

NAME:

ECON 603
Macroeconomic Theory
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Midterm

A. Answer one of the following two questions.

1. (50 points) Suppose that utility function U of a representative agent is $U = C^\alpha \cdot \ell^{1-\alpha}$, where C is consumption of physical goods and ℓ is consumption of leisure. Suppose that production technology is represented by $Y = K^\beta \cdot N^{1-\beta}$ where K is physical capital stock, and N is labor stock. We assume that $\bar{h} = l + N$, ω is the real wage, and π is real profit. There is no government in the economy. Find the optimal values of C , ℓ , N , ω , Y , and U under

- $K = \bar{K}$ (the short run interpretation).
- K is variable (the long run interpretation).

2. (50 points) Suppose that utility function U of a representative agent is $U = C^\alpha \cdot \ell^{1-\alpha}$, where C is consumption of physical goods and ℓ is consumption of leisure. Suppose that production technology of a firm in the industry is $Y = A \cdot N$, where $A > 0$ is productivity parameter and N is the labor stock. We argue that the firm is a monopoly and that demand function is $P = (1 - b) \frac{1}{Y^b}$, where $0 < b < 1$. We continue to assume that $\bar{h} = \ell + N$, ω is the real wage and that there is no government in the economy. Find the optimal values of C , ℓ , N , ω , Y , and U under the monopoly (market solution).

B. Answer one of the following two questions.

1. (50 points) Suppose that there is a two-period endowment model (no production in both periods) and that endowments are \bar{Y}_1 and \bar{Y}_2 . Utility function U of a representative agent is $U = \frac{C_1^{1-\theta}-1}{1-\theta} + \frac{1}{1+\rho} \cdot \frac{C_2^{1-\theta}-1}{1-\theta}$. The real rate of interest, \bar{r} , is constant. Find the equilibrium values of C_1 , C_2 , and S in this partial equilibrium model.

2. (50 points) Suppose that there is a two-period **small open-economy** model with no production in the first period (the endowment is \bar{Y}_1). There is no capital market in this model-economy and that the real rate of interest is determined by rest of the world. Utility function U of a representative agent is $U = Ln[C_1] + \frac{1}{1+\rho} \cdot [Ln[C_2] + Ln[\ell_2]]$, the first period and second period budget constraints are respectively $C_1 + S = \bar{Y}_1$ and $C_2 = (1 + \bar{r}) \cdot S + \omega_2 \cdot N_2^S + \pi_2$, and the production function in the second period is $Y_2 = A_2 \cdot N_2^{1-\alpha}$. **Try** to find the equilibrium values of C_1 , C_2 , ℓ_2 , etc. If you cannot solve, assume that the model-economy is an **absolute borrower**, that is, $C_1 = -S$.