Problem Set #3

Innovation and Growth

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Due Tuesday 2/14/23 2:00PM

1. Consider the addition of dynamic consumer/household optimization to Solow growth model. In class, we argued that the solution to the HH optimization problem is an Euler equation of the form:

$$\frac{\dot{c}}{c} = \frac{1}{\theta}(r - \rho)$$

   (a) Interpret this equation in a few sentences. What does it tell us? Which exogenous parameters and endogenous variables does it depend on?

   (b) Describe how we can think of the Euler equation as providing an upward sloping supply curve in the loanable funds market.

   (c) How do we define the model's equilibrium? (i.e. what are the equilibrium conditions?)

   (d) Sketch the typical phase diagram that we use to illustrate equilibrium. Include the arrows that show the direction of movement for k and c in each of the four quadrants of the diagram. Provide a brief explanation for these arrows in each quadrant.

2. Optimal growth -

   (a) Write down the dynamic household optimization problem and the social planner's problem. Compare the two. What is the same? What is different?

   (b) In a few sentences, describe how we use the social planner's problem to determine the efficiency of the market equilibrium.

   (c) Is the market equilibrium efficient in this model? What is the main assumption that delivers this conclusion?