

AMERICAN UNIVERSITY
Department of Economics

Comprehensive Examination
MA Theory - ECON-501 in Fall 2007

Summer 2009
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Instructions: You must answer both the microeconomic and macroeconomic sections of the exam. Each section receives equal weight in the grading. Plan to spend about two hours on each *section*. Make sure you follow the directions in each section carefully.

MICROECONOMICS SECTION

Directions: Answer *all* questions from part A (short-answer questions) and from part B (long-answer questions). Show all your work.

Part A: Answer *all* questions (20 minutes each - 60 minutes total)

1. Choose **three** of the following to explain with economic intuition. Please be concise.
 - a Production functions are generally assumed to have constant returns to scale but utility functions are not.
 - b The marginal revenue curve is always below the demand curve.
 - c Long run supply curves can be upward sloping, downward sloping, or flat.
 - d If transaction costs are sufficiently low, well-defined property rights bring about the socially optimal allocation of resources.

2. Let $f(L, K) = L^\alpha K^\beta$ be the firm's production function. Let w and r be the prices of labor and capital.
 - a Find the firm's input demand and cost function.
 - b If $\alpha = .75$, $\beta = .25$, $r = 3$, and $w = 1$ how much does the firm produce at a price of $p = 3$?

3. The domestic demand for portable radios is given by

$$Q = 5,000 - 100P.$$

where (P) is measured in dollars and quantity (Q) is measured in thousands of radios per year. The domestic supply curve for radios is given by

$$Q = 150P$$

- a What is the domestic equilibrium in the portable radio market?
- b If portable radios can be imported at a world price of \$10 per radio what is the market equilibrium (with trade)?
- c If a \$5 tariff is implemented, what is the market equilibrium? What is the deadweight loss?
- d If foreign suppliers agreed to limit supply to 1,250,000 radios per year, what is the market equilibrium? What is the deadweight loss?

Part B: Answer *all* questions (30 minutes each - 60 minutes total)

1. Suppose the oil industry in Utopia is perfectly competitive and that all firms draw oil from a single (and practically inexhaustible) pool. Assume that each competitor believes that it can sell all the oil it can produce at a stable world price of \$10 per barrel and that the cost of operating a well for one year is \$1,000. Total output per year (Q) of the oil field is a function of the number of wells (n) operating in the field. In particular,

$$Q = 500n - n^2$$

and the amount of oil produced by each well (q) is given by

$$q = \frac{Q}{n} = 500 - n.$$

- Describe the equilibrium output and the equilibrium number of wells in this perfectly competitive case.
 - Suppose now that the government nationalizes the oil field. How many oil wells should it operate? What will total output be?
 - Can the Utopian government achieve the optimal outcome without nationalizing the field? Be *very* specific (numbers).
2. Mr. A derives utility from martinis (m) in proportion to the number he drinks:

$$U(m) = m.$$

Mr. A is very particular about his martinis, however: He only enjoys them made in the exact proportion of two parts gin (g) to one part vermouth (v). Hence, we can write Mr. A's utility function as

$$U(m) = U(g, v) = \min\left(\frac{g}{2}, v\right).$$

- Graph Mr. A's indifference curve in terms of g and v for various levels of utility. Show that, regardless of the prices of the two ingredients, Mr. A will never alter the way he mixes martinis.
- Calculate the demand functions for g and v .
- using the results from part (b), what is Mr. A's indirect utility function?
- Calculate Mr. A's expenditure function; for each level of utility, show spending as a function of p_g and p_v .

MACROECONOMICS SECTION
For Students Who Took ECON-501 in Fall 2007

Directions: Answer **all four** of the following questions:

1. In the IS-LM model, first explain briefly why each curve (IS and LM) has its typical slope, i.e., either upward or downward (you are supposed to know which is which). Then, use the IS-LM model to analyze (graphically and intuitively) the effects on output (Y) and the interest rate (i) of each of the following (analyze each one separately):
 - a. A fiscal stimulus policy (increase in government spending G).
 - b. A tax increase (rise in taxes T).
 - c. The central bank, fearing a financial bubble, reduces the money supply M .
 - d. Consumers become very pessimistic and reduce their “autonomous” consumption, i.e., there is a fall in c_0 in the consumption function $C = c_0 + c_1(Y - T)$.
2. Using the model of aggregate supply and aggregate demand (AS-AD), analyze the effects of each of the following in the short run and the medium run (draw a graph and explain how the economy gets from the short run to the medium run equilibrium in each case):
 - a. There is a positive oil price shock (oil prices rise).
 - b. The government adopts a fiscal stimulus policy.For the effects of the fiscal stimulus in part b., does it matter if output is at its “natural” (medium-run equilibrium level) Y_n initially? How is this relevant to the present debate over Obama’s stimulus policy? Discuss briefly.

3. Graph the Phillips Curve in the short run and the medium run. What is the meaning of the unemployment rate in the medium-run equilibrium? Is there a trade-off between inflation and unemployment in the short run? in the medium run? What accounts for the difference between these two time frames?

4. Consider the following short-run model of the goods market in a closed economy:

$$\begin{array}{ll} C = 100 + 0.7Y_D & G = 350 \\ I = 280 + 0.05Y - 10i & T = 400 \end{array}$$

where Y is total output (national income) and Y_D is “disposable income.” You may assume that the central bank targets the interest rate at $i = 5\%$ (use 5, **NOT** .05) and keeps this rate constant unless otherwise stated.

- a. Calculate the equilibrium level of national income (Y), and also solve for the equilibrium levels of consumption (C) and investment (I).
- b. The country is in a recession and the government is considering two alternative stimulus policies: an increase in government spending of $\Delta G = 50$ or a tax cut of $\Delta T = -50$. Would these have the same stimulating effects on national income? Calculate ΔY for each type of stimulus and compare the results (explain why they are equal or different).
- c. Alternatively, the central bank is considering cutting its interest rate target to $i = 1\%$. What would be the effects of such an interest rate cut on the equilibrium level of Y , starting from the initial situation you calculated in part a.?

(end of exam)