

HOMWORK ASSIGNMENT TWO

The empirical assignment 1 is the same for people sharing assigned countries. Feel free to consult with students who have the same country but submit your own work. Include computer code and printouts.

1. [4 points] **Testing for Unit Roots**

For several tests to be conducted, you will use the textbook by Kocenda and Cerny “Elements of time series econometrics: An applied approach,” which is available in our library (henceforth KC2007), 2007. The book contains a description of each test and the corresponding critical values. Perform all the tests for real GDP growth rate (adjust it by your inflation series). In each case, summarize your findings. Download the GDP series for your country from the file TSF09_HW1_DATA.xlsx whose zipped version is available on the course website at

<http://home.cerge-ei.cz/petrz/Econometrics/TS2011Fall.html>. Again, update the series.

a. Perform the augmented DickeyFuller (ADF) test - see KC2007, Section 3.4.2. for both trend and level stationarity. It means that for the original time series you run a regression with trend and intercept (model C). Use two lags to account for autocorrelation.

b. Perform Kwiatkowski, Phillips, Schmidt and Shin (KPSS) test - see KC2007, Section 3.4.5. KPSS tests should be performed for both trend and level stationarity. Use procedure from `kwunit2.tsp`.

2. [2 points] Replicate Table IV for $n = 25$ from Dickey and Fuller, LIKELIHOOD RATIO STATISTICS FOR AUTOREGRESSIVE TIME SERIES WITH A UNIT ROOT, *Econometrica* 49(4), July 1981. You can re-program the Gauss code from *DFmodelA.g* in Matlab.

3. [2 points] Enders, Chapter 4, Problem 1 a, b, c, d, g.

4. [2 points] **Testing for Bubbles in the Real Estate Markets using Panel Data**

Use the data in the Eviews workfile *pricesrents.wf1*, which are described in the paper *Mikhed.Zemcik_JREFE.pdf* in detail. They are semi-annual, for the period from 1978:1-2006:2. Real rents and real house prices for 23 US regions, normalized to be 1 in 1995:1. Use the IPS test in Eviews (see the paper for details) to find if the price to rent ratio is stationary. Was there a bubble on the US market using this dataset?

5. [3 points] **GMM**

This question follows Hansen and Singleton (1982). You will need the data from St Louis FED web page for the period January, 1959-December, 2007 in monthly frequency. The data in the wk1 format are in the file HW4_Pr2_data.wk1 and can be open in TSP through the Looking Glass program. The data set consists of the following series: real personal consumption expenditures on services (*cs*), non-durables (*cmd*), 1-year treasury bond interest rate (*rf*, risk free rate), the return on a value-weighted portfolios of the S&P 500 Universe (*vwretd*, includes the dividend distribution), and a population *pop*. As a consumption measure, use per capita consumption of non-durables and services. As a return on equity *re* use *vwretd*.

a. Follow the GMM_manual.pdf to estimate β and γ by GMM in the the Euler equation $E_t [(1 + re_t)\beta(c_t/c_{t-1})^{-\gamma}] = 1$ using heteroskedasticity and autocorrelation consistent options with instruments consisting of a constant, c_{t-1}/c_{t-2} , c_{t-2}/c_{t-3} , re_{t-1} , re_{t-2} . Report parameter estimates with corresponding standard errors and p-values plus the Hansen J-statistic.

b. Estimate a two-return model using a mask option in TSP. The system of equations in this case is $E_t [(1 + re_t)\beta(c_t/c_{t-1})^{-\gamma}] = 1$ and $E_t [(1 + rf_t)\beta(c_t/c_{t-1})^{-\gamma}] = 1$ with instruments consisting of a constant, c_{t-1}/c_{t-2} , c_{t-2}/c_{t-3} , re_{t-1} , re_{t-2} , rf_{t-1} , rf_{t-2} . Report parameter estimates with corresponding standard errors and p-values plus the Hansen J-statistic.

c. Compare results from a and b. How do they differ and why? Considering your results from b, is there is still an equity premium puzzle?