

2. Consider a model in which each agent maximizes utility defined over consumption and effort. The utility function for each agent is identical and given by: $U(c,e) = c_i^\lambda (T-e_i)^\theta$ where c is consumption, e is effort (work time), T is total time available, and λ and θ are positive constants that sum to one. The agent generates consumption via production with the per capita production function given by: $C_i = A_i e_i^\alpha \bar{e}^\beta$ where e_i is the effort of agent i , \bar{e} is the average effort for all agents in the economy, A is a productivity shock, and α and β are positive constants and $\alpha < 1$. Assume that there are a large number of agents so that agent i takes \bar{e} as given.

- (i) Characterize the optimal consumption and effort decisions by agent i .
- (ii) Characterize the rational expectations equilibria under these assumptions. How many equilibria will there be? Will they be Pareto ranked? Discuss.
- (iii) Does this model exhibit persistence in response to productivity shocks? Does this model exhibit amplification in response to productivity shocks? Discuss.
- (iv) Even though the model is static as stated, discuss the local stability of the rational expectations equilibria (i.e., what are the properties of locally stable equilibria). Discuss how you might extend the model to allow for dynamic adjustment of expectations in this context.
- (v) Suppose that some fraction of the agents use some form of naive expectations (e.g., adaptive expectations) while another fraction use rational expectations. Characterize the equilibria that emerge when there is a mix of agents. How do these equilibria differ from the full rational expectations equilibria? Discuss.
- (vi) Suppose that the productivity shock has both aggregate and idiosyncratic components and that the agents observe both components with error. Suppose further that the standard deviation of idiosyncratic shocks is an order of magnitude larger than the standard deviation of aggregate shocks. Suppose that agents can reduce the variance of measurement error in each component by incurring costs of information acquisition (with a separate cost for each component) and rising marginal costs for additional reductions in measurement error. Characterize the acquisition of information in this setting. In addition, without solving this more complex model, discuss how the information acquisition issues are likely to impact the nature of the solution to this problem.