**Macroeconomic Theory**
**Fabrizio Perri**

# Macroeconomic Theory (8107)

## Spring 2008, Mini 1

### Problem set 2

**Due Thursday, Feb. 7, in class**

1. Consider the following version of the economy discussed in class. There are two consumers. Consumer 1 starts owning 40% of a representative firm, consumer 2 owns 60% of the firm. Assume that consumers can trade a full set of Arrow securities at time 0. The representative firm solves

$$\begin{aligned} & \max_{\{k_j\}} \sum_{j=0}^{\infty} p_j \left( k_j^{\alpha} + (1-\delta) k_j - k_{j+1} \right) \\ \equiv & \max_{\{k_j\}} \sum_{j=0}^{\infty} p_j d_j \end{aligned}$$

   where $p_j$ is the price of consumption at date $j$ relative to consumption at date 0. Assume that initial capital is 80% of the steady-state capital. Preferences of both consumer are given by

$$\sum_{t=0}^{\infty} \beta^t \log(c_t + \bar{c})$$

   Assume that $\alpha = 0.4, \delta = 0.1, \beta = 0.9, \bar{c} = -0.1$. Solve and plot for the paths, as the economy transits from its initial condition to the steady state, of risk free interest rate, consumption and wealth of both consumers. Also plot the saving rate of both consumers where saving rate is $(s_{it} d_t - c_{it})/s_{it} d_t$

2. Now assume that consumers cannot trade any assets so in each period

$$c_{it} = s_{i0} d_t$$

(a) Assume that the firm chooses the same capital stock as in question 1. Solve and plot consumption and wealth for both consumers in this case. Would consumer 1 (the poor one) want the firm to choose a faster or slower growth of capital stock? How about consumer 2. Explain why and briefly discuss why, in general, when markets are not complete the problem of the firm is not uniquely defined

(b) Compute the price (in terms of proportional increase in lifetime consumption) that a person (before knowing its type) is willing to pay to live in the economy of question 1 rather than in the one of question 2.