

# TOPICS IN MACRO: PROBLEM SET 1

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## Incomplete markets and aggregate uncertainty

Consider the version of the Krusell-Smith (KS) model as described in Den Haan, Judd and Juilliard (2009)<sup>1</sup>. This is a version of the KS model with unemployment benefits. The model and parameter values are given in the paper.

- a) It turns out that introducing an unemployment benefit makes it more likely that the borrowing constraint binds. What is the intuition behind this result? Relative to the model without unemployment benefits, is it more difficult or less difficult for agents to forecast the aggregate capital stock using only the mean of the distribution?

Suppose the agents believe in the following law of motion for aggregate capital:

$$\begin{aligned}\ln K_{t+1} &= 1.4914 + 0.9648 \ln K_t \quad (\text{good state}) \text{ if } z_t = z_g \\ \ln K_{t+1} &= 1.3804 + 0.9623 \ln K_t \quad (\text{bad state}) \text{ if } z_t = z_b\end{aligned}$$

- b) Write a program that solves the problem of the individual agent, taking the above law of motion as given.
- c) Draw a sequence of aggregate shocks of length 10.000. Run a simulation of the economy to generate a time series for the aggregate capital stock (You can either simulate a panel of agents or a continuum of agents).
- d) Consider one individual agent with cognitive limitations (and zero mass). Suppose this agent believes that the aggregate capital stock follows a unit root process. How much does the value of this agent differ from the values of the other agents?

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<sup>1</sup>The paper can be found here: <http://www.wouterdenhaan.com/papers/djj.pdf>