

AMERICAN UNIVERSITY
Department of Economics

Comprehensive Examination
MA Theory

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

Directions: Answer two (2) questions from part A (short-answer questions), one (1) question from part B, and one (1) question from part C (long-answer questions). Show all your work.

Part A: Answer TWO (2) of the following (answer in about 2 paragraphs EACH, with any necessary equations, graphs, or math). (20 minutes each – 40 minutes total)

1. When measuring output in the economy, what is *chained measurement* of GDP? In what sense does this measure better capture economic output than measures that use constant prices? Be as specific as possible in your answer.
2. What is *Ricardian equivalence*? Discuss one of its strengths and one of its weaknesses.
3. What is a *liquidity trap*, and what are its implications for the effectiveness of (a) monetary policy and (b) fiscal policy? Consider in your answer the recent experience of Japan.
4. What is the theory of *rational expectations*? Explain how rational expectations can limit the power of the central bank to influence output even in the short run. Illustrate your answer on a Phillips curve or on an AD/AS graph.
5. What is *monetary neutrality*? Discuss the Keynesian and classical views of monetary policy and its effects. Would you expect to find monetary neutrality in the short-run or long-run (or what Blanchard calls “medium-run”)?
6. What are the key differences between the *expectations-augmented Phillips Curve* and the original Phillips Curve? What are the policy implications of each formulation of the Phillips Curve? Is there any economic environment in which the original Phillips Curve might still be useful? Discuss.

Part B: Answer ONE (1) question from this part. (40 minutes)

1. Present the neoclassical or “Solow” growth model and derive (and explain) the general condition for a long-run, steady-state equilibrium. Next, suppose there are two countries described by such a model, and that they both have the same technology (aggregate production function) and the same rate of population (labor force) growth. Assume initially that population (labor force) growth is equal to zero for simplicity. Assume also that there is no technological progress. If one of these countries has a higher saving rate than the other, what does the model say about how these countries will compare in terms of their output per capita (per worker)? What does the model say about their long-run, steady-state growth rates? (Use equations and graphs to illustrate your answer.) Now modify the model to incorporate differences in population (labor force) growth rates between the two countries. How does this modify the comparison of the two countries? Finally, give at least one reason for dissatisfaction with the Solow model as a representation of real-world economic growth.

2. The sustainability of a country’s public sector debt burden can be judged by the level of public sector debt as a share of GDP, b_t . Typically, economists talk in terms of stabilizing b_t at a particular value. Let d_t be the period t primary fiscal deficit as a share of GDP, i the nominal interest rate on government debt, and g the growth rate of nominal GDP.

- a. How does b_t evolve over time? Provide an equation and define each variable in it.
- b. Suppose a government wanted to stabilize b_t at or below 60 percent of GDP. (This is the value that the Maastricht Treaty required EU countries to aim for.)
- c. Assume that the government had a public sector debt of 52 percent of GDP ($b_t = 0.52$), was running a primary surplus of 1 percent of GDP ($d_t = -0.01$), the interest rate on government debt was 6 percent ($i = 0.06$), and nominal GDP growth was 4 percent ($g = 0.04$). Given these values, calculate the ratio of government debt to GDP in the next period, $t + 1$. Describe in words what has happened to the country’s debt ratio.
- d. Given the values of b_t , i , and g above, what value of d would cause the country to breach its debt ceiling in a single year?
- e. What are the implications of having the nominal interest exceed the rate of nominal GDP growth? Discuss the implications if the circumstances change so that the growth rate of nominal GDP exceeds the nominal interest rate.
- f. What are the consequences if government debt as a share of GDP increases to a very high level? What are the considerations from the perspective of financial market participants and policymakers?

Part C: Answer ONE (1) question from this part. (40 minutes)

1. Consider an economy that experiences an unexpected fall in consumption spending. Policymakers respond by increasing the money supply.
- a. Analyze the impact of the decline in spending and the increase in money supply in the short run and the long run using the closed economy IS/LM and AD/AS models. Assume that the economy is at full employment at the start of your analysis.

Then answer **EITHER** parts b) and c) **OR** parts d) and e) below:

- b. Compare your results in part a) to the results from an open economy model with floating exchange rates and which incorporates the uncovered interest parity condition. Use the appropriate graphs to illustrate your answer. You may consider only the short run in your answer.
- c. Compare your results in part a) to the results from an open economy model with fixed exchange rates and which incorporates the uncovered interest parity condition. Use appropriate graphs to illustrate your answer. You may consider only the short run in your answer.

OR

- d. Explain the short run effect of a fiscal expansion using the IS/LM framework. Explicitly show and explain the potential role of “crowding out,” assuming a traditional policy that holds the money supply constant.
- e. Suppose the monetary policy (central bank) instead follows a policy an interest rate targeting rule. What steps will the central bank take and what effect will this have on the response of real GDP to the fiscal expansion? Show the effects on a graph and explain.

2. Consider the following macro model for a closed economy with no transfers:

(1) $C = 20 + 0.75YD$

(2) $T = 0.2Y$

(3) $I = 210 * 5i$

(4) $G = 200$

(5) $M^s = 200$

(6) $P = 1$

(7) $L = 0.5Y * 50i$

Here C = consumption, YD = disposable income, Y = national income, T = taxes, I = investment, i = interest rate, G = government purchases, M^s = money supply, P = price level, and L = money demand (liquidity preference).

Answer the following questions (note that you must supply the necessary equilibrium conditions and the definition of disposable income where needed):

- a. Solve for the IS and LM curves. Explain what each of these means. Solve for the equilibrium levels of income (Y) and the interest rate (i).
- b. Graph your solution and label everything clearly.
- c. What are the effects of an increase of 50 in the money supply (M^s)? Calculate and show on your diagram.
- d. Suppose the investment function (3) is replaced by a function including an “accelerator” term as follows: (3') $I = 110 * 5i + 0.1Y$
 - How do your answers to parts a. through c. change?
 - Re-solve the model and re-calculate the effects of an increase of 50 in the money supply using (3') in place of (3).
 - Are the effects of the monetary stimulus on income (Y) larger or smaller? Explain the intuition for your result.