

ADVANCED QUANTITATIVE METHODS

ACADEMIC YEAR 2012-2013

ASSIGNMENT ONE

Deadline: to be determined.

Download the dataset lutkepohl2.dta from within Stata:

```
. webuse lutkepohl2.dta
(Quarterly SA West German macro data, Bil DM, from Lutkepohl 1993 Table E.1)
```

The dataset is made up of the following variables:

```
. des
Contains data from http://www.stata-press.com/data/r11/lutkepohl2.dta
obs: 92
Quarterly SA West German macro data, Bil DM, from Lutkepohl 1993 Table E.1
vars:      10      4 Dec 2008 14:31
size:      3,496 (99.9% of memory free)
-----
```

variable name	storage type	display format	value label	variable label
inv	int	%8.0g		investment
inc	int	%8.0g		income
consump	int	%8.0g		consumption
qtr	float	%tq		quarter
ln_inv	float	%9.0g		log investment
dln_inv	float	%9.0g		first-difference of ln_inv
ln_inc	float	%9.0g		log income
dln_inc	float	%9.0g		first-difference of ln_inc
ln_consump	float	%9.0g		log consumption
dln_consump	float	%9.0g		first-difference of ln_consump

```
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```

Exercise

- Identify, estimate and diagnostic check ARIMA models for each of the following variables: \ln_inv , \ln_inc , and $\ln_consump$.
- Formulate and estimate a dynamic linear model with four lags for $\ln_consump$ with \ln_inc and \ln_inv as explanatory variables.
- Reformulate the model in b. as an error correction model; store the log-likelihood value using the command `-estimates store llu-`; and subject the model to mis-specification testing.
- Reduce the model in successive steps by dropping insignificant variables (subjecting each step to mis-specification testing) in order to obtain a parsimonious model.

- e. Save the log-likelihood value of the parsimonious model (`-estimates store 11r-`) and perform a likelihood ratio test comparing the model in c. with the model in d. (`-lrtest 11u 11r`). You may wish to save the log-likelihood value at each step of the reduction using different names with the `estimates` command at each step.
- f. Estimate a VAR(4) for the three variables `dln_consump`, `dln_inc`, and `dln_inv`, that is, for the first difference of `ln_inv`, `ln_inc`, and `ln_consump`. Then determine the minimum number of lags required for the VAR, and subject it to mis-specification testing.
- g. Finally, drop individual variables from each of the three equations until you end up with a parsimonious model.