ECON 222: ASSIGNMENT 4

(Due on March 27, 2009)

The IS-LM-FE model

To do this and the following question you will need to be familiar with the workings of the macro model as described in Chapter 9 as well as some of the policy implications.

Question 1 (25 marks):

Suppose that the economy is closed and that it can be described by the following set of equations for desired consumption (C^d), investment (I^d) and money demand (M^d):

$$C^d = 180 + 0.7(Y - T) - 150r \qquad \text{Eq. 1}$$

$$I^d = 150 - 50r \qquad \text{Eq. 2}$$

$$M^d = P[0.6Y - 200(r + \pi^e)] \qquad \text{Eq. 3}$$

In the above, Y is real output and r is the real interest rates. T, the level of taxation, is set at 200; G government spending, is 250; M, the supply of money, is fixed and is equal to M^d, the demand for money; and expected inflation, π^e, is equal to 0.02.

a) From the above information, derive the IS curve for this economy in terms of r as a function of Y, the LM curve in terms r as a function of Y and M/P. Also derive the aggregate demand curve in terms of Y and M/P. For each curve be sure to show and explain your steps. (**10 marks**)
b) Now suppose that the money supply is set at 1260 and that the price level (P) equals 1.5. From your model, find the real interest rate and the level of output that is consistent with equilibrium in the market for goods and services and for money. Illustrate your results graphically. As well, calculate consumption and investment and verify that the components of aggregate demand add up to your calculation of real output. (**5 marks**)
c) Suppose that the full-employment level of output ($\overline{Y}$) in this economy has changed to 1440 due to a productivity shock. Is the

shock positive or negative, assuming that the level of output derived in (b) above was the initial full employment value? Show your results graphically. What will be the new long-run equilibrium value of r and how will equilibrium come about? What is the new price level? (**5 marks**)

d) Suppose that the central bank did not want to let the price level change as a result of this shock, by how much would the money supply have to change to insure a constant price level? (**5 marks**)

Question 2 (25 marks):

Suppose that the economy is characterised as in question 1 above with full employment output as calculated in part (b) before the productivity shock and that there is a negative demand shock in the form of a fall in both consumer and business confidence. This can be represented by declines in the constant terms of the C^d and I^d equations to 175 and 147 respectively.

a) Derive the new IS curve and AD curve. Calculate the new short-run level of output and the real interest rate assuming that the money supply is 1260 and the price level is 1.5? Using the diagrams in the text show where the IS and LM curves intersect and compare that with the full-employment curve. By how much has output fallen compared to its full-employment level (FE)? (**10 marks**)

b) If the government and the central bank did nothing, would the economy move back to equilibrium? Describe how would this adjustment would occur and what variable in the model would change? (**5 marks**)

c) Suppose now that the Bank of Canada decides to offset the effects of the output short fall. By how much would the money supply have to be increased to achieve this? What are the implications for the interest rate? Show your results graphically. (**5 marks**)

d) If the fiscal authorities decided to act instead, by how much would G have to rise? Equivalently, suppose that the government decide to rely solely on tax cuts, by how much would T have to fall in order to get the economy back to full employment? What are the implications for interest rates? Show your results graphically. In the case of each fiscal policy instrument, calculate the budgetary implications. (**5 marks**)

The IS-LM-FE model, the open economy version

This and the following question will require knowledge of Chapter 10 and the policy implications that follow from the fact that the economy is open to world markets.

Question 3 (25 marks)

Assume that the economy is the same as describe in Question 1 above, except that it is open to trade. This requires the addition of two equations, one for net exports (NX) and one for the real exchange rate (e), which is assumed to be market determined for the moment.

$NX = 150 - 0.1Y - 0.5e$ Eq. 4

$e = 20 + 400r$ Eq. 5

a) Starting with the model in Question 1 (equations 1 to 3), use the additional equations (4 and 5) to derive the new IS curve for the economy, explaining the steps that you take. Using the same money supply and the price level as in Question 1 above (1260 and 1.5, respectively), solve for equilibrium values of Y, r, NX and e. If the price level in the foreign country is unity, what is the level of the nominal exchange rate (e_{nom}) in new equilibrium? (**10 marks**)

b) Assuming flexible exchange rates, suppose now that the domestic real interest rate (r) found in part (a) of this question is the long-run equilibrium rate, to which the economy must return after a shock. From this point, assume that the central bank increases the money supply to 1269. Find the short-run equilibrium values of Y, NX, e and e_{nom}. By how much have net exports changed from their initial position. Be sure to describe the processes at work and show your analysis graphically. Finally, assume that the original equilibrium was the level of output calculated in part (a) of this question, and that it represented full employment. Describe how

the economy will move back to that point. What will be the final values of Y, r, P, e and e_{nom}? (**15 marks**)

Question 4 (25 marks)

Suppose the exchange rate is now fixed at the nominal value determined in part (a) of Question 3 as is the price level at P = 1.5.

a) Show how this change would affect the equations for the IS and LM curves. Describe, using the diagrams in the text, how an increase in the money supply would affect the economy (note, no calculations are required). (**5 marks**)
b) Now suppose that the government increases spending by 10 to 260. Describe, using the diagrams, how the short-run equilibrium is obtained and calculate the values of Y, r and M at that point. Finally describe how long-run equilibrium is attained assuming that the equilibrium level of output was as derived in part (a) of Question 3. What happens to net exports and why? (**15 marks)**
c) Suppose that you are given the following information about investment opportunities between Canada and the euro area over a one year period, where "I" is the nominal rate of interest in each country and "e_{nom}" is the nominal exchange rate as of today:

   $i^{euro} = 0.03$
   $i^{can} = 0.032$
   $e_{nom} = €/\$ = 0.65$

   How would you go about deciding whether to invest in Canada or the euro area? If you decided to invest in euro denominated bonds, what level of the exchange rate one year from now would insure that you were indifferent between investing in either economy? In terms of the euro, is the Canadian dollar expected to depreciated or appreciates? Suppose now that the forward exchange rate was 0.66, what would happen? Show how you arrive at your answer. (**5 marks**)