

NAME:

ECON 603
Macroeconomic Theory
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20 December 2011

Midterm

1. (50 points) Suppose that utility function U of a representative agent is $U = \alpha \cdot \ln[C] + (1 - \alpha)\ln[l]$, where C is consumption of physical goods and l is consumption of leisure. Suppose that production technology is represented by $Y = A \cdot K^\alpha \cdot N^{1-\alpha}$ where A is productivity parameter, K is physical capital stock, and N is labor stock. We assume that $h = l + N$, w is the real wage, and π is real profit. There is no government in the economy. Find the optimal values of C , l , N , w , Y , and U **a)** under the competitive equilibrium (market solution), **b)** under the social planner's solution.

2. (50 points) Suppose that there is a two-period model with no production in the first period. Utility function U of a representative agent is $U = \ln[C_1] + \frac{1}{1+\rho} \cdot [\ln[C_2] + \ln[l_2]]$, and the production function in the second period is $Y_2 = K_2^\alpha \cdot N_2^{1-\alpha}$. We assume that capital depreciates completely after production, and so, the firm must pay the principal and interest on capital entirely from output. Find the equilibrium values of C_1 , C_2 , l_2 , etc.

Hint: Recall that first period budget constraint is $C_1 + S = Y_1$ and the second period budget constraint is $C_2 = w_2 \cdot N_2^S + (1 + r_2) \cdot S$.