ECONOMETRICS II, FALL 2022

Homework 9. Due Wednesday November 6.

1. Consider the linearized Euler equation

$$\Delta \log(C_t) = \kappa + \alpha \log(R_t) + u_t \,,$$

where R_t is the gross stock market return. Here α is the inverse of the coefficient of relative risk aversion and κ is proportional to the logarithm of the discount factor.
a) Try and estimate this using the instruments (one at a time) you used when estimating the Hansen-Singleton relation with GMM. What are the first stage F-statistics and the adjustment factors to the t-statistic (for testing $\alpha = 0$) from the Lee et al. "tF" paper?
Now consider the relation (a version of Nelson and Starz):

$$\Delta \log(C_t) = \kappa + \gamma \Delta C_t^2 + \alpha \log(R_t) + u_t \ , .$$

b) Use the safe interest rate and assume that term is exogenous, while the growth in the squared term is obviously not and needs to be instrumented. Try and estimate the relation using the instruments (one at a time) you used when estimating the Hansen-Singleton relation with GMM. What are the first stage F-statistics and the adjustment factors to the t-statistic (for testing $\gamma = 0$) from the Lee et al. "tF" paper?
c) Report on what you found in class on Wednesday Nov 6th. (If you have started on your own research and have a dataset and instruments, you can substitute this, but we want to see what the "tF" correction is.)

2. Simulate and estimate the model

$$y_t = \mu + \rho y_{t-1} + e_t \ ,$$

where y_0 is fixed and e_t are standard independent normals. Set the number of observations $T = 50, 100$ and 500.

Do, say, 200 simulations (more is better, but no reason for large number if it takes time) for each value of T and for values of $\rho = 0.9, 0.95$, and 1.0 and report the average values of $\hat{\rho}$ and their empirical t-statistics. (Even better if you plot the distribution of the t-stats.)