Economics 2103A **Intermediate Macroeconomics II**
Midterm Exam **February 27th 2012**

This exam consists of 2 sections. Answer 4 of the 5 questions in section A and 3 of the 4 questions in section B. Within each section all questions have equal weight. You have 120 minutes to complete this test. Write your student number on the front page of the answer booklet. You may use a non-programmable calculator. Please write in non-erasable ink.

SECTION A (32 marks): Answer 4 Questions

Answer whether the statement is true, false or uncertain. In each case you should explain your answer very carefully. Answers that are not accompanied by an explanation automatically receive a mark of zero. You may find it helpful to use diagrams.

1. If investment becomes more responsive to changes in the interest rate then the short-run effects of a monetary expansion will be greater.

2. Suppose that the cost of printing new menus falls due to the introduction of word processing and low cost printers. An implication of this from the sticky price model is that the short-run aggregate supply curve will become flatter.

3. The increase in the natural rate of unemployment between the 1960s and 1980s can be explained by the increased labor force participation of women and teenagers.

4. Suppose I live for two periods receiving income $y_1 = 100$ in period one and $y_2 = 50$ in period two. Perfect consumption smoothing implies I set $c_1 = c_2 = 75$.

5. One way for the Bank of Canada to increase the money supply is to sell Government of Canada Treasury Bills.

SECTION B (60 marks): Answer 3 Questions

1. This question uses the $IS - LM$ model to consider the implications of using monetary policy to offset declines in household consumption caused by the recent financial crisis. Assume that Canada is a closed economy and that consumption and investment are given by:

$$C = 100 + 0.8Y - 400r \quad (1)$$
$$I = 200 - 600r, \quad (2)$$

where Y is real output and r is the real interest rate. Government spending and taxation are both equal to zero. Money demand is given by:

$$M^d = P(0.8Y - 500(r + \pi^e)). \quad (3)$$

Suppose $\pi^e = 0$, $\overline{Y} = 1000$ and the nominal money supply is $M = 750$.

(a) Derive the IS and LM curves and solve for the *long-run* equilibrium values of Y, C, I, r and P. [8 MARKS]

(b) Suppose that the financial crisis means that firms and consumers find it harder to get access to credit. Consumption and investment are now given by:

$$C(r) = 80 + 0.8Y - 400r \quad (4)$$
$$I(r) = 150 - 600r, \quad (5)$$

Find the new *short-run* values of Y, C, I, r and P. Illustrate your answer with an $IS - LM$ diagram. [6 MARKS]

(c) What would the Bank of Canada have to set the money supply at in order to offset the effects of the financial crisis and keep output at its natural rate in the short-run? Illustrate your answer with an $IS - LM$ diagram. [6 MARKS]

2. This question studies the sticky wage model. Assume that the production function in Canada is given by $Y = 50L^{0.5}$ and the target real wage is $\omega = 1$.

(a) Derive the aggregate supply curve as a function of the price level and the expected price level. [6 MARKS]

(b) Assume that velocity is constant at $V = 1$ and use the quantity equation to derive the aggregate demand curve for $M = 1000$. Solve for equilibrium price level and output if $P^e = 0.8$. [4 MARKS]

(c) Now suppose that an unanticipated monetary contraction reduces M to $M = 900$. Solve for the new equilibrium values of Y and P and carefully explain the intuition behind your answer. You should illustrate your answer with a diagram. What is employment in the short-run? [10 MARKS]

3. Consider an economy where inflation and unemployment are determined by the following equations:

$$\begin{aligned} \pi_t &= \pi_t^e - (u - \overline{u}) \\ \pi_t^e &= \pi_{t-1} \\ \overline{u}_t &= 0.5u_{t-1} + 0.5\overline{u}_{t-1} \end{aligned}$$

Suppose that $\pi_0 = 0.08$ and $u_0 = \overline{u}_0 = 0.06$. A new central bank governor decides that inflation is too high and must be reduced to a target of $\pi = 0.02$.

(a) If the central bank tries to reach its new target in one year (i.e. $\pi_1 = 0.02$), what will be unemployment in year one and year two? [4 MARKS]

(b) If the central bank aims to reach its new inflation target in two years by setting $\pi_1 = 0.05$ and $\pi_2 = 0.02$ what will be unemployment in year one and year two? [4 MARKS]

(c) Now suppose the central bank is able to send an informative signal of current inflation to the public. This has the result that inflationary expectations are now given by:

$$\pi_t^e = 0.5\pi_t + 0.5\pi_{t-1}$$

Solve for u_1 and u_2 if the central bank uses the one year approach to reducing inflation. Is this signal good for the economy? [6 MARKS]

(d) Now suppose that the public are unsure about the signal that is sent by the central bank. This means that the signal contains an error and so:

$$\pi_t^e = 0.5\pi_t + 0.5\pi_{t-1} + x$$

where x is the signal error. If the central bank cares only about u_1 how small must the signal error be for the central bank to still use the signal when undertaking the two year approach to reducing inflation? [6 MARKS]

4. Suppose Henrik's life is divided into two period. He exploits his athletic talents by working in period 1 and earns income $y_1 = 5500$ and pays tax $t_1 = 2000$. In period 2, Henrik hangs up his skates, receives income $y_2 = 1500$ from media appearances and pays tax $t_2 = 400$. Henrik wishes to smooth consumption over the two periods, so that $c_1 = c_2 = c^\star$. The real interest rate is $r = 0.02$.

(a) Write out Henrik's intertemporal budget constraint. [4 MARKS]

(b) What is the highest feasible amount of consumption in each period? Use this information to graph the budget line. [4 MARKS]

(c) Find the optimal consumption in each period, and the amount of saving/borrowing. Is Henrik a borrower or a lender? Plot the optimal consumption point along with the budget line and the original no-borrowing, no-lending point on the graph.[4 MARKS]

(d) The Bank of Canada is worried about inflation so they raise the real interest rate to $r = 0.08$. Find the new optimal consumption and savings plan, and graphically show the effects of this policy change. Comparing this answer with the answer to part (b), carefully explain which effect is stronger for Henrik, the substitution effect or the income effect? [8 MARKS]