

Econ 210C Homework 2

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Due: 5/13/2022, 11:59PM PST, on your Github repository.

1. Complementarity of Money and Consumption

Suppose the utility function in our classical monetary model is now

$$U(X_t, L_t) = \frac{X_t^{1-\gamma} - 1}{1-\gamma} - \chi \frac{N_t^{1+\varphi}}{1+\varphi}$$

where X_t is a composite of consumption and money,

$$X_t = \left[(1-\vartheta)C_t^{1-\nu} + \vartheta \left(\frac{M_t}{P_t} \right)^{1-\nu} \right]^{\frac{1}{1-\nu}}$$

- Derive the first order conditions for this economy.
- Under what conditions does this economy predict that money is neutral? Explain why.
- Solve analytically for the steady state of the model (as far as you can), assuming $A = 1$.
- Based on your steady state equations describe an algorithm for how to solve for the steady state.
- How would you calibrate ϑ given knowledge of ν ?
- Derive the log-linearized model.
- Following your calibration strategy for each of $\nu \in \{0.25, 0.5, 1, 2, 4\}$, solve the model using sequence space methods using the following parameters:

$$\gamma = 1, \varphi = 1, \chi = 1, \beta = 0.99, \rho_m = 0.99$$

where $m_t = \rho_m m_{t-1} + \epsilon_t^m$ and the steady state money supply is such that $P = 1$ in steady state.

Report the IRFs for consumption, prices, the nominal interest rate. Your graph for each variable should contain all five cases, appropriately labelled.

- Intuitively explain your results.
- If you had evidence that an increase in the money supply increases consumption, which values for ν can you rule out? Explain why.
- Make sure your code packet contains a file that produces your graphs with a single click. (It does not need to save the graphs.) Upload it to Github.