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45-812 Econometrics II

Mini 2 2026

ASSIGNMENT 1 (Hansen and Singleton 1982)

Overview The purpose of this assignment is to introduce you to actually estimating a structural econometrics model. The assignment should be undertaken in groups of about three. I do not object to discussion taking place across groups in the early stages of the work either. I do insist that each group should re
ne its own answers and submit a unique report.

Due data and assessment Please submit your answers in the form of a report by Friday October **30, 11:59 p.m.** with your code attached as an appendix. Hand written work will not be graded. The code must be clearly written with comments where appropriate so that a reader can easily follow. Poor grammar, unclear expression, and lack of precision, will be graded as if I have very limited expertise in this area. All questions carry equal weights.

The model: Consider the following model of consumption and portfolio choices we analyzed in lectures, and recall:

$$1 = E_t \left[r_{t+1,k} \beta \frac{u'(c_{t+1})}{u'(c_t)} \right] \equiv E_t \left[r_{t+1,k} MRS_{t+1} \right]$$

where:

- $E_t[\cdot]$ is an expectations operator that conditions on all the information the consumer has at time t;
- r_{tj} denotes the real return on the j^{th} asset purchased in period $t-1$;
- β is the subjective discount factor;
- $u(\cdot)$ denotes the within-period utility function.

Suppose:

$$u(c_t) = (1+\alpha) c_t^{1+\alpha} \qquad \text{(Assumption 1)}$$

Question 1: For the whole of the post WW2 era, plot the aggregate quarterly series of:

- nondurables per capita c_t and the ratio of c_{t+1}/c_t
- nondurables and services per capita c_t^* and the ratio of c_{t+1}^*/c_t^*
- value weighted aggregate stock returns r_{t+1}
- equally weighted aggregate stock returns r_{t+1}^*

Test whether any of these series have a unit root. (You should read about unit root tests first.) Is there evidence that these series are not stationary and ergodic?

Question 2: Replicate (to the extent you can) the two top panels of Table III from Hansen and Singleton (1984), by estimating their model with their subsample (data from 1959:2 through 1978:12), and the instrument sets they used. How do your results (estimates and values of test statistics) compare with theirs? If they are not identical can you explain the discrepancies?(

Question 3: Now reestimate the model using the whole sample, where the two parameters α and β, are allowed to differ in the three time frames, with say (α_1, β_1) parameterizing the model before 1959:2, (α_2, β_2) in Hansen-Singleton frame, and (α_3, β_3) after 1978:12. Test the overidentifying restrictions of the model and compare the estimates for the three time frames. Interpret your results. Test whether $(\alpha_1, \beta_1) = (\alpha_2, \beta_2) = (\alpha_3, \beta_3)$ and interpret your results.

Question 4: Finally, replace Assumption 1 with:

$$u(c_t) = -e^{-\gamma c_t} \qquad \text{(Assumption 2)}$$

Repeat the exercises entailed in Questions 2 though 4.

Question 5: On the basis of the evidence from your work, which is the more palatable parameterization. Briefly explain the reasons for your choice.