TSP 4.4 an old but powerful econometric software

Michel LUBRANO*

February 1998

Abstract

This paper evaluates the latest version 4.4 of the econometric software TSP. After reviewing the general estimation methods, the originalities of the software are underlined, compared to what is available on the market. Some aspects of programing in TSP are detailed and the new Window 95 environment is presented.

Résumé

Ce papier évalue la dernière version 4.4 du logiciel économétrique TSP. Après avoir passé en revue les méthodes générales d'estimation, les originalités du logiciel sont soulignées et comparées à ce qui existe sur le marché. Quelques aspects sur la programmation dans TSP sont détaillés et le nouvel environnement Window 95 est présenté.

Classification JEL: C87

Key words: Software, Time Series, TSP

Mots clé: Logiciel, séries temporelles, TSP

*GREQAM-CNRS, Centre de la Vieille Charité, 2 rue de la Vieille Charité, 13002 Marseille, France, email: lubrano@ehess.cnrs-mrs.fr

1 Introduction

TSP 4.4 is the latest version of one of the oldest and most widely used econometric packages [see Silk (1996)], the Time Series Processor written by Bronwyn Hall and Clint Cummins. Previously available for PCs running DOS and OS2, for MAC users, for most mainframes and Unix workstations, TSP has now been adapted for the PC Windows environment. For the while, only the version for Windows 95/NT is available. A version for Windows 3.1 is announced as well as a version for Linux and X-Windows. However the reader should not be mislaid. What is really new is simply a companion programme called "TSP through the looking glass" (TLG) which gives a Windows environment for managing input and output files of the otherwise still traditional DOS version of TSP. I shall thus separate my review into an examination of the usual DOS TSP software with the improvements brought in by version 4.4 and a celebration of the incoming of TSP into the world of modern window systems with the separate viewer "TSP through the looking glass".

2 TSP 4.4

2.1 General

TSP is essentially a batch oriented econometric software like RATS or SHAZAM and unlike PC-GIVE or MICROFIT. You have first to edit an input file with extension .TSP, file which contains the necessary instructions to read and process your data. There is a possibility to run interactively TSP on PCs. Then usually the first instruction you type is to ask the programme to read a TSP file (instruction INPUT fn.TSP) where you have stored the instructions that would be otherwise fastidious to type interactively at each run (reading and transforming your data for instance). You can then process your data with the 140 different instructions available in TSP and plot the necessary graphs.

You can enter your data in three different ways. Your data can be stored at the end of your input file in the data section. You can read your data from one of your files with the instruction READ. The data file can be an ASCII file (human readable) or a worksheet file like Lotus, Excel or Quattro Pro. This last possibility is extremely convenient for data management. Finally, TSP has created a special data bank format. With the instructions IN fn(.TLB) and OUT fn(.TLB), you access implicitly (without naming them) all the variables present in the data bank and you save all the variables created in your session. The basic data concept of TSP is a vector of observations called by its name. In TSP language, this is a variable.

Data can be transformed using the GENR instruction together with the usual algebraic operators. GENR operates on series opposed to SET which operates on scalars or subscripted variables. GENR can also evaluate dynamically a recursion like $x = r * x(-1) + e$. Finally, GENR serves to simulate an expression previously declared by mean of an FRML.

The graphical possibilities of TSP are certainly too limited. The main command is PLOT, which accepts many options. In particular, the graph can be saved into a file with a format which is roughly speaking postscript or LaserJet (HP). When plotting one series, there is an automatic scaling. For two series, the scale is adjusted on the global min and max. If you want to nicely plot two series on the same screen, you have to program your own scaling (centering the series for instance). Otherwise, one series may appear as a flat line at the bottom of the screen. The HIST command for histograms produces only an ASCII graph. There is no 3-D graphs.

2.2 General estimation methods

TSP can of course perform OLS, but also roughly all the modern methods of estimation. OLS output comes out with adequate tests, some of which have been added recently. Satisfactorily, the DW does not appear when there is a lagged endogenous variable and is replaced by the Durbin's h statistics. With REGOPT, it is possible to have more diagnostic tests. The list is very complete and P-Value are computed. Extensions of OLS are provided for models with distributed lags, instrumental variables, heteroskedasticity. I would like to make two mentions, one positive, one negative. TSP offers the LIML command for limited information maximum likelihood which gives far better results than simple 2SLS. On the contrary, it is still possible to apply the one time famous Cochrane-Orcutt correction for first order serial correlation. The serious econometrician knows with Mizon (1995) that he should never do this. So why giving such a temptation to students using TSP?

The other methods provided by TSP cover panel data, limited dependant variables, the generalised method of moments. For time series analysis, if the identification, estimation and evaluation steps of the Box Jenkins methodology have been introduced for long in TSP, ARCH disturbances, Kalman filtering and VAR models are more recent (version 4.2). Note that the VAR command produces Granger noncausality tests, variance decomposition and impulse response functions.

2.3 What is unique

Every time you have to estimate a macroeconomic model, probably with some nonlinearities in the variables and that you want to simulate it, the same question appears: which software must I use? There is a variety of extremely powerful, but also extremely costly softwares on the market like TROLL for instance. Or there are specialised softwares which can simulate models, but cannot estimate them [see Jacquinot et al (1991) for instance]. There is one exception, this is TSP. The nonlinear estimation methods are well written and powerful for estimating nonlinear systems with 3SLS, ML, FIML or GMM, including cross equation restrictions. ML uses analytical derivatives in the recent versions of TSP (from version 4.0). The numerical procedures of TSP are very accurate and the experience of some users is that they dominate the existing procedures of GAUSS for instance. Of course, TSP is not as flexible as GAUSS for programming, but this is not the same product. Once your model is estimated, you can analyse it to order the equations so as to make apparent block structures (instruction MODEL). Finally the instructions SOLVE or SIML perform the simulation and ACTFIT evaluates the quality of the results. For macroeconomic modelling, this is unvaluable.

2.4 What is still lacking

TSP is written in Fortran, with some parts in C. This choice was made because the program started a long time ago. I remember using version 3 at the end of the seventies. Modern computer programmes are now written in object oriented languages like the C++. These languages have the advantage that it is very easy to incorporate new modules, some of which are lacking in TSP. The programming examples given with the package are very interesting. But some are basic as the Hodrick Prescot filter and so widely used in empirical work that including them as a new command would be really welcome.

With large data sets, there is now the need of non parametric estimation procedure, starting with basic kernel estimation of empirical densities and going up to non parametric regression. There is nothing like that in TSP. I would not say that it is redhibitory as there are specialised packages for that like XPLORE. But that would be a nice plus.

Despite its name, linear time series analysis is not the favourite item of TSP. I have given some details above concerning time series. I would like to comment here on the recent procedure COINT, introduced in version 4.3. It computes first unit root tests with the optimally selected number of lags. Once variables are found I(1), the procedures compute the Engle-Granger and the Johansen cointegration tests. Note that this command make obsolete the example file JOH1 which reproduces the Johansen-Juselius results for the Finnish data. However, COINT gives only the trace statistics (together with the P-Values) and not the λ Max statistics. It is not as convenient and as versatile as Cats for RATS or PC-GIVE. In particular, there is no built-in restriction and specification tests.

2.5 What is new in version 4.4

Apart from the new Windows environment on which I shall comment later on, there are new and interesting features in version 4.4 that were not present before. Nonlinear instrumental variables methods have been revised and greatly improved and enhanced. In the maximum likelihood method ML, you could previously only describe the likelihood function with the FRML instruction. This limited the likelihood function description to a single line. Version 4.4 improves ML by allowing the likelihood function to be written inside a procedure which allows of course many lines. These two enhancements confirm the nonlinear orientation of TSP. For other improvements, the reader should refer to the Web site of TSP which is described below.

3 Programming in TSP

TSP comes with a lot of example files which tend to accredidate the idea that programming in TSP is simple. Three different types of tools are available for programming in the macro language of TSP:

- You can write procedures that will later be called with different data sets. Variables are local in a procedure. With version 4.4, procedures can be used in conjunction with ML. Many examples are given for special ARCH models and panel data.

- Matrix algebra was greatly improved from what it was in version 4.0. You simply have to declare that you require matrix manipulations with the operator MAT. Then can follow as many matrix operations as you want like $MATB = (X'X)"X'Y$ provided they verify the required properties. Note that TSP distinguishes between general, symmetric, lower triangular and diagonal matrices. You can create a matrix by reading it, by copying it from the results of a statistical procedure, by packing time series with MMAKE. You can change the type of a matrix with MFORM.

- TSP loops looks like Fortran loops. The most simple loop with an index is obtained as "DO I=1,N;... ENDDO;". The DO WHILE structure is obtained by combining an IF-THEN-ELSE with a DO loop without an index: "IF condition; THEN; DO; ... ENDDO;". Note the special loop DOT; ENDDOT; acting on variables names. This command was slightly extended in version 4.4 for nested loops, but I had difficulties in using these extensions.

Programming is made difficult because of the ambiguity about what is exactly a variable. You must be careful about variables which are vectors, scalars and matrices. The logic is difficult to enter in when one is used to programming for instance in Gauss. There are restrictions on some operators. For example, declaring d as a constant with a given value and then asking to generate the lagged value of y with $y(-d)$ gives an error. Consequently the average user will most of time be confined to little programming, like retrieving results from existing TSP commands and then processing them to compute some simple tests. I do not think that TSP would be efficient for programming for instance a complicated Monte Carlo experiment. There are other softwares for doing that.

4 TSP and Windows 95

Many of the modern econometric packages appear now with a Windows environment, the latest example being PC-GIVE Professional 9 [See Judge and Harris (1997)]. "TSP through the looking glass" (TLG) is a convenient interface to access the batch version of TSP. There is a menu bar with "File, Edit, Text, Go, Window, Help" items. These items are detailed below the bar with equivalent buttons plus a blue button which serves to execute TSP. In a left window, you have the input file. After pressing the TSP button and waiting for a few seconds, the right window appears with the resulting output file. Each window can be manipulated and printed. This is extremely convenient for applied work.

I have however to underline two drawbacks of this system. First, the help concerns only the TLG program and gives no help for the syntax of TSP. There is no on-line reference manual within the Windows environment. Second, the TLG shell concerns only the batch operating of TSP. You can operate TSP interactively only in a DOS window, without the help of TLG. This may seem anodinous, but is not.

- Nice graphics seems to be available only with interactive execution. Otherwise, batch TSP produces only ugly ASCII plots which are not at all convenient. After a close look at the manual, I must confess that this is only partly true. There is an option to the PLOT command which is PREVIEW. It enables the displaying of VGA graphs on the screen within a batch execution. But the graph appears in a DOS window and cannot be manipulated in the windows environment.

- The interactive execution of TSP provides an on-line help for the rather complex syntax of TSP. With TLG, this facilities disappears and is not replace by the help of TLG as mentioned above.

- TLG launches a batch execution of TSP with no possible interaction. In particular you cannot stop the execution of a run, which is not under the control of TLG. If you have programmed an infinite loop, you can imagine what happens.

A final note about TSP and Windows 95. TSP was previously distributed on one zipped disquette. The zipped file could be decompressed on any PC running DOS or Windows if you had purchased the PC version. Now TSP is distributed on three compressed disquettes. The files can be decompressed only under Windows 95, despite the fact that TSP.EXE (not TLG.EXE) can be run indifferently under DOS, Windows 3.1 or Windows 95/NT. This detail is rather unpleasant for people who have not Windows 95/NT and I hope it should be fixed soon.

5 WEB support

There is a technical support for TSP on the WEB. The address is

http://www.tspintl.com

For Europe, there is a mirror site

http://www.econ.ucl.ac.be/tspintl/home.html

located in Belgium, hosted by the Economic Department of the Catholic University of Louvain. The site is maintained by the distributor of TSP for Belgium and France, Jean-Pierre Lemaitre. You can find on this site a lot of informations concerning the software. You can download a demo version, have access to FAQ, download examples, see what is new in version 4.4, how to order it, etc. The FAQ especially can be very useful to solve some of the compatibility mysteries of previous versions of the software.

6 Conclusion

Why are so many people using TSP, including myself? The answer is simple. First, even if it does look old fashioned, it works. It is well documented with two companion booklets: the reference manual and the user's guide. Second, it is versatile. If you buy RATS, you have access to a Sims like econometrics, centered on linear VAR models. If you buy PCGIVE, you are committed to the Hendry's vision of econometrics, with extensions to cointegration. With TSP, you do your own econometrics and may enhance the programme with your own routines. Finally, TSP is not expensive (I am not saying cheap). The basic price is $400. Upgrade is $100 from 4.3 and $200 from any older version. Final question. Is it worth buying version 4.4 if you already have a previous version? I was not fully convinced by the Windows platform, which is perfectible. So, if you have already version 4.3, you may perhaps wait for the next version of TSP through the Looking Glass. If you have an older version and that your PC is running Windows 95 or NT, it may really be worth considering seriously version 4.4.

REFERENCES

Jacquinot Pascal, Ferhat Mihoubi and Abderrahim Loufir (1991) *Muscadet et Muscadine, deux Outils pour la Micro-Informatique Appliquée à la Macro-Economie.* Economica, Paris.

Judge Guy and R.I.D. Harris (1997) PcGive Professional 9.0 for Windows. *The Economic Journal* 107, 1604-1613.

Mizon Grayham E. (1995) A Simple Message for Autocorrelation Correctors: Don't. *Journal of Econometrics* 69(1), 267-288.

Silk Julian (1996) System Estimation: A Comparison of SAS, SHAZAM and TSP. *Journal of Applied Econometrics* 11, 437-450.