Homework - 4
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 asymmetric information in macroeconomic models.

1. **Typo Police.** Please spot typos in the lecture notes corresponding to the class on asymmetric information.

2. **Endogenous Choice of Risk in Eisfeldt (2004).** Suppose that ex-ante, agents can choose the risk of their projects. That is, suppose that they can choose some $\pi(m)$ with $\pi' > 0$ for some index m. Of course, there has to be a cost of chosing m. Assume that φ is also an increasing function of m. Work with a linear function $\pi(m)$ and a convex function $\varphi(m)$. Use paper and pencil as much as possible. Resort to a numerical solution if needed. Be creative.

   First, setup a planner's problem.

   (a) Solve a planner's choice of m when the information structure satisfies the conditions to achieve first best —when trade occurs ex-ante before the realization of π_m. What trade-off does the planner face in choosing m?

   (b) Suppose now that the planner's chooses m, but the competitive equilibrium operates as presented above. What is the planner's choice and how does it compare to the answers to the previous question?

   (c) Suppose that agents can individually deviate from the choice of m setup by the planner in the previous excercise. Would they choose to do so? Is the solution constrained efficient?

   (d) Find the solution to the competitive equilibrium that corresponds to the actual choice of m. Identify the pecuniary externality in this model.

3. **Non-Linear Impulse Response and Welfare.** Take the model described in class. Treat Π_t as a Beta distribution of π. The Beta distribution has two parameters (a,b), so set the mean a/(a+b) to some constant. Then, index a choice of $a(\phi), b(\phi)$, such that the mean is always the same, but an increment in ϕ induces a mean preserving spread.

   (a) Assume that ϕ follows a markov chain with at least two values.

   (b) Compute a recursive competitive equilibrium. It should be a repetition of static equilibria as we learned in class.

   (c) Compute a non-linear impulse response of investment to a shock of ϕ and compare the impulse responses when the shock size is doubled.

- A non-linear impulse response is constructed by simulating for M simulations of N periods for the endogenous variables in the model.
- Then, integrate accros all simulations and report the paths.

(d) Show numerically the conjecture discussed in class that introducing opacity —private information— could improve outcomes relative to the second best economy.

4. **Intermediation.** What if the distribution Π_t is unknown to the intermediary. Write the Bellman equation of a monopolist intermediary that has some wealth of his own, and must honor his promises in all periods.

5. **Costly State Verification.** Read section 3.7 of Tirole's Corporate Finance book on Costly State Verification. Suppose that the state $y_t(z)$ can be verified only ex-post upon making a payment. Adapt the model in the notes to allow for CSV. If you solve this question, you will have done in one homework what made Bernanke and Gertler famous many years ago.