

HOMEWORK 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/TS2009.html>

- 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.
- c. Select a candidate for a break i.e. identify visually some break years and find an economic rationale for this break (what happened in your country at this time?). Using your candidates for breaks in time series perform Perrons tests - see KC2007, Section 3.5.1. Out of the 3 types of Perrons test, which differ with respect to the number and type of break dummies included (intercept only, trend only, both trend and intercept), choose only one type. Try to select such test type that based on visual inspection of the break seems to be the most appropriate.
- d. Conduct the HEGY test for seasonal unit roots for the growth rate of GDP - see Enders, pp. 198-199. Use the most general formulation and conduct the test only at 5% level of significance. Use software of your choice for this task.

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?