QUEEN'S UNIVERSITY AT KINGSTON

FACULTY OF ARTS AND SCIENCE

DEPARTMENT OF ECONOMICS

ECON 222 FINAL EXAMINATION

April 2005

Instructors:

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Section B
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Instructions:

This examination is THREE HOURS in length.

You may use a hand calculator.

Answer 8 of the 10 questions in Part A. Each question
in Part A is worth 5 marks, for a total of 40 marks.

Answer 3 of the 5 questions in Part B. Each question
in Part B is worth 20 marks, for a total of 60 marks.

The total number of marks is 100.

For questions that involve a numerical part be sure
to show your calculations and intermediate steps.

Read the questions carefully.

If the instructor is unavailable in the examination room and if doubt exists as to the
interpretation of any question, the candidate is urge to submit with the answer
paper a clear statement of any assumptions made.

PART A: Answer 8 of the 10 following questions. Each question is worth 5 marks.

1. Consider a typical money demand function: $M^d/P = L(Y, i)$. Use a diagram to show the effect of a decrease in inflation volatility on the real interest rate.

2. In a closed economy, what is the effect of an increase in lump-sum taxes on the equilibrium real interest rate?

3. Consider the introduction of more severe environmental laws in Canada (maybe due to the application of the Kyoto protocol). What will be the impact on the production function? Will there be consequences for the equilibrium employment level and the real wage?

4. With an ever accelerating money supply growth, the central bank will be able to maintain the unemployment rate permanently lower than the natural rate. Assess this claim using an expectations-augmented Phillips curve diagram.

5. The government wants to eliminate taxes on wage income. What will be the consequences of this policy in the short-run? What will happen in the long-run? Analyze using an $IS - LM - FE$ diagram.

6. The European Economic Union and the U.S.A. can be considered as two large open economies. If the American government decreases the effective tax rate on capital, what will be the effect on European savings and investment?

7. Consider a standard growth model with savings rate s, depreciation rate d, population growth rate n and production function $y_t = k_t^{0.5}$. Is $k = 0$ is a steady-state capital-labour ratio? Explain.

8. Business cycle data indicates that money growth is a procyclical and leading variable while inflation is a procyclical and lagging variable. Can a monetary expansion in the $IS - LM - FE$ model account for these observations? Explain.

9. The United States is a large open economy with flexible exchange rates. Is a monetary expansion in the U.S. more likely or less likely to have a negative effect on output in Canada if the IS curve in the U.S. is elastic (i.e., relatively flat)?

10. If people's expectations of inflation are myopic (i.e., $\pi_{t+1}^e = \pi_t$), then it is better for the money supply to be governed by a rule rather than by discretion. Discuss.

PART B: Answer 3 of the 5 following questions. Each question is worth 20 marks.

1. The money demand function for Uruguay is given by:

$$\frac{M^d}{P} = \sigma \frac{\sqrt{Y}}{\sqrt{10i}}$$

where σ is a measure of volatility for non-monetary assets. For this question assume that $Y = 100$, $i = 0.064$ and $P = 4$. If necessary, express your answer as a function of σ.

(a) What is (i) nominal money demand and (ii) real money demand?

(b) If the money market is in equilibrium, what is the velocity of money?

(c) What is the income elasticity of real money demand in Uruguay?

(d) Over the course of a year the $\Delta^\% \sigma = -1\%$, the $\Delta^\% Y = 4\%$ and both the nominal interest rate and the money stock were unchanged. What was the inflation rate?

(e) Given your answer in part (d), what was the growth rate of velocity?

2. Ecuador's economy can be described by the equations:

$$\begin{aligned}
\pi_t &= \pi_t^e - 2(u_t - \bar{u}_t) \\
\pi_t^e &= \pi_{t-1} \\
\frac{\bar{Y}_t - Y_t}{\bar{Y}_t} &= 2(u_t - \bar{u}_t) \qquad \text{Okun's Law}
\end{aligned}$$

You have the following data: $\pi_0 = 0.04$, $\pi_1 = 0.04$, $\frac{\bar{Y}_2 - Y_2}{\bar{Y}_2} = 0.04$ and $\frac{\bar{Y}_3 - Y_3}{\bar{Y}_3} = 0.02$. The unemployment rates were $u_1 = 0.06$, $u_2 = 0.08$ and $u_3 = 0.08$.

(a) What were π_2 and $\bar{u}_2$?

(b) What were π_3 and $\bar{u}_3$?

(c) Use a Phillips curve diagram to explain what changed between period 2 and period 3. What theory explains the behavior of the natural rate of unemployment?

(d) What is the sacrifice ratio for this economy?

3. Consider the following closed economy $IS - LM - FE$ model where the IS curve is given by $r = 25 - 0.25Y$, the LM curve is given by $M/P = Y - 2r$ and the FE curve is given by $\bar{Y} = 40$.

(a) If the price level $P = 1$, solve for the equilibrium values of Y, r and M.

(b) Suppose that the central bank has two possible actions. It can either increase the money supply M by 30% or leave it at its current level. In the same way, firms in the economy have two possible actions. They can either increase their prices (and hence the price level P) by 30% to 1.3 or they can leave prices at their current levels ($P = 1$). Note that there are **four** possible combinations of actions. Find the equilibrium level of output for each of the four cases.

(c) If the payoff function of the central bank is given by $Y - \bar{Y}$ and the payoff function of firms in the economy is given by P, determine which of the above actions the central bank will take and which of the above actions firms will take.

(d) Using an appropriate diagram (or set of diagrams), describe how the central bank's payoffs would change relative to part (c) if the investment curve in the goods market were perfectly elastic (ie, horizontal.) Note that you do not need to calculate exact numbers, just indicate the direction of changes.

4. Consider an economy with a production function given by $Y = AK^{0.5}N^{0.5}$, with $A = 10$. Suppose further that there are 400 potential workers in the economy. 100 of these workers will work for any wage w, but the other 300 will only work for a wage $w \geq 5$. (Hint: you may want to use a diagram to help you answer these questions.)

(a) Find the minimum level of capital stock K such that all 400 workers will be employed.

(b) Suppose that $K = 576$. Find the equilibrium wage and the equilibrium level of employment.

(c) Now suppose that $K = 64$. Find the equilibrium wage and the equilibrium level of employment.

(d) Finally, suppose that $K = 256$. Find the equilibrium wage and the equilibrium level of employment.

5. Suppose that the Canadian economy can be represented by the following equations:

$$C^d = 60 + 0.8(Y - T)$$

$$I^d = 180 - 20r$$

$$G = 100$$

$$NX = 20 - 0.2Y + 0.25Y_{us} - 20e$$

$$e = 2(r - r_{us})$$

$$\frac{M}{P} = Y - 100(r + \pi^e)$$

Assume that the Canadian government is running a balanced budget, the current price level is 1.5 and $\pi^e = 0$. Assume further that $Y_{us} = 1600$ and $r_{us} = 2$.

(a) Assume that the Canadian economy is currently in a long-run equilibrium where $\bar{Y} = 1000$. Find r, NX, e and M.

(b) Trade disputes between Canada and the U.S. (over softwood lumber, Canadian beef exports etc.) cause net exports to fall to $NX = -40 - 0.2Y + 0.25Y_{us} - 20e$. Find the new (short-run) equilibrium values of Y and r in Canada.

(c) Policy makers in Canada respond to the trade disputes by inflating the money supply in order to restore Y to its full employment $\bar{Y}$. By how much does the money supply have to rise?

(d) Instead of inflating the money supply to restore Y to its original level (as in part (c)), policy makers instead choose to inflate the money supply until NX is restored to its original level in part (a). By how much does the money supply have to rise?