lower, and income will be higher.
E) net exports will remain unchanged, but the money supply and income will both be higher.

9. If Trump follows through on his threats to impose a 25% tariff to all imports from China, which one of the following would best describe its impact on the U.S. economy?

A) Exports would increase while imports would fall.
B) The current account deficit would be significantly reduced.
C) The rate of inflation would increase.
D) Real wages would rise.
E) All of the above are correct.

10. Late last year, President Trump signed into law a $1.5 trillion tax overhaul, reducing corporate and income taxes for the rich. Which of the following has materialized since the tax cuts?

A) Most large companies have increased employment.
B) Payouts to shareholders have risen significantly.
C) Real wages have increased considerably.
D) Most companies have changed their investment decisions.
E) All of the above are true.

PART II (10 points)

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

$C = 140 + 0.8YD$	$X = 250 + 200e$
$I = 200 - 20i + 0.1Y$	$Q = 400 - 100e + 0.1Y$
$G = 300$	$L = 0.2Y - 10i$
$TA = 0.25Y$	$i^* = 10$
$TR = 50$	$P = P^f = 1$

NOTE: <u>Although not needed</u>, you might find it helpful to draw a diagram when answering the following questions.

a) What is the equilibrium value of Y when the exchange rate is fixed at $e = 0.9$ and the economy achieves external balance? **(1 point)**

$AE = C + I + G + NX$

$= (140 + 0.8YD) + (200 - 20i + 0.1Y) + 300 + (250 + 200e) - (400 - 100e + 0.1Y)$

$= 490 + 300e + 0.8YD - 20i$

where $YD = Y - 0.25Y + 50 = 50 + 0.75Y$

$= 490 + 300e + 0.8\,(50 + 0.75\,Y) - 20i$

$= 530 + 300e + 0.6Y - 20i$

In equilibrium, $Y = AE$:

$Y = 530 + 300e + 0.6Y - 20i \rightarrow 20i = 530 + 300e - 0.4Y$.

And solving for i we obtain the equation for the *IS* curve:

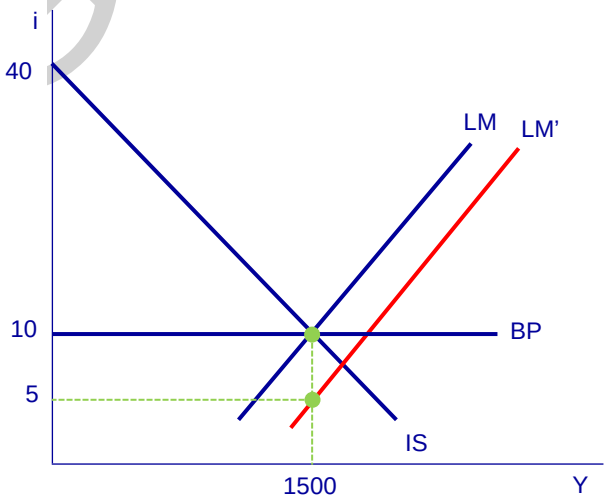
$i = 26.5 + 15e - 0.02Y$.

And if e = 0.9, then the equation for the *IS* curve is:

$i = 26.5 + 15\,(0.9) - 0.02Y = 26.5 + 13.5 - 0.02Y = 40 - 0.02Y$.

If the economy has achieved external balance, then $i = i^* = 10$ and equilibrium Y is:

$10 = 40 - 0.02Y \rightarrow 0.02Y = 40 - 10 = 30 \rightarrow Y = 30/0.02 = 1500$



b) What are the balances in the current account and the capital account in the equilibrium of part a)? **(2 points)**

If $e = 0.9$ and $Y = 1500$, then the balance in the current account is:

$NX = (250 + 200e) - (400 - 100e + 0.1Y)$

$= -150 + 300e - 0.1Y$

$= -150 + 300\,(0.9) - 0.1\,(1500)$

$= -150 + 270 - 150$

$= -30$.

Therefore, since $BP + NX = 0$, then the balance in the capital account is: $CF = 30$.

c) What is the size of the real money supply in the equilibrium of part a)? **(1 point)** What is the equation for the *LM* curve? **(1 point)** (*Note: The size of the money supply is expressed in billions of dollars.*)

Since the money market is in equilibrium, the real supply of money is equal to the real demand for money. And at $i = 10$ and $Y = 1500$, the real demand for money is:

$L = 0.2Y - 10i = 0.2\,(1500) - 10\,(10) = 300 - 100 = 200$.

Therefore, the real money supply is $200 billion.

To find the equation for the LM curve we must equate the real demand and the real supply of money:

$0.2Y - 10i = 200 \rightarrow 10i = -200 + 0.2Y \rightarrow i = -20 + 0.02Y$

d) Suppose now that, through an open market operation, the central bank increases the supply of money by \$50 billion. What would be the new rate of interest in the very short run (i.e., before any change in Y could occur)? **(1 point)** What would be the very-short-run impact on the balance of payments (i.e., in both the current and capital accounts)? Briefly explain. **(1 point)**

If the real supply of money increases by \$50 billion, then the equation for the *LM* curve becomes:

$$0.2Y - 10i = 250 \rightarrow 10i = -250 + 0.2Y \rightarrow i = -25 + 0.02Y$$

And thus at $Y = 1500$, the rate of interest is:

$$i = -25 + 0.02\,(1500) = -25 + 30 = 5$$

On the one hand, the balance of the current account doesn't change when the rate of interest changes, i.e., it remains unchanged at $NX = -30$. On the other hand, the balance of the capital account deteriorates when the rate of interest falls, i.e., $CF < 30$. Therefore, the balance of payments would show now a deficit, i.e., $BP < 0$ in the very short run.

e) What would be the equilibrium values of Y and i in the short run? **(1 point)** And the balances in the current and capital accounts? **(1 point)** What is the level of money supply in the new equilibrium? **(1 point)** (*Note: Provide a numerical answers and briefly explain the economics.*)

Since $BP < 0$ after the decrease in i, an excess demand for foreign currency would arise in the exchange market. Since the central bank wants to keep the value of the exchange rate at $e = 0.9$, it will have to sell foreign currency in the exchange market and the domestic money supply will decrease (and the rate of interest will rise). As the rate of interest rises, the balance in the capital account improves and the deficit in the balance of payments decreases. This process will continue as long as the domestic rate of interest is lower than the international rate, i.e., as long as $BP < 0$.

In the new equilibrium, the domestic rate of interest is once again equal to the international rate, i.e., $i = i^* = 10$. The level of income remains at the same equilibrium, i.e., $Y = 1500$. Therefore, the balances in the current and capital accounts are also once again equal to the initial equilibrium, i.e., $NX = -30$ and $CF = 30$. And the money supply decreases until it also becomes equal to its size in the initial equilibrium, i.e., $M = 200$.

This shows that monetary policy is completely ineffective when the exchange rate is fixed.

PART III (30 points)

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

1. Describe the main characteristics that differentiate a "balance-sheet recession" from a more "typical" recession. Comment on the relative effectiveness of expansionary monetary and fiscal policy during balance-sheet recessions.

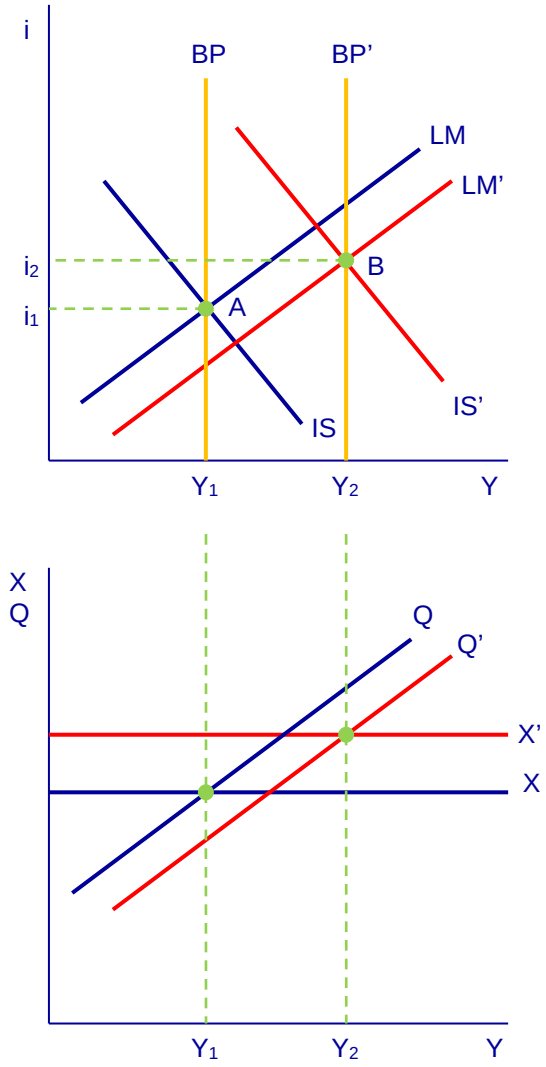
What are the causes of a "typical" recession and of a "balance-sheet" recession? A "typical" recession usually arises as a result of: (1) the central bank implementing contractionary monetary policy to reduce inflationary pressure in the economy (and, most particularly, to reduce the public's expectations 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 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 typical recessions, expansionary monetary policy might be quite effective in restoring household consumption expenditure to pre-recession levels—and particularly so when the recession is "created" by the central bank itself in an attempt to curb inflation. Combining expansionary monetary policy with expansionary fiscal policy might further accelerate the recovery by helping to restore the business sector's confidence to boost private expenditure. In the case of balance-sheet recessions, 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 "typical" liquidity trap arises. Moreover, private banks might also be unwilling to increase lending due to higher risks of default and to the fact they are also deleveraging.

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: 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 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 for households and businesses to start spending once again.

What is the most effective composition of 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 businesses might use the additional disposable income to pay off debts rather than to increase expenditure.

2. Assuming fixed exchange rates and no capital mobility, explain the impact of a devaluation of the domestic currency. In your answer, clearly indicate the effect on the equilibrium income, the equilibrium rate of interest, and the balance of the current account. **(Show your answer with the help of *IS-LM-BP* and *X-Q* diagrams and explain the economics. Assume external balance and a recessionary gap at the initial equilibrium.)**



Since there is no capital mobility, the balance of payments is equal to the balance in the current account only—where the balance in the current account is equal to net exports (*NX*). Therefore, the *BP* curve is vertical at the level of *Y* at which *NX* = 0. As shown in the diagram, the economy is initially in equilibrium at point *A*, and at Y_1 there is also external balance in the economy.

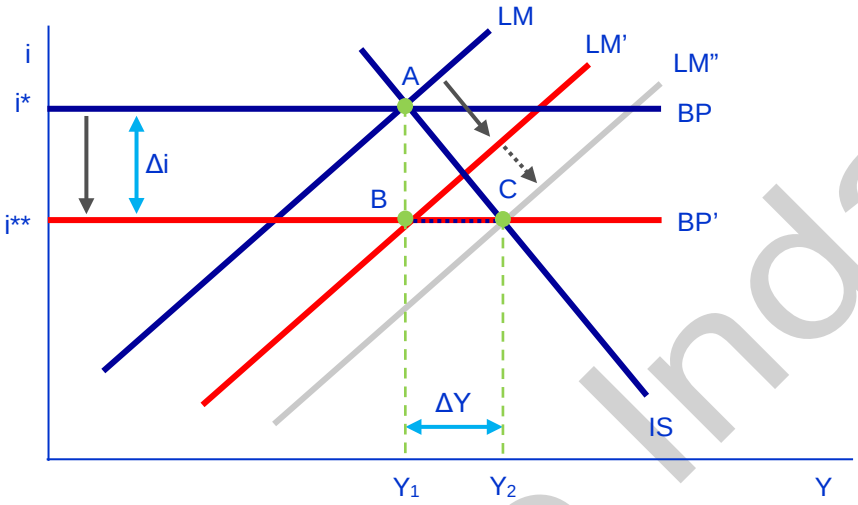
A devaluation of the domestic currency increases the degree of competitiveness of domestic goods in the international market and thus *NX* increases at each level of *Y*. Graphically, the *X* curve shifts up to *X'* and the *Q* curve shifts down to *Q'*. As shown in the lower diagram, external balance is now achieved at a higher level of output (Y_2), and thus the *BP* curve shifts rightward to *BP'*. In addition, the increase in *NX* creates a situation of excess demand in the goods market. Indeed, graphically, the increase in *NX* increases overall *AE* and thus the *IS* curve shifts up to the right to *IS'*. At point *A* now there is equilibrium in the money market but excess demand in the goods market and a surplus in the external sector.

To prevent the exchange rate from depreciating as a result of the excess supply in the exchange market, the central bank buys foreign currency and the money supply increases. Graphically, this causes the *LM* curve to shift to the right—and this process continues until the *LM* curve shifts all the way to *LM'*. Note that as *Y* increases to eliminate the excess demand in the goods market, imports also increase and the surplus in the external sector is reduced and finally eliminated at Y_2.

Therefore, as a result of the devaluation of the domestic currency, the level of *Y* increases. The balance in the current account initially moves into a surplus position but eventually moves back to a situation of equilibrium (although at higher levels of both *X* and *Q*).

With respect to the impact of the devaluation on the rate of interest, the results are ambiguous: it could end up with a higher level (as shown in the diagram) or a lower one depending on the relative sizes of the increase in the money supply and the income sensitivity of the demand for real balances.

3. Critically evaluate the following statement: *"A decrease in the international rate of interest will cause equilibrium income to rise, the equilibrium rate of interest to fall, the balance in the current account to deteriorate, and the balance in the capital account to improve."* (**Show your answer with the help of an *IS-LM-BP* diagram and explain the economics. Consider an open economy with a fixed price level, fixed exchange rates, and perfect capital mobility. Assume external balance and a recessionary gap at the initial equilibrium.)**



The economy is initially in equilibrium at point *A* (see diagram). The drop in *i** leaves the balance in the current account unchanged but causes the balance in the capital account to improve. Therefore, at point *A* there is now a surplus in the external sector, i.e., *BP* > 0. Note that for the external sector to remain in equilibrium (i.e., *BP* = 0), *i* must decrease by the same amount as *i** did (so the rate differential would remain constant and the balance in the capital account unchanged). Therefore, the drop in *i** causes the *BP* curve to shift down to *BP'*.

But the economy is still at point *A* and thus *BP* > 0 due to the improvement in the capital account. Therefore, there is now an excess supply of foreign currency in the exchange market and thus *e* would depreciate (and the country would lose competitiveness) if its determination were to be left up to the market. Since the central bank wants to keep *e* unchanged at the set level, the central bank buys foreign currency (thus increasing its reserves).

As the central bank purchases foreign currency, the money supply increases and the *LM* curve shifts down to *LM'* (and the domestic rate of interest falls to *i***). The economy is now at point *B*: the money market and the external sector are both in equilibrium but there is an excess demand in the goods market (i.e., desired investment increased due to the decrease in *i*) and *Y* starts to increase. As *Y* increases, the demand for money rises and *i* increases (i.e., graphically, the economy starts moving up along the *LM'* curve). As the rate of interest increases along the *LM'* curve, a surplus arises in the external sector and the central bank again buys foreign currency. Therefore the money supply increases and the *LM'* curve shifts down. This process continues as long as an excess demand remains in the goods market and *Y* keeps increasing. At the end of the process of adjustment the *LM'* curve shifts all the way to LM" (see diagram) and equilibrium *Y* is reached at point *C*. At point *C* the money market, the external sector, and the goods market are all in equilibrium. Note that the adjustment path is along the *BP'* curve: the economy being at all times at a point of intersection between the *BP'* curve and the moving *LM'* curve until the excess demand in the goods market is eliminated.

The statement is thus correct: as a result of the decrease in *i**, *Y* increases and *i* falls while the balance in the current account deteriorates (because *Q* increases as *Y* rises) and the balance in the capital account improves (because at point *C*, *BP* = 0 while the balance in the current account deteriorated).