Izmir University of Economics

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ECON 202
MACROECONOMIC THEORY **26 May 2008**
Dr. Yetkiner

Key to Final Exam

1. (**20 Points**) Suppose that the government decides to reduce government spending. Using the model in Chapter 5 (market solution **or** social planner's solution), determine the effects this has on aggregate output, consumption, employment and the real wage, and explain your results. Do not forget to support your answer by drawing a figure.

See chapter 5

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2. (**20 Points**) Using the two-period model in Chapter 8, determine the effects of a decrease in the real rate of interest on first and second year consumption and saving behavior of a lender. Do not forget to support your answer by drawing a figure.

See chapter 8

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3. (**20 Points**) Suppose that utility function u of a representative agent is $u = c^{0.2} l^{0.8}$, where c is consumption of physical goods and l is consumption of leisure. Suppose that production technology is represented by $y = 2N$ where y is output, z is productivity parameter and N is labor demand. We assume that $24 = l + N$ and w is the real wage. There is no government in the economy.

a) Find the optimal values of c, l, N, y, w, and u under the competitive equilibrium assumption.

$$L = c^{0.2} l^{0.8} - \lambda\{c + wl - w24 - \pi\}$$

$$\frac{\partial L}{\partial c} = (0.2)c^{-0.8} l^{0.8} - \lambda = 0 \qquad (1)$$

$$\frac{\partial L}{\partial l} = (0.8)c^{0.2} l^{-0.2} - \lambda w = 0 \qquad (2)$$

$$\frac{\partial L}{\partial \lambda} = c + wl - w24 - \pi = 0 \qquad (3)$$

From (1) and (2), we get $c = [(0.2)/(0.8)]wl$. Since $\pi = 0$ under constant returns to scale technology, it is straightforward to show that $l^* = (0.8)24 = 19.2$ and $c^* = (0.2) \cdot 2 \cdot 24 = 9.6$. Noticeably, $w = 2$, which can be easily found from profit maximization process.

b) Find the optimal values of c, l, N, y, and u under the social planner's solution assumption. Are the results different? Why or why not?

In this case, our static maximization problem reads

$$L = c^{\alpha} l^{1-\alpha} - \lambda\{c - z(h - l)\}$$

The rest of the solution program is similar and the results obtained are identical.

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4. (**20 Points**) Suppose that Daniel has income of ***100*** when he is young and ***125*** when he is old. The real interest rate is $r = 0.1$. The overall utility function of Daniel is $U = 2c_1^{0.35} + (0.5)2c_2^{0.35}$. Find the optimal values of c_1, c_2, s and U.

This is a Partial Equilibrium Model. The household's problem is: $L = 2c_1^{0.35} + (0.5)2c_2^{0.35} - \lambda\left\{c_1 + \frac{c_2}{1.1} - 100 - \frac{125}{1.1}\right\}$. The first order conditions are:

$$\frac{\partial L}{\partial c_1} = 0 \Rightarrow 2(0.35)c_1^{-0.65} - \lambda = 0 \qquad \text{(Equation 1)}$$

$$\frac{\partial L}{\partial c_2} = 0 \Rightarrow 2(0.35)(0.5)c_2^{-0.65} - \frac{\lambda}{1.1} = 0 \qquad \text{(Equation 2)}$$

$$\frac{\partial L}{\partial \lambda} = 0 \Rightarrow c_1 + \frac{c_2}{1.1} - 100 - \frac{125}{1.1} = 0 \qquad \text{(Equation 3)}$$

From the first two first-order conditions (i.e., from (1) and (2)), we obtain:

$$\frac{2(0.35)c_1^{-0.75}}{2(0.35)(0.5)c_2^{-0.75}} = 1.1 \Rightarrow c_2 = (0.398)c_1$$

Using this result in the third first-order condition: $c_1 + \frac{c_2}{1.1} = 100 + \frac{125}{1.1} \Rightarrow$

$c_1^* = 156.7$
$c_2^* = 62.43$
$s^* = -56.87$
$U^* = 15.97$

Variable	Optimal Value
C_1^*	156.87
C_2^*	62.43
s^*	-56.87
U*	15.97

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5. (**20 Points**) Suppose that due to climate change current period productivity has fallen. Analyze macroeconomic implications of this shock in a complete manner as it is done in Chapter 9 of your textbook.

Refer to our class notes; the question is about how the economy responds when current productivity parameter z decreases.

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Bonus Question

6. (**5 Points**) Turks have the following proverb: "Ayağını yorganına göre uzat" (Cut your coat according to your cloth). Do illustrate equilibrium of a representative consumer that follows this proverb on a graph by using tools from your macroeconomics course.