

# Applied Econometrics

## Assignment One: Unit Root Analysis

October 2010

### Assignment Overview

#### Regulations

This assignment contains three questions. The questions one and three require you to undertake data analysis using the EViews econometric software package. For these questions, you must undertake the analysis for a specific variable which has been allocated to you on the basis of your student number. Please note that a penalty will be imposed if you do not perform the analysis for the specific variable allocated to you. Therefore, it is essential that you understand and comply with the allocation rules below. **If you are unsure which variable you are required to use for each of the these questions, do not hesitate to contact me as soon as possible.**

#### Deadline

The deadline for this assignment is ...

#### Question weightings

The marks allocated to the three questions in this assignment are as follows:

Question One: 60

Question Two: 40

Question Three: 60

# Question One

## Background information for Question One

Question One requires use of the EViews file *Nel\_Plos.wf1*. This file contains four of the annual series analysed by Nelson and Plosser (1982, *Journal of Monetary Economics*). The variables contained in this file are all measured in natural logarithms and are referred to by Nelson and Plosser as:

**gnp:** Real GNP.

**indp:** Industrial Production.

**deflat:** GNP deflator.

**velo:** Velocity.

For this question, you are required to consider one series according to the following allocation rule:

If the sixth digit of your student number is:	You must use the variable:
0, 1 or 2	gnp
3 or 4	indp
5, 6 or 7	deflat
8 or 9	velo

Denoting the augmented Dickey-Fuller (ADF) test statistic including an intercept and deterministic trend as  $\tau_\tau$ , and the degree of augmentation of the underlying testing equation as  $p$ , Nelson and Plosser (1982, *Journal of Monetary Economics*) obtained the following results for the data contained in the EViews workfile *Nel\_Plos.wf1*:

Table One		
Variable	$\tau_\tau$	$p$
gnp	-2.99	1
indp	-2.53	5
deflat	-1.44	2
velo	-3.05	1

## Tasks for Question One

- Provide a full and detailed account of the ADF test, illustrating your answer by replicating the results presented in Table One for the particular variable assigned to you.
- Provide results obtained from application of the ADF test under two differing methods of determining the degree of augmentation of the ADF testing equation, explaining whether these change the degree of augmentation of the testing equation and your subsequent results.
- Discuss the implications of the analyses of Perron (1989, *Econometrica*) and Leybourne, Mills and Newbold (1998, *Journal of Econometrics*) for the empirical analysis of the unit root hypothesis using the Dickey-Fuller test, explaining whether you feel these studies have relevance for the particular series you have examined.

## Question Two

### Background information for Question Two

Question Two involves close reading of Leybourne (1995, *Oxford Bulletin of Economics and Statistics*).

### Tasks for Question Two

- Provide a detailed and critical account of the maximum (A)DF test. Ensure that the answer you provide draws fully upon the results presented in Tables 3, 4 and 9 of Leybourne (1995). Your report should be no more than 1,000 words in length.

# Question Three

## Background information for Question Three

Question Three requires use of the EViews file *gdp.wf1*. This file contains annual observations on real per capita GDP for 10 economies over the period 1950 to 2008. The economies considered are listed in the first column of Table Two below. The second column of the table provides the name assigned to the differing GDP series in the EViews file. The third column provides an allocation identifier which will be used to determine which series you must examine. Note that you must conduct your answer for one specific series and this must be the one for which the allocation identifier equals the **fifth** digit of your student number. For example, if the fifth digit of your student number is ‘2’, you must consider the variable ‘den’.

Table Two		
Economy	EViews variable name	Allocation identifier
Austria	aus	0
Belgium	bel	1
Denmark	den	2
France	fra	3
Italy	ita	4
Netherlands	neth	5
Norway	nor	6
Spain	spa	7
Sweden	swe	8
Switzerland	swit	9

## Tasks for Question Three

- Provide a full and detailed account of the motivation and means of application of the (A)DF-GLS test. Illustrate your answer by applying an appropriately specified (A)DF-GLS test to the natural logarithm of the series assigned to you.
- Outline the nature and motivation of the KPSS test. Complete your answer by applying the KPSS it to the natural logarithm of the series assigned to you.
- Discuss the inferences drawn from the above two exercises involving application of the (A)DF-GLS and KPSS tests.