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A REVIEW OF MicroTSP, A SOFTWARE PACKAGE FOR ECONOMETRIC ANALYSIS

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1. Introduction

This note discusses the econometric computer program MicroTSP, version 5.1, from *Quantitative Micro Software*, Irvine, California, which runs on the IBM PC and compatibles. Practical aspects of the program which showed themselves during its use are noted, embedded in an overview of the program. For overviews of statistical software, we refer to ESRC (1986) and Siegel (1985). Siegel discusses MicroTSP version 4.1. [If you already know this literature, you may be interested primarily in section 8, where the differences between version 5.1 and version 4.1 are summerized.]

Many readers will know the widely used mainframe package TSP, from *TSP International*, Stanford, California. Although the command language of MicroTSP is roughly similar to the command language of TSP, we stress that MicroTSP is not a micro version of mainframe TSP. MicroTSP is an entirely different program, written in (compiled) BASIC, while TSP is written in FORTRAN. As you might expect, the version numbers of MicroTSP and TSP differ: the most recent version of MicroTSP is 5.1, while the most recent version of TSP is 4.1.

However, TSP International recently released a download of mainframe TSP: 'PC TSP'. This program is a full copy of TSP for VAX/VMS. As stated above, this note is about MicroTSP, but it contains some references to PC TSP too, for comparison.

MicroTSP is an econometric program: it can estimate several types of dynamic linear and nonlinear equations and systems of equations and it can solve a model of nonlinear simultaneous equations. In the next two sections, these facilities are discussed in some detail. In sections 4 through 7 other aspects of the program are presented. In section 8 a comparison is made with earlier versions, and the results of a benchmark test are given in section 9. Section 10 gives some technical and commercial details, while section 11 gives a short conclusion.

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2. Statistical analysis

MicroTSP offers a wide range of regression options. In a linear regression specification, any sequence of AR(p) terms and MA(q) terms may be added to the regression specification, where AR(p) indicates AutoRegressive disturbances of order p and MA(q) indicates Moving Average disturbances of order q. Also, a list of instruments for linear Two Stage Least Squares may be included. Coefficients of lagged regressors may be restricted to an Almon lag structure. Coefficients and residuals can be retrieved. As an option on the linear regression command, a series of weights may be specified.

Missing data - created for instance by a time lag - abort a regression if they are within the sample range. (The sample range is not automatically updated when missing values are created.) The option to deselect observations for which one or more of the series in the regression contains a missing value may be included in the regression command.

Also, nonlinear equations can be estimated, as well as systems of related nonlinear equations. Available estimation techniques are Two Stage Least Squares, Seemingly Unrelated Regression and Three Stage Least Squares.

The nonlinear regression procedures in MicroTSP use a Gauss-type algorithm, making successive linear approximations. We found this procedure to work better than TSP's procedure LSQ in one specific badly conditioned estimation problem.

3. Forecasting and simulation

Forecasting with a single regression equation and simulation with a multi-equation model can be done in MicroTSP with either static or dynamic use of lagged endogenous variables and autoregressive disturbances.

Models are solved with the Gauss-Seidel method: the right hand sides of the equations are computed repeatedly, using the most recently computed value of the endogenous variables, until convergence is reached. This is a very simple procedure and not all models can be solved with it. As far as we could find out, there is on the other hand no limit to the size of the model to be solved, except the limit of the total number of series (300).

4. Keyboard input

The input of commands in MicroTSP shows clearly that the program is not an adapted version of a mainframe program: the facilities which are offered by the IBM PC are well exploited. Thus, the last 10 commands given are retrieved by pressing Ctrl A one or more times; the retrieved command can then be editted in-line with the edit keys and reentered.

Also, about 40 commands can be given with a stroke of a function key. Key 1 is used to change the meaning of the other nine keys, which are (optionally) shown at the bottom of the screen.

Some DOS commands are available as MicroTSP commands: Dir, Chdir, Type, Rename, and Del. It must be noted here that MicroTSP contains no command such as the SYSTEM command in PC TSP, which brings the user temporarily into DOS.

If not all (or none) of the parameters of a command are given, then the user is asked for the remaining parameters, one by one, instead of facing an error message. The latter is the case with PC TSP.

5. Screen output and printer output

The screen output of MicroTSP is also tailored to the PC. The top of the screen shows the status of the session, such as the sample period, what series are in RAM, the default drive letter, etc. This information may be suppressed, using the customizing facility of MicroTSP.

The output of statistical procedures is divided into sections which roughly fill one screen. One may inspect these sections cyclically on the screen or print them.

If the required graphics hardware is installed, the series can be plotted against each other or against time. A text can be written in the picture in the most direct and easy way: move the cursor to the required position and type the text. The picture can be printed.

Optionally, all printer output can be redirected to a file - one of the facilities of the OPTION command.

6. Editing

MicroTSP is provided with a simple text editor, with 18 one letter commands. Among these are the ordinary commands such as Edit line (with in-line editing), Delete line, etc. Also there is a command which reads an equation from an equation file and converts it in text format, for inclusion into a model. There is no Copy Line command or Move Line command.

Also, a data editor is available for convenient input and correction of data.

Most of the facilities discussed in this and the previous sections are absent in PC TSP. In particular, the input and output of PC TSP would work equally well with a typewriter terminal! The absence of an editor for text files in PC TSP is no great loss, however, because of the SYSTEM command, noted above.

7. Files

One may distinquish four types of files in MicroTSP: data files, equation files, model files and batch files. MicroTSP uses data files of several kinds: binary files and files in text format; the latter ordered by series or by observation, either in a general format without directives, in DIF format or in Lotus .PRN format. MicroTSP can read and write Lotus WKS files.

Reading of .PRN files is like */File Import Numbers* in Lotus. Unfortunately, the READ command in MicroTSP can not skip items between quotes in a .PRN file. For example, the series name "MONEY1" in a .PRN file is interpreted as 1.0.

Equation files contain an estimated equation in binary format. Model files contain model equation in text form; they can be editted with the MicroTSP text editor. See also section 3.

Batch files contain MicroTSP commands and can be executed with the RUN command. A batch file may contain a RUN command.

8. What's new: versions 5.1 versus version 4.1

Version 5.1 contains several improvements over version 4.1. Firstly, the maximum number of series in RAM is now 300 (was 150). Also, several new statistical procedures are added: nonlinear regression, both for single equations and for systems of equations, and probit/logit regression. Series can be sorted and a FOR..NEXT facility for batch operation is added. Lotus WKS files can be read and written.

Some minor bugs and inconveniences are removed. For instance, it is now possible to plot in a batch program; although only to the printer, not to the screen.

The program runs now without an overlay structure, which is an important advantage for users without a hard disk.

Finally, we like to mention here the quick response of the author of the program: we sent a letter with some complaints about MicroTSP and after two weeks we received a satisfactory reply, with a copy of the version 5.0, which was not yet officially announced at the time.

9. A benchmark

We have done a small timing test with MicroTSP. The test involves two tasks. One of them is to solve *69-C*, the annual econometric model of the Netherlands Central Planning Bureau used in the early seventies. The other task is the computation of the exogenous series of the model and the lagged endogenous series, from a few base series.

For comparison, we did the same computations with and without the 8087 math coprocessor. Also, for comparison, we did the computations with PC TSP (with the 8087). Since MicroTSP can solve models only with the Gauss-Seidel method, this method was applied (for both programs). Notice that PC TSP has more methods for model solving.

MicroTSP has no facility for the 'optimal' ordering of the equations; this has to be done manually. The ordering of 69-C from PC TSP has been used here.

The model 69-C consists of 50 equations, with a simultaneous block of 36 equations. PC TSP uses the block structure of the model.

We solved the model over the time period 1970-1975, with the dynamic use of the endogenous variables. The convergence criterion was set at 0.005 for all variables, in both programs. (CONV2 in PC TSP was set to a very large number.) An Olivetti M24 computer has been used, with the software on hard disk and the input data (batch files + series + model) on diskette.

The table below gives the results of the test. The effect of the 8087 math coprocessor is very small. Also, at first sight, the difference between the two programs is only marginal. Notice, however, that MicroTSP uses more than three times as many iterations as PC TSP. This may very well be caused by the difference between the two programs in the treatment of small values of the endogenous variables: PC TSP switches to an absolute criterion for values less than unity (in absolute value), while MicroTSP uses a relative criterion throughout. Corrected for the difference in the number of iterations, MicroTSP is twice as fast as PC TSP. Finally, we note that the differences in the solved values between the programs was of the order of the convergence criterion.

Computing time (seconds) for the model 69-C, 1970-1975

task	MicroTSP [5.1] with 8087	MicroTSP [5.1] without 8087	PC TSP [4.0J] with 8087
compute series	83	93	66
read model	30	30	88
solve model	154 (48)	178	149
total	267 (161)	301	303
index total	.9 (.5)	1.	1.
total number of iterations	268 (83)	268	83

Index: PC TSP = 1

(): corrected for number of iterations being different from PC TSP

10. Facts and figures

This section brings together some details, partly discussed already in section 8.

MicroTSP can be ordered from Quantitative Micro Software, 4521 Campus Drive, Suite 336, Irvine, CA 92715, USA. The program costs $595. There is a gradual quantity discount scheme; for example, 50% discount with ten copies.

Version 5.1 of MicroTSP can hold 300 series in RAM, and (with 640 Kbytes) 32 K data points. The program has no overlay structure: it runs smoothly on a system without hard disk and with minimal 384 Kbytes of RAM. The 8087 math coprocessor is supported.

MicroTSP is copy protected, but when installed on a hard disk, it runs without using the key diskette.

Finally, some details about PC TSP. This program can be ordered from TSP International, P.O.Box 61015, Station A, Palo Alto, CA 94306, USA. It is not copy protected and the first copy costs $300; additional copies $150.

PC TSP has an overlay structure and requires 512 Kbytes of RAM. The program can hold approximately 15 K data points (version 4.0J). The 8087 math coprocessor is required. A hard disk is recommended.

11. Some conclusions

MicroTSP is a user friendly econometric software package, with a fairly wide range of econometric capabilities. It runs with a relative small hardware configuration.

PC TSP has all econometric techniques of the well known mainframe version. It makes little use of the facilities of the IBM PC.

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