

Queen's University
Department of Economics
Economics 222
Sections C and D
Midterm Examination
25 February 2004 6-8pm

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

Part A consists of true, false, uncertain questions. Marks will be awarded based on the logical arguments given to support your answers. Do **FOUR** of the six questions. Each question is worth 10 marks for a total of 40 marks.

Part B consists of long questions. Do **TWO** of the three questions. Each question is worth 30 marks for a total of 60 marks.

The exam is 120 minutes long. Budget your time carefully.

Hand calculators are permitted for this exam.

PART A – True, False, Uncertain

Answer any **FOUR** of the following six questions. Please explain whether they are true, false or uncertain. Each question is worth **10** marks for a total of **40** marks. *Answers without any explanations will receive **zero** marks.*

1. If the labour supply curve is downward sloping, it must be the case that the income effect dominates the substitution effect given a change in the real wage.
2. When trying to measure the total income of Canadians in a given time period, GDP is a better measure than GNP.
3. According to the growth model studied in class, sustained growth in output per worker can be achieved as a result of an increase in the savings rate.
4. If the tax rate, the interest rate, and the depreciation rate all diminish, then the tax-adjusted user cost of capital will decrease.
5. Consider the United States and the European Economic Union as two large open economies. If the U.S. has an initial current account deficit, a downward shift in I^{US} necessarily decreases S^{US} .
6. If net investment is negative, gross investment cannot be positive.

PART B – Long Questions

Answer any **TWO** of the following three questions. Each question is worth **30** marks for a total of **60** marks.

1. Consider an industry in the economy with an aggregate production function given by $Y = AK^{0.5}lN$. All workers in this industry are identical and are paid the same real wage w . Assume that $A = 50$ and $K = 100$.

- (a) What is the equation for labour demand N^d in this industry? (Hint: the derivative of $ln x$ is x^{-1} .)
- (b) If the labour supply curve is given by $N^s = 5w$, what is the equilibrium real wage $\bar{w}$ and equilibrium employment $\bar{N}$ in this industry?
- (c) Suppose that other industries in the economy begin to expand production and hire more workers. As a result labour supply in this industry falls so that $N^s = 1.25w$. What is the new equilibrium wage and employment in this industry?
- (d) Now suppose that the production function in this industry instead is given by $Y = A(K^{0.5} + N)$ where A and K have the same values as above. What is the equation for labour demand N^d in this case?
- (e) What happens to the equilibrium real wage in this case when the labour supply curve shifts from $N^s = 5w$ to $N^s = 1.25w$? How does this compare with your answer in part (c)? Draw the two labour demand curves (from parts (a) and (d)) and illustrate your answer.

2. Consider the economies of Canada and Panama, both of which have an aggregate production function of the form $Y_t = K_t^{0.5}N_t^{0.5}$ ($A = 1$ in both countries.) The depreciation rate d is equal to zero in both countries. Population in both countries grows according to the formula $N_{t+1} = (1 + n)N_t$.

- (a) Modify the form of the aggregate production function so that you can express output per worker y_t as a function of the capital-labour ratio k_t .

(b) The aggregate capital stock K_t in both countries is given by the law of motion $K_{t+1} = K_t + sY_t$. Solve for the law of motion for k_t by expressing k_{t+1} as a function of k_t , the savings rate s and the population growth rate n .

(c) Suppose that the population growth rate in Canada is $n_c = 0.01$ and the savings rate in Canada is $s_c = 0.2$. Solve for the steady state values of k_c^* and y_c^* .

(d) Canada's output per worker y_c^* is currently 5 times greater than Panama's output per worker y_p^* . If k_c^* and k_p^* are the capital-labour ratios in Canada and Panama, what is the value of the ratio k_c^*/k_p^* ?

(e) Suppose that the growth rate of population in Panama is $n_p = 0.01$. What must be the savings rate in Panama (denoted by s_p) to produce the steady state capital labour ratio k_p^* ?

3. Consider the country of Lesotho as initially being a closed economy. You have the following information:

$$C = 10 + 0.8(Y - T) - 100r$$

$$I = 30 - 300r$$

$$G = 10$$

$$T = 0$$

$$Y = 100$$

(a) What are the equilibrium values for C , I and r ?

(b) Suppose now that Lesotho becomes a small-open economy and that $r^w = 0.05$ (also assume that $NFP = 0$). What are the equilibrium values for C , I and CA ?

(c) The government is concerned about the current account value found in (b). How should the taxes be set to have $CA = 0$?