

## **TSP** *(a brief introduction)*

TSP is a complete language for the estimation and simulation of econometric models. It is a world-wide standard for econometric estimation. TSP stands for "Time Series Processor", although it is also commonly used with cross section and panel data.

### **How to open the software?**

- click Start -> TSP 5.0 -> TSP through the looking glass

### **Help?**

- basic command help is built in the TSP itself
- for advanced manual and additional packages check <http://www.tspintl.com>
- TSP user's guide is available at:  
<http://www.tspintl.com/products/TSP50UG.pdf>
- TSP reference manual is available at:  
<http://www.tspintl.com/products/TSP50RM.pdf>

### **How to read data?**

- TSP works the best way with the standard Lotus WK1 format - in Excel choose "Save As", then "WK1 (1,2,3)"
- to read data use **READ** *READ(file='tsp\_data.wk1', format=lotus) VARIABLE;*
- the data file needs to be saved in the same folder as your code

### **Basic commands in TSP:**

- to set frequency of data use **FREQ**, e.g. *FREQ a;* (a annually, q quarterly, m monthly, w weekly)
- to set time span use **SMPL**, e.g. *SMPL 1960 1999;*
- to generate scalar use **SET**, e.g. *SET max\_number = min\_number+2;*
- to generate vector use **GENR**, e.g. *GENR log\_gdp = log(ndp/cpi);*
- to generate a lag variable of order X use **(-X)**,  
e.g. *GENR diff\_gdp = gdp - gdp(-1);*
- to display value of a variable use **PRINT**, e.g. *PRINT diff\_gdp;*
- to plot a graph of a variable use **PLOT**, e.g. *PLOT log\_gdp;*
- to print a critical value of a distribution use **CDF**,

e.g. *CDF(INV,F,DF1=3,DF2=10) .05;*

- some saved variables

*@SSR* sum of square residuals

*%T(i)* p-value of the  $i^{\text{th}}$  variable

*@T(i)* t-statistic of the  $i^{\text{th}}$  variable

*@NOB* number of observations

*@RSQ*  $R^2$

### Advanced commands in TSP:

- to estimate OLS regression use **OLS**, e.g. *OLS (SILENT) gdp c gdp(-1) log\_cons;*
- to identify ARMA process use **BJIDENT**, where *ndiff* = degree of differencing, *nlag* = number of autocorrelations to be computed, *nlagp* = number of partial autocorrelations to be computed  
*BJIDENT (ndiff=1,nlag=10,nlagp=10) log\_gdp;*
- to estimate ARMA process use **BJEST**, where *nar* = number of AR parameters, *nma* = number of MA parameters, *nlag* = number of autocorrelations  
*BJEST(constant, nar=1, ndiff=1, nma=0, nlag=10) log\_gdp;*

? load data from the “tsp\_data.wk1” file

```
TITLE '***** LOADING DATA *****';
FREQ a;
SMPL 1960 1999;
READ(file='tsp_data.wk1', format=lotus) cons gdp;
```

? transform data into natural logarithm

```
TITLE '***** DATA TRANSFORMATION *****';
GENR log_gdp=log(gdp);
GENR log_cons=log(cons);
```

? run OLS regression, estimate gdp on constant and consumption, then the same in logarithm

```
TITLE '***** OLS ESTIMATION *****';
PRINT cons gdp;
OLS log_gdp c log_cons;
OLS gdp c cons;
```

? figure out whether estimated coefficients in first model are significant

```
TITLE '***** SIGNIFICANCE *****';
```

```

CDF (INV, T, df=38) 0.05;
PRINT @T(1);
? using Box Jenkins methodology estimate ARIMA model
  TITLE '***** ARMA ESTIMATION *****';
  BJIDENT (ndiff=1,nlag=10,nlagp=10) log_gdp;
  BJEST(constant, nar=1, ndiff=1, nma=0, nlag=10) log_gdp;
  SMPL 1961 1999;
  GENR residuals = @RES;
  BJIDENT (ndiff=0,nlag=10,nlagp=10) residuals;
? FOR loop
  DO i=1 TO max;
  OLSQ gdp c cons
  ENDDO;
? IF command
  IF (i=0); THEN;
  DO;
  OLSQ gdp c cons;
  PRINT @RSQ;
  ENDDO;
IF (i=0); THEN; PRINT i;

```

### **References**

1. TSP Reference Manual
2. TSP User's Guide
3. TSP: a brief manual by Ľuboš Briatka