Queen's University
Department of Economics
Economics 222 A and B
Midterm Examination
25 October 2005

Please read all the questions carefully. Record your responses in the answer booklet provided. You are encouraged to draw diagrams to support your answers. Please label the axes and lines or curves on your diagrams. The exam has two parts.

Part I consists of short questions. Do **any five** of the nine questions. Each question is worth 10 marks for a total of 50 marks.

Part II consists of long questions. Do **any two** of the three questions. Each question is worth 25 marks for a total of 50 marks.

The exam is 120 minutes long. Upon completion of your exam, hand in only the answer booklet clearly labelled with your name, student number, and class section (A/Smith or B/Paterson). Keep the question paper for future reference.

Please do not write on the first page of an examination booklet. Start each answer on a new page. Use the back of a page only for rough work.

Part I

Answer **any 5** of the following 9 questions. Each question is worth 10 marks for a total of 50. Answers without any explanations will receive zero marks. Where possible, illustrate your answer with a diagram.

1. Some analysts predict a sharp drop in the prices of houses in the U.S.. According to economic theory, what would be the effect on labour supply and real wages?

2. The unemployment rate is higher in Canada than in the U.S. Does that imply that Canada has a lower employment ratio?

3. The nominal interest rate is 5%, the expected inflation rate is 2%. Nominal interest income is taxable at a rate of 25%. What is the after-tax, expected real rate of interest?

4. Suppose that the Japanese government sharply reduces its spending, to try to reduce its budget deficit. What are the predicted effects on its current account balance, the U.S. current account balance, and the world real interest rate?

5. What does growth accounting tell us about the east Asian growth 'miracle'?

6. Imagine that the U.S. federal government tries to reduce its budget deficit. It raises the general level of taxes, with no planned changes in government spending. What will be the effects on private saving and on the U.S. current account deficit?

7. Imagine that we study the levels of GDP per capita in a cross-section of countries. What does the growth model predict about how these levels should be related to population growth rates?

8. Use a diagram to illustrate the impact of an increase in the price of oil on wages and employment in Europe, an oil-importing region.

9. Statistical evidence suggests that investment spending is negatively related to the real interest rate. What behaviour by firms could explain this evidence?

Part II

Answer **any two** of the three questions. Each question is worth 25 marks for a total of 50 marks.

1. The world interest rate is $r^w = 5\%$. (Use this in percentage points, as 5 not 0.05.) Suppose that a small, open economy has the following saving and investment behaviour:

$$S = 80 + 5r - 0.5G$$
$$I = 100 - 4r$$

(a) Suppose that $G = 80$. Solve for the current account balance.

(b) As a condition of lending to this country's government, the IMF requires that it reduces its government spending. What value of G would eliminate the current account deficit?

(c) Suppose that the country declines to take this advice. The capital inflow ceases and the country becomes closed to international borrowing and lending. With its original level of government spending, now find its interest rate and level of investment.

(d) Illustrate outcomes (a), (b), and (c) in a single diagram.

2. This question studies how labour-market institutions affect the outcome when the demand for unskilled labour falls. Suppose that we focus on the market for relatively unskilled labour, where the supply of labour is:

$$N^S = 9w^2,$$

and w is the real wage. The production function is:

$$Y = AN^{\frac{1}{2}}.$$

(a) Find the labour demand curve.

(b) Suppose that $A = 10$. Solve for employment and the real wage.

(c) Suppose that A falls to a new value of 8. Imagine we are in an economy – like the U.S. – where wages are flexible. Find the predicted effects on the real wage and employment.

(d) Again consider the fall to $A = 8$, but in a Keynesian economy – perhaps like France – in which real wages are completely inflexible. Find the predicted effects on the wages and employment of the unskilled workers.

3. This question uses the growth model to predict what happens to an economy if its savings rate suddenly drops. Suppose the production function is:

$$Y = K^{\frac{1}{2}} N^{\frac{1}{2}}.$$

The fundamental equation of the growth model is:

$$k_{t+1} = \frac{(1-d)}{1+n} k_t + \frac{s}{1+n} k_t^{\frac{1}{2}},$$

where k is the capital-labour ratio. The depreciation rate is $d = 0.10$ and the population growth rate is $n = 0.03$.

(a) If the saving rate is 0.25, then what is the value of k^*?

(b) At that value of k^*, find consumption c^*.

(c) The saving rate falls to $s = 0.20$. It seems that this drop would lead to higher consumption, but to see if this can persist we need to find the new value of output or income per capita. Find the new value of c^*.

Part I Answers

The following are very brief solutions to part I of the midterm. In order to get full marks all diagrams must have been included and labelled. Additionally, all movements in the market must be fully explained.

1. The fall in house prices is an example of a fall in wealth. Lower wealth tends to raise labour supply, which would tend to lower the average real wage.

2. No. The unemployment rate is $U/(U+E)$ while the employment ratio is $E/(U+E+N)$. If Canada had a higher participation rate than the US, then it could have a higher unemployment rate and a higher employment ratio. A numerical example also would make this point.

3. The after-tax, expected real interest rate would be $r_{at} = i(1-t)-\pi^e = 5(1-0.25)-2 = 1.75$ percent.

4. A fall in G leads to a rise in Japanese national saving. Japan is a large open economy. The Japanese current account balance rises, the US current account balance falls, and the world interest rate falls.

5. Growth accounting tells us that rapid growth in output was mainly due to growth in factor inputs (capital and labour) rather than growth in TFP. In turn, that implies that it cannot be sustained indefinitely. An increase in the savings rate or in female labour force participation lead to growth but not ongoing growth.

6. Under Ricardian equivalence, a tax increase that raises government saving will be offset by a decrease in private saving, so that national saving and the current account are unaffected. But if, instead, households are myopic, then they will also reduce consumption (and not reduce saving as much) so that national saving will rise and the current account deficit will fall.

7. The growth model predicts that countries with high population growth rates will have low levels of GDP per capita. We can illustrate this with the diagram for the growth model, as a large value of n makes the line $(n+d)k$ steep. But of course the rankings would depend on levels of s also.

8. I would use a labour supply-demand diagram. A rise in oil prices is like a drop in TFP, which lowers the MPN. Thus the labour demand curve shifts south-west. This tends to lower real wages and employment. Output falls because of the direct effect on TFP and the effect on employment.

9. There are two parts to the answer. First, use a diagram or formula to explain why the target capital stock depends on the user cost of capital. Second, show how to go from the target to the flow of investment.

Part II Answers

1. (a) $CA = S - I = 65 - 80 = -15$

(b) $G = 50$

(c) $80 + 5r - 40 = 100 - 4r$ so $r = 6.67$ and $I = 73.34$.

(d) Include a diagram. In part (b) the saving curve shifts out. In part (c) the interest rate jumps up and investment is lower.

2. (a) The labour demand curve is:

$$w = \frac{A}{2} N^{-1/2}$$

(b) With $A = 10$ we have $N = 15$ and $w = 1.29$

(c) In the US we find $N = 12$ and $w = 1.154$.

(d) In France we stay at $w = 1.129$ and find employment from the new labour demand curve, as $N = 9.61$. Thus France experiences less wage inequality but higher unemployment.

3. (a)

$$(n + d)k = sk^{0/5},$$

so $k^* = 3.698$.

(b)

$$c = (1 - s)k^{0.5} = 0.75(3.698)^{0.5} = 1.442$$

(c) At the new value $s = 0.20$ we have $k^* = 2.366$ and $c^* = 0.80(2.366)^{0.5} = 1.230$. Thus the level of consumption per capita is lower.