Homework - 5
UCLA - 2016
ECON 221C MONETARY ECON III
Liquidity and Financial Friction in Macroeconomics
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This homework corresponds to the notes on class notes on endogenous liquidity and money.

1. **Typo Police.** Please spot typos in the lecture notes corresponding to the class on endogenous liquidity and money.

2. **Endogenous Liquidity Only.** Take a version of the model we discussed in class yesterday.

   (a) Write the sketch of an algorithm to solve the model we learned in class for the case where the supply of outside money is 0.

   (b) Write a code to solve the model without money. You can have a look at the code and see how I do it. You can adapt it if you want, or write your own code.

   (c) Interpret the figure where I report endogenous variables as functions of the state.

   (d) Adapt the code so that the stochastic process for ξ_t in the notes follows:
   - If $\xi_t > \bar{\xi}$ then,

   $$\begin{aligned} \xi_{t+1} &= (1+z)\,\xi_t \text{ w.p. } 1/3 \\ & (1-z)\,\xi_t \text{ w.p. } 2/3. \end{aligned}$$

   - If $\xi_t < \bar{\xi}$, flip probabilities to:

   $$\begin{aligned} \xi_{t+1} &= (1+z)\,\xi_t \text{ w.p. } 2/3 \\ & (1-z)\,\xi_t \text{ w.p. } 1/3. \end{aligned}$$

   - If $\xi_t < \bar{\xi}$, flip probabilities to:

   $$\begin{aligned} \xi_{t+1} &= (1+z)\,\xi_t \text{ w.p. } 1/2 \\ & (1-z)\,\xi_t \text{ w.p. } 1/3. \end{aligned}$$

   Where $\bar{\xi}$ is some average. Build a markov matrix that approximates this process —you need to change the probabilities in the boundaries to 1 going up and down.

3. **Exogenous vs. Endogenous Liquidity.**

   (a) Now work with the model with a fixed money stock.

(b) Adapt the code to allow for money. Essentially, you need to find pairs of functions: $(p(\xi), q(\xi))$ that map states into the price of money and the price of capital. The returns you construct from those prices will determine the agents portfolios and the demands for either asset. Update prices.

- Since the shock ξ_t only changes to two values, you should be able to solve portfolios using the first-order condition of the problem easily.
- This is a challenging problem to solve. I have tried myself several times but I didn't succeed.
- I don't expect you to nail it with perfection. But I think you will learn a lot trying.

(c) Phillips curve: do you think this model is capable of generating a Phillips curve. Can the government exploit it?