Chapter 4
INTERACTING WITH TSP

This chapter provides a general overview of TSP's interactive mode. It is a sufficient introduction for new users anxious to dive into their first session. You will find additional convenience features discussed in Chapter 17, and further information about the commands in the *Reference Manual*. A short sample session has been included at the end of the chapter for added clarity (**Example 4.1**). If you use Windows, you may want to try the visual user interface utitlity *Through the Looking Glass* (TLG), which combines the best features of batch and interactive modes in TSP.

4.1. Basic operation

You don't really need to know much before jumping into your first interactive session, but it's useful to have an idea of how to start, stop, and enter commands. Also, having an understanding of the operating modes of the program may affect how you approach it and will enable you to get the most out of it.

4.1.1. Beginning and ending a session

The command you use to start running interactive TSP depends on how the program was installed on your system; it will probably be "TSP" (on some systems, you double-click on a TSP icon). If this doesn't work you will have to consult your system manager. Once you have given the command (or double-click), the following will appear:

```
Enter batch filename [or press Enter for interactive]:
```

Two responses are possible:

1. If you supply a filename here (such as prog2a), TSP will run in *batch* mode (in this case, reading commands from prog2a.tsp and putting output in the file prog2a.out). When TSP finishes, it will prompt for a new batch filename (or to rerun the same batch file). If you are using a multitasking operating system (such as unix, OS/2, Windows, or Mac), you can use a task switch key at this point to view the output file and edit the input file, and then rerun TSP a second time if necessary. Otherwise, you'll have to exit from TSP, give commands to do these operations, and then restart TSP. (In this case, you would be better off using the command tsp prog2a which will run TSP in batch mode automatically and skip the prompt). Batch mode is recommended if a long sequence of TSP commands are needed to estimate your model; it is easier to revise and reproduce results this way.

> **Note for Windows users:** If you want to work in batch mode, TLG is easier and more convenient.

2. If you press Enter (or Return on some keyboards) to the initial prompt, the following will appear:

```
Enter TSP statements:
1?
```

You are now in the *interactive* mode of the program, and each command that you enter will be executed immediately, and results will be displayed on the screen.

It is possible to suppress execution of commands selectively; see the next section and COLLECT in the *Reference Manual*. It is also possible to redirect output; see Section 4.4 or the OUTPUT command in the *Reference Manual*.

If your last session ended abnormally, the following message should appear before the first line number prompt. (Chapter 17 discusses the automatic recovery system. See also the RECOVER section in the *Reference Manual*.)

```
WARNING> Your previous TSP session was terminated abnormally.
  Do you wish to recover it (y/n)? [y]
```

To end an interactive TSP session use either the EXIT or STOP command. But first be sure to save any output you want. SAVE (see Section 4.3) saves all the current TSP variables (but not the commands) so they can be restored later. The batch-compatible commands that you entered will be saved in the file BKUP.TSP. This file may be useful for starting your next session (with INPUT or LOGIN.TSP). You can restart an interactive session (i.e. start over at line 1), by using the CLEAR command. You can also use the SYSTEM command to temporarily suspend your session to take care of other business on the computer. (See Chapter 17 for more information.)

4.1.2. Modes of operation

TSP operates in three modes:

Interactive: One line at a time is executed, right after the command is entered. Control may be transferred between interactive and collect modes as often as you like. In general, blocks of statements that are executed as a unit (PROCs, DO loops, etc...) must be entered in collect mode. EXIT or STOP returns you to the operating system, terminating TSP. CLEAR restarts an interactive session (without saving anything). It is also possible to pass control temporarily to the operating system without interrupting the interactive session (SYSTEM command.)

Collect: Collect mode is entered from interactive mode by the COLLECT command. Execution is suppressed until a group of commands has been entered, and execution is requested (EXEC). The commands are then processed and you are returned to interactive mode. EXIT returns you to interactive mode without executing the collected lines. Reading a stream of commands from an external file (with INPUT) is functionally the same as COLLECT. With INPUT, execution is automatic when END or end-of-file is reached. In either case, the commands read are incorporated into the interactive session, and may be REVIEWed, EDITed, etc... later in the session.

Batch: In batch mode TSP reads and executes a previously prepared, complete TSP input file. You create this input plain text (ASCII) file with a separate text editor (such as the EDIT command in DOS 5-6, or a word processing program, saving as a text only file). You can run your file via a batch queue (multiuser systems), or while waiting at your PC/terminal. In either case, TSP usually terminates when execution of the file is completed. This was once the only mode in which TSP operated.

Through the Looking Glass (for Windows only): This visual interface utility works just like any other Windows program. It allows you to edit multiple TSP input files using standard Windows editing conventions (such as cut and paste). You can run the files in batch mode by clicking a TSP button, and browse and print the output.

You may want to execute a short TSP program you have prepared, displaying the output on the monitor. In this case, you could open TSP interactively, and then immediately INPUT a previously prepared batch file.

4.1.3. Entering commands in Interactive Mode

There is not much difference between entering TSP commands in a file for batch execution, and entering them in interactive mode -- just follow the usual syntax. However, you may want to note the following:

1. You can abbreviate TSP commands (and options). The abbreviation must be unambiguous, and must not skip characters; it may be any length (including 1). For example:

OLS	valid abbreviation for OLSQ
BJ	ambiguous -- could be BJEST, BJIDENT, BJFRCST
BJF	valid for BJFRCST
Q	valid for QUIT (no other "Q" commands)
FCST	invalid for FORCST (skips characters)

2. When entering commands in interactive or collect modes, a carriage return defines the end of the command -- semicolons are not necessary to separate commands on different lines. However, they are still a required part of TSP statement syntax, and consequently still required in batch or INPUT files. If you REVIEW any portion of the session, you will notice that they have been added for you. You may enter more than one command per

line in interactive mode if you separate them with semicolons.

3. In interactive or collect mode, you may indicate that a statement takes more than one line by typing a backslash (\) at the end of the line(s) that are to be continued.

4. You can use cursor keys to recall and edit lines that you've previously typed. This is useful for correcting typographical errors, adding/dropping variables, or repeatedly executing commands. The cursor keys work just like they do in DOS EDIT, Notepad, or Wordpad:

↑ recall previous line(s)	**Ins** toggle typover/insert mode (default: typeover for each line)
↓ recall later line(s)	
← move (cursor) left in current line	**Del** delete character at cursor
→ move (cursor) right in current line	**Esc** clear current line
Home move (cursor) to start of line	**Backspace** delete character to left of cursor
End move (cursor) to end of line	

For more advanced methods of editing commands in interactive mode, please see Chapter 17.

4.2. Requesting information: HELP, REVIEW, FIND, SHOW, DIR

Several commands will give information on the current status of your session or remind you of command syntax.

HELP *TSP command*

displays information about the syntax and function of a particular TSP command.

REVIEW *first line, last line*

redisplays a range of lines from your session.

FIND *TSP command*

displays all the lines in your session that begin with the specified TSP command. This is useful when you want to EDIT or EXEC a command, but you don't know its line number.

SHOW *list of names and/or keywords*

provides information about how TSP has stored specific items, or groups of items in the symbol table. You can SHOW SERIES to find out which time series you have stored, along with their frequencies, starting and ending dates, and number of observations. You can also SHOW SMPL or FREQ to find out the current settings of each.

DIR *

displays all the files in your current directory with the extension TSP; this can be useful in conjunction with the INPUT command. DIR "alone" prompts for a directory specification; you can display information about any file, from any directory (as well as request information regarding size, date, etc.).

4.3. Methods of entering or reading data

The interactive mode of TSP offers a number of approaches to loading data. If the data you need is not on disk in some usable form, the easiest method of data entry is the ENTER command.

ENTER *series name*

prompts you to enter data based on the current sample and frequency. Any number of data points may be entered per

line. If a non-numeric item is encountered (your fingers slip on the keyboard) it is ignored (along with any numbers that follow it on the line). Numeric corrections to the values of a series may be made with the UPDATE command. ENTER prompts for data until enough numbers have been supplied to fill the current SMPL.

READ *series name*

also allows you to enter data from the keyboard, though no prompting will occur (other than the current line number prompt), and nothing is stored until a semicolon is entered; this is one of the few instances in which a semicolon is required in interactive mode. Numeric errors not corrected immediately can also be UPDATEd.

If the data you need is already stored on disk, you can use any of the following methods to read it:

READ with the options FILE= and/or FORMAT=
INPUT the name of a file that contains a data section.
IN databank.
FETCH *micro-TSP* (or *EViews*) databank.
RESTORE a SAVEd session.

4.4. Saving selected output during interactive use: OUTPUT, TERM, PrtSc

As you use TSP interactively, you will often produce output on the screen that you want to save for later examination or printing. You can save screen output easily with the OUTPUT command.

OUTPUT *filename*

sends all output to the file "filename.out" until the TERMINAL command, or another OUTPUT command is encountered. You can create as many output files as you like during a session; each OUTPUT statement opens a new output file and closes the previous one (if there was one). If the output filename already exists (whether it was created earlier in the session or not), output will be appended to the old file rather than creating a new file. For rules on specifying filenames, see OUTPUT in the command reference section.

It is not possible to send output to the terminal and an output file simultaneously, but error and warning messages are displayed in both places so you will know if something is seriously wrong. There are several solutions to the "seeing your output and saving it, too" dilemma. Which is best depends on how much of the output you want to see, and how much you are paying for computer resources. For simplicity, the following examples save output from one procedure only; all may be extended to handle any volume of output.

1. To print just the output on the screen, you can use the shift-printscreen keys in either DOS or in a DOS window running TSP. You can also mark the screen output in a DOS window and save it in Clipboard for later use.

2. If you are not certain that you want to save the results, you can execute the procedure(s) first, and then repeat the command after issuing an OUTPUT command if it looks good (commands that the user enters are in **bold**).

   10? **OLSQ CONS C GNP**
   (regression output)
   11? **OUTPUT REGRESS**
   12? **EXEC 10**
   13? **TERM**

3. If you only need to see selected results from what you save, the following method is faster. All output is sent to the file until TERM, and any other variables created during execution may be examined with PRINT or SHOW.

   10? **OUTPUT REGRESS**
   11? **OLSQ CONS C GNP**
   12? **TERM**
   13? **TSTATS(NAMES=@RNMS) @COEF @VCOV;** ? Prints t-statistics

4. This method takes the most steps, but avoids a wait during re-execution. The system prompt character is shown as $. This may be different, for example, on a PC the prompt is the disk drive letter (usually C> or D>):

   10? **OUTPUT REGRESS**
   11? **OLSQ CONS C GNP**
   12? **TERM**
   13? **SYSTEM**
   $ **TYPE REGRESS.OUT**
   (contents of regress.out)
   $ **CONTINUE**
   14?

You can look at the file with your editor instead of the TYPE command. You can also print, delete, rename, or copy the file before continuing TSP. The TERM command is essential because it closes the file; if the file is not closed when you try to look at it, it will either appear empty or be missing the output you added since the last time it was closed.

4.5 Sample session in Interactive Mode

The following pages give a simple example of running TSP in interactive mode.

For information on advanced techniques in interactive mode, please see Chapter 17.

```
Commands which the user enters are in boldface

C>tsp

Enter TSP statements:

  1 ? input illusdat       ? Read data from the file ILLUSDAT.TSP

Do you want the output displayed at the terminal (y/n)? [y]

CURRENT SAMPLE : 1961 TO 1975

 5 ? review                ? List the statements executed thus far

        1. ?INPUT ILLUSDAT;
        1. FREQ A;
        2. SMPL 61 75 ;
        3. READ GNP CONS I ; ? GNP, CONSUMPTION, INVESTMENT
        4. REGOPT(LMLAGS=2) LMAR;  ? TURN ON THE LMAR DIAGNOSTICS
        5. REVIEW;
```

Example 4.1: Sample Session

6 ? **olsq cons c gnp** ? Regress CONS on GNP and a constant

```
                                        Equation   1
                                        ============

                      Method of estimation = Ordinary Least Squares

Dependent variable: CONS
Current sample:  1961 to 1975
Number of observations:  15

         Mean of dep. var. = 626.527
    Std. dev. of dep. var. = 105.195
  Sum of squared residuals = 1911.53
     Variance of residuals = 147.040
  Std. error of regression = 12.1260
                 R-squared = .987662
        Adjusted R-squared = .986712
              LM het. test = .513322 [.474]
             Durbin-Watson = .616923 [.000,.002]
Breusch/Godfrey LM: AR/MA1 = 9.22897 [.002]
Breusch/Godfrey LM: AR/MA2 = 8.69666 [.013]
          Jarque-Bera test = .659462 [.719]
           Ramsey's RESET2 = 6.96993 [.022]
           F (zero slopes) = 1040.62 [.000]
            Schwarz B.I.C. = 5.20868
            Log likelihood = -57.6411

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C         -63.3408      21.6135       -2.93061      [.012]
GNP       .676823       .020981       32.2586       [.000]
```

7 ? **plot @res** ? Plot the residuals from the last regression
(Note: the output below is typical batch or unix output. The interactive plot command on a PC or Mac gives a high resolution color line plot with time on the horizontal axis. See Chapter 6 for an example.)

```
                                TIME SERIES PLOT
                                ================
@RES PLOTTED WITH *


        MINIMUM                                                MAXIMUM
      -15.49356                                              26.95816
        |-+-------------------------------------------------+-|
1961    |                                   *                 | 14.33653
1962    |                          *                          | 5.39168
1963    |                      *                              | 2.50406
1964    |                    *                                | 0.22691
1965    |              *                                      | -5.22950
1966    |  *                                                  | -14.52242
1967    | *                                                   | -15.49356
1968    | *                                                   | -15.14146
1969    |      *                                              | -11.41568
1970    |                        *                            | 4.45320
1971    |                          *                          | 5.65954
1972    |                        *                            | 3.71360
1973    |              *                                      | -5.15250
1974    |                        *                            | 3.71143
1975    |                                                   * | 26.95816
        |-+-------------------------------------------------+-|
      -15.49356                                              26.95816
        MINIMUM                                                MAXIMUM
```

Example 4.1: (Continued, page 2).

```
 8 ? normal gnp 72 2608.5          ? Normalize to 1982 dollars (from 1972 dollars), to prepare
 9 ? normal cons 72 1621.9         ? for updating in 1982 dollars
10 ? update gnp

Which observations do you wish to update? 74 85

Enter data for GNP
    1974? 2729.3 2695.0 2826.7
    1977? 2958.6 3115.2 3192.4
    1980? 3187.1 3248.8 3166 3277.7 3492 3573.5
 12 observations of GNP      have been updated.

 11 ? update cons

Which observations do you wish to update? 74 85

Enter data for CONS
    1974? 1674 1711.9 1803.9 1883.3 1961 2004.4
    1980? 2000.4 2024.2 2050.7 2145.9 2239.9 2312.6


 12 ? save                 ? Save the data so it can be restored later
 13 ? smpl 61 85           ? Change the sample to include the new data
 14 ? graph gnp cons               ? Plot Consumption vs. GNP

                        PLOT OF GNP      VERSUS CONS
                        ===========================
GNP
             |-------------------------------------------------|
  3573.500 - |                                                *|
             |                                             *   |
             |                                        2*    *  |
  3100.712 - |                                      *   *      |
             |                                  *             |
             |                            **   *              |
  2627.924 - |                          *   *                 |
             |                     ** *                       |
             |                 *  *                           |
  2155.136 - |              *                                 |
             |         * *                                    |
             |   **                                           |
  1682.349 - |*                                               |
             |-------------------------------------------------| CONS
              |          |          |          |          |
       1022.704             1538.664             2054.623
                 1280.684             1796.643             2312.602

 12 observations of CONS     have been updated.


 15 ? find olsq            ? Look for all OLSQ commands thus far
     6. OLSQ CONS C GNP;
 16 ? exec 6               ? Repeat the OLSQ under the new SMPL (output is shown on the next page)
     6. OLSQ CONS C GNP;
```

Example 4.1: (Continued, page 3).

```
                                    Equation   2
                                    ============
                      Method of estimation = Ordinary Least Squares
Dependent variable: CONS
Current sample:  1961 to 1985
Number of observations:  25

          Mean of dep. var. = 1649.17
     Std. dev. of dep. var. = 385.115
  Sum of squared residuals = 19485.3
     Variance of residuals = 847.185
  Std. error of regression = 29.1064
                 R-squared = .994526
        Adjusted R-squared = .994288
              LM het. test = .634874 [.426]
             Durbin-Watson = .993869 [.001,.006]
Breusch/Godfrey LM: AR/MA1 = 5.96885 [.015]
Breusch/Godfrey LM: AR/MA2 = 6.52117 [.038]
           Jarque-Bera test = 1.24251 [.537]
            Ramsey's RESET2 = 3.64755 [.069]
            F (zero slopes) = 4178.60 [.000]
             Schwarz B.I.C. = 6.91605
             Log likelihood = -118.705

            Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C          -190.235      29.0447       -6.54975      [.000]
GNP        .694874       .010750       64.6421       [.000]



17 ? retry 6          ? Change from OLSQ to AR1
     6. OLSQ CONS C GNP;
    >> r olsq ar1
     6. AR1 CONS C GNP;
                                    Equation   3
                                    ============
                  FIRST-ORDER SERIAL CORRELATION OF THE ERROR
                  MAXIMUM LIKELIHOOD ITERATIVE TECHNIQUE

                  CONVERGENCE ACHIEVED AFTER   11 ITERATIONS
Dependent variable: CONS
Current sample:  1961 to 1985
Number of observations:  25

(Statistics based on transformed data)  (Statistics based on original data)
          Mean of dep. var. = 807.195          Mean of dep. var. = 1649.17
     Std. dev. of dep. var. = 171.116     Std. dev. of dep. var. = 385.115
  Sum of squared residuals = 14785.7   Sum of squared residuals = 15034.9
     Variance of residuals = 642.855      Variance of residuals = 653.692
  Std. error of regression = 25.3546   Std. error of regression = 25.5674
                 R-squared = .979573                  R-squared = .995846
        Adjusted R-squared = .978685         Adjusted R-squared = .995666
             Durbin-Watson = 1.67542              Durbin-Watson = 1.66861
Rho (autocorrelation coef.) = .536778
      Standard error of rho = .176223
        t-statistic for rho = 3.04601
             Log likelihood = -115.425

            Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C          -155.104      46.8728       -3.30903      [.001]
GNP        .682614       .017270       39.5257       [.000]

18 ? exit     ? Terminate the session

C>
```

Example 4.1: (Continued, page 4).