

Queen's University
Department of Economics
ECON 222
Macroeconomic Theory I
Winter Term 2010/11

Sections A and B
Midterm Examination
1st March 2011

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. Marks will be awarded also on the basis of the logical arguments given to support your answers.

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

Part B consists of short questions. Do **TWO** of the *three* questions. Each question is worth 20 marks for a total of 40 marks.

The exam is **90 minutes** long. Budget your time carefully. Hand calculators (non programmable) are permitted for this exam. Upon completion of your exam, hand in the answer booklet clearly labeled with your student number and class section as well as the exam. Any cheating attempt will be sanctioned with the toughest possible punishment.

PART A: Long Questions.

Answer any **TWO** of the following *three* questions. Each question is worth 30 marks for a total of 60 marks. *Answers without any explanations will receive zero marks.*

Question A.1: Equilibrium in the Labour Market (30 Marks)

Consider an economy in which the marginal product of labour (MPN) is $MPN = 25 - 0.5N$, where N is the amount of labour used. The amount of labour supplied, NS , is given by $NS = 28w$, where w is the real wage.

(a) What are the equilibrium values of employment and real wage?

(b) Now suppose that workers are not alike. We have skilled workers and unskilled workers. The marginal products of labour (MPN) for each group of workers is given by:

$$\begin{aligned} MPN_{sk} &= 22 - N_{sk} \\ MPN_{usk} &= 30 - N_{usk} \end{aligned}$$

where MPN_{sk} = marginal product of labour of skilled workers, MPN_{usk} = marginal product of labour of unskilled workers, N_{sk} = skilled labour and N_{usk} = unskilled labour. We also have a labour supply for each group:

$$\begin{aligned} NS_{sk} &= 10w_{sk} \\ NS_{usk} &= 19w_{usk} \end{aligned}$$

where w_{sk} = real wage of skilled workers, and w_{usk} = real wage of unskilled workers. Calculate the equilibrium real wage and full-employment level for each group of workers. Compare your answers with the one from part a).

(c) Supposed that a skill-biased technological change, such as the introduction of computers, raises the MPN of skilled workers (who can accomplish more with the aid of a computer than they could without one) by 11 at every level of skilled workers, $MPN_{sk} = 33 - N_{sk}$, but reduces the MPN of unskilled workers (who do not have the training to be productive in a computerized workplace) by 10 at every level of unskilled workers, $MPN_{usk} = 20 - N_{usk}$. Find the new equilibrium real wage and employment level for each group of workers.

(d) Compare your answer from part c) with the one in part b). Comment on your results.

Question A.2: Employment, Output, Productivity and Inflation (30 Marks)

Part 1)

In Table 1 you are given information on the consumer price index (*CPI*), where the values given are those for December 31 of each year.

(a) In which year was the inflation rate the lowest?

(b) Did total factor productivity (*TFP*) grow between 2009 and 2010? (Assume that the aggregate production function is of the *Cobb-Douglas* type, that is $Y = AK^\alpha L^\beta$, with constant returns to scale and the exponent on capital is $\alpha = 0.5$)

(c) Consider the year 2008. You are told that total factor productivity was equal to $A = 0.5$. The data for output, capital and labor are the ones in the table. How much was the exponent on capital (α), assuming that the production function was *Cobb-Douglas* with constant returns to scale?

<i>Year</i>	<i>CPI</i>	<i>Output</i>	<i>Capital</i>	<i>Labor</i>
2005	99.0	-	-	-
2006	100.0	-	-	-
2007	99.0	-	-	-
2008	105.9	120	200	300
2009	107.9	127	256	289
2010	110.8	131	196	324

Table 1: Question A2, Part1

Part 2)

Assume that there is an Economy where only one good is produced: food. Macroeconomic information for this economy is given in Table 2.

(d) What was the growth rate of average labour productivity in this economy between 2009 and 2010?

(e) Did the participation rate increase or decrease between 2009 and 2010?

(f) What was the unemployment rate in 2009? In 2010? What was the employment ratio in 2009? In 2010?

	2009	2010
<i>Output</i>	8500	9100
<i>Employment</i>	700	800
<i>Unemployed</i>	70	100
<i>Population (Working Age)</i>	900	1000

Table 2: Question A2, Part2

Question A.3: Savings, Investment, and Current Account (30 Marks)

Consider the Country of North Korea as initially being a closed economy. You have the following information on desired consumption (C^d), desired investment (I^d), government purchases (G), output (Y), and the marginal propensity to consume (c_Y), while r denotes the real interest rate:

$$C^d = 10 + c_Y Y - 100r$$

$$I^d = 30 - 300r$$

$$G = 10$$

$$Y = 100$$

$$c_Y = 0.7$$

(a) What are the equilibrium values of C^d , I^d , and r ? Show your results in a graph representing the goods market equilibrium.

(b) Suppose now that North Korea becomes a small-open economy, and that the world interest rate is $r^w = 3\%$ (assume that the Net Factor Payment is $NFP = 0$). What are the equilibrium values for C^d , I^d , and the current account CA ? How much is the absorption for this economy?

(c) What value for the world interest rate r^w would give a capital account balance (KA) equal to 15?

PART B: Short Questions.

Answer any **TWO** of the following *three* questions. Each question is worth 20 marks for a total of 40 marks. *Answers without any explanations will receive zero marks.*

Question B.1: Consumption and Saving (20 Marks)

Assume that individuals are "consumption smoothers"; that they are forward looking; that each can borrow or lend at the going rate of interest; and that they are not income constrained. Based on your understanding of the two-period model of consumption behaviour, explain briefly how saving would respond to the following situations?

(a) Households are expecting a recession in the future. (Hint, use the inter-temporal budget constraint to make your points.)

(b) From a position where the household was consuming all of its current income and assets, the real rate of interest falls. In this case, use a graph to illustrate your results. In your view, is the effect on saving potentially ambiguous?

(c) There is a temporary increase in current taxes to be refunded (with interest) in the future with a tax rebate. (Hint: use the inter-temporal budget constraint to make your points.)

Question B.2: The Behaviour of Investment (20 Marks)

You are given the following information on the economy: The relationship between output (Y) and capital (K) is given by: $Y = 100K - K^2$. In addition, the rate of depreciation of capital is 20 per cent; there are no corporate taxes; the price of capital is 10; and the initial stock of capital is 30. Use this information to derive the desired demand for investment (I^d) for this economy. Be sure to show the steps that you have taken to arrive at your results.

Question B.3: The Demand and Supply of Labour (20 Marks)

From a position where the labour market is in equilibrium, explain, using a diagram, what will happen to the equilibrium levels of employment and wages under the following circumstances?

(a) Workers in this economy become aware that their pension plan has been negatively affected by a downturn in the stock market.

(b) Suppose that all firms in the economy are identical. The government decides to impose a payroll tax that is proportional to the wage rate. For your information, a payroll tax has to be paid by the employer.

(c) The whole economy is hit with a temporary negative productivity shock.