1 Homework #4 - Due December 4 (in class)

1. In the model of banks based on liquidity uncertainty presented in class, we solved for the Pareto optimum. Calculate the optimal \((c_1^*, c_2^*)\) given the following:

- Agent’s have constant relative risk aversion preferences with relative risk aversion = 2.
- All agents are endowed with 1 unit of consumption.
- The probability of being a type 1 person is 1/2.
- Agents discount factor, \(\rho\), is equal to 0.5.
- The return on the productive asset is \(R = 2.0\)

2. In the model of banks as providers of liquidity insurance, explain precisely why the existence of banks can yield a Pareto optimum. Why is the Law of Large Numbers relevant?

3. Again using the model of banks as providers of liquidity insurance, demonstrate that the market economy equilibrium is not Pareto Optimal (Assume that agents have a constant relative risk aversion utility function with relative risk aversion parameter greater than unity.)

   Answer the following using the article by Gertler and Hubbard:

4. The Gertler and Hubbard model of lending under uncertainty included an additional constraint: the incentive compatibility constraint. This was given by:

   \[
   (\pi^g + \pi^b g) f(K) - (\pi^g P^g + \pi^b P^b) \geq (\alpha f(K) - P^h) + \nu K
   \]

   (In class, I used the notation \(\eta = \nu\).) Explain in detail each term in this expression.

5. The authors state that the new theory of financial intermediaries role in business cycles stress two key avenues: what are these?

6. What is the relevance of Table 2 and Table 4?

7. Derive eq. (4) in the paper.

8. Using eq. (9), prove that investment is an increasing function of borrower’s net worth.

9. What is the financial accelerator?

10. The authors state “.the model presented here has implications for cross-sectional differences in investment behavior.” Why is this important?