

ECON 653 - HOMEWORK 5

(Due: November 3, 2009)

1. To solve the present problem, you use the data in files "hw5data1.txt" and "hw5data2.txt" on the Econ 653 webpage (<http://www.econ.iastate.edu/classes/econ653/lence/>). File hw5data1.txt contains the nominal net rates of return for stocks (S&P 500), 3-month T-bills, and long-term (10-year) government bonds, along with the inflation rate for the U.S. File hw5data2.txt has data on U.S. total population and real aggregate consumption of nondurable goods and services. Please submit your responses as spreadsheets attached to e-mails.

- a. Program up a GMM estimator (e.g., in MATLAB or in a statistical package like STATA) of the following conditions resulting from the consumption CAPM's Euler equations:

$$E_t[(C_{t+1}/C_t)^{-\gamma} (R_{k,t} - R_{f,t})] = 0, k = 1, \dots, K.$$

Assume that the T-bill is the risk-free asset (R_f), and that stocks and long-term bonds are the risky assets (R_k). Use a constant and two-lagged values of C_{t+1}/C_t , R_k , and R_f as instruments for the estimation.

- b. Test the validity of the model using consumption of nondurable goods. What are the point estimate and the standard deviation of γ ?
 - c. Test the validity of the model using consumption of services. What are the point estimate and the standard deviation of γ ?
 - d. Test the validity of the model using consumption of nondurable goods and services. What are the point estimate and the standard deviation of γ ?
2. Prove that a sufficient (but not necessary) condition for the aggregation property to hold is that all agents in the economy exhibit linear risk tolerance (LRT) with the same cautiousness, and have the same time preferences and the same beliefs about the probabilities of occurrence of the different states. (Note that risk tolerance may be different across agents.)
Hint: (a) Set up the optimization problem for agents with LRT, (b) obtain the first-order necessary conditions, (c) manipulate them so that individual consumption and individual endowments can be aggregated across individuals, and (d) show that aggregate consumption and aggregate endowments satisfy an expression analogous to the first-order necessary conditions for individual agents.
 3. Solve Exercise 10 on p. 348 of Luenberger.
 4. Solve Exercise 13 on p. 349 of Luenberger.
 5. Solve Exercise 15 on p. 349 of Luenberger.
 6. Solve Exercise 16 on p. 349 of Luenberger.

References:

Luenberger, D. G. *Investment Science*. New York: Oxford University Press, 1998.