TSP Exercise Session - Problem Set 5

Simple Linear Regression

This exercise session is an introduction to working with TSP and gives an overview of basic commands you need for a simple regression analysis. For the first exercise we will use a macroeconomic data set consisting of three variables from the national accounts of the DIW (German Institute for Economic Research). This quarterly data from 1960/I to 1994/IV is for West Germany only. The variables are:

CON:	private consumption in current prices (bn DM)
YV:	disposable income of private households in current prices (bn DM)
P:	price index of private consumption (1991=100)

General remarks on working with TSP:

- Lecturer's path (here you can only read): L:\Applied Econometrics
  $\Longrightarrow$ Here you can find the data prepared for the course.
- Common path (everyone can read and write here): T:\
  $\Longrightarrow$ You can work either here (create a folder with your name) or locally (D:\).
- Don't forget to save your files at the end of the exercise session by taking them home on an USB stick or sending them to yourself by email!
- The program TSP can be started as **TSP through the Looking Glass** (more clearly organised on the screen) or as **TSP/Givewin** (better for graphical analyses) per ICON–Click or through the Start–menue, group "Programs". In the course we will use the latter option.
- The TSP/Givewin workspace is divided into two areas. In the left hand area there is a window giving you an overview of all the files currently in use, e.g. TSP program files, output files, plots, etc. All those files will be displayed in windows in the right hand area of the workspace.
- You can **create a TSP program file** by clicking File→New→TSP Program. A TSP program begins with the command **options crt ;** followed by the command **freq ;** defining the type of data used. The program ends with the command **end ;**. **All** TSP commands must be followed by a **semicolon ";"**, otherwise the program won't work correctly.
- **Run the TSP program** by clicking Modules→Run TSP, by clicking on the icon "run" (depicting a runnig person) or by pressing Ctrl+R on the keyboard.

- You can insert **comments** by writing a **question mark** in front of the respective text line. You can stop the programm from running right through to the end by inserting the command **stop ;**
- For further reference see the online edition of the TSP Reference Manual: http://www.tspintl.com/products/tsphelp/tsp.htm

1) Preparations

Please create a new folder for this exercise session with your name in directory T:. Then go to L:\Intermediate Econometrics\PC1 and copy the files "pc1_01.tsp", "pc1_01.xls" "pc1_02.tsp", and "pc1_02.xls" into your folder.

2) Getting started with TSP: Data Preparation

(a) Start TSP and open the file "pc1_01.tsp". Read in the data file "pc1_01.xls" and display the data. Use the commands **read** and **print**.

(b) Display the descriptive statistics of the three variables. Firstly, display the mean, standard deviation, minimum and maximum. Secondly, display the variance-covariance-matrix. Use the command **msd** and choose the necessary options.

(c) Display the descriptive statistics again, but only for the first ten years (i.e. the time period 1960/I-1969/IV). Use the command **smpl**.

(d) Return to using the **full sample**. Then generate the following variables using the command **genr**:

- CON_R: real consumption in prices of 1991 $= (CON/P) * 100$
- YV_R: real disposable income

(e) During how many periods has real consumption been lower than 150 bn DM? Use the command **select**.

(f) Plot the two variables CON_R and YV_R using the command **plot**.

(g) Create a plot placing the real disposable income on the x-axis and real consumption on the y-axis. Use the command **graph**.

3) Estimation of a Keynesian consumption function

The Keynesian consumption function is theoretically specified as:

$$C = \bar{C} + c \cdot Y$$

with:

C	real consumption
$\bar{C}$	"autonomous consumption"
c	marginal rate of consumption
Y	real income

Replacing the theoretical variables C and Y by the variables from our data set CON_R_t and YV_R_t and adding an error term u_t leads us to the corresponding econometric model:

$$CON\_R_t = \beta_1 + \beta_2 \cdot YV\_R_t + u_t$$

(a) Estimate such a model by applying the method of ordinary least squares (OLS). The necessary TSP-command is **olsq**.

(b) How large is the estimated autonomous consumption? Is the coefficient statistically different from zero?

(c) How large is the estimated marginal rate of consumption? Is it statistically different from zero?

(d) What does the estimated consumption function look like in a (YV_R_t , CON_R_t)-diagram? Create a plot placing the real disposable income on the x-axis and real consumption and the estimated consumption function on the y-axis.

A hint: The estimated values of CON_R_t are stored in the variable @fit.

4) CEO salary and tenure as a CEO

(Based on Wooldridge, Computer Exercise C2.2, p. 65)

Open the file "pc1_02.tsp". The data set in "pc1_02.xls" contains information on chief executive officers for U.S. corporations. The variable **salary** is annual compensation, in thousands of dollars, and the variable **ceoten** is prior number of years as company CEO.

(a) Find the average salary and the average tenure in the sample.

(b) How many CEOs are in their first year as CEO (that is, ceoten=0)? What is the longest tenure as a CEO?

(c) Estimate the following simple regression model:
$log(salary) = \beta_0 + \beta_1 \cdot ceoten + u$
Report the results of your estimation along with the number of observations and R^2.

(d) What does the intercept in this equation mean?

(e) What is the (approximate) predicted percentage increase in salary given one more year as a CEO?

(f) How reliable are these results?

A hint: Are the coefficients statistically different from zero?

5) Appendix: TSP-commands

generate	**genr** newvariable **=** variable1 + variable2 **;** **genr** newvariable **=** variable1 * variable2 **;** etc.
graph	**graph** (title='text') x-variable1 y-variable2 y-variable3 **;**
msd	**msd** (option1,option2) variable1 variable2 variable3 **;** → **possible options:** all, terse (only mean, standard deviation, min, max), cova (displays variance-covariance-matrix as well), byvar (when describing several variables)
plot	**plot** (title='text') variable1 variable2 variable3 **;**
print	**print** variable1 variable2 variable3 **;**
read	**read(file='**filename**');**
select	**select** dummy1=1 **;** **select** variable1>variable2 **;** etc. ; return to the full sample: **select** 1 **;**
smpl	**smpl** year:quarter,year:quarter **;** e.g. **smpl** 1900:1,2000:4 **;**
olsq	**olsq** (options) **y** c x1 x2 x3 **;** → with dependent variable **y**, constant **c**, independent variables **x1, x2, x3**