Chapter 2
GETTING STARTED

2.1. Tools you will need to use TSP

The hardware you will need to use TSP depends on whether you want to work on your own personal computer or on a shared larger computer. One advantage of TSP is that since essentially the same program runs on both types of computers, you can develop your program on a smaller, cheaper personal computer, and then move to a larger computer to take advantage of its greater speed and data storage. TSP input files are ASCII files which are easily uploaded (transferred to another computer) over a modem or network. (If necessary, consult your local system consultant for information on how to upload.)

In addition to TSP, you will need one other piece of software to work efficiently with the program: a text editor for preparing input and reading output. If you run TSP under Windows, you can use *TSP through the Looking Glass* (TLG) to edit and run your batch files, and examine the results. More TLG information is available on the installation diskettes.

In this chapter, we assume that you know which computer you want to use and have chosen the appropriate version of TSP for that computer. First we discuss how to use the program on personal and networked computers. Then we give a simple introductory example of a TSP program to help you get started.

2.1.1. On a personal computer

TSP runs on most personal computers that use either the DOS operating system, Windows, or OS/2. It also runs on Macintosh systems and many UNIX-compatible workstations.

You will probably find it convenient at first to work in interactive mode, as described in Chapter 4. Interactive mode is good for trying things out, and for quick one-time computations. Later, if you find yourself repeatedly typing the same commands, you can use a separate text editor (such as *TSP through the Looking Glass* (TLG), the DOS EDIT command or a word processing program) to edit your commands and save them in an ASCII file. If you use a word-processor to prepare TSP programs, be sure to save the file as a DOS text or ASCII file. You can submit your commands (program) to TSP as an INPUT file to be executed. In TLG, this is done simply by clicking on the TSP icon. Setting up a session with an INPUT file and then using interactive mode to try new ideas is often the most efficient way to work.

2.1.2. On a shared or network computer

We assume that you or someone else has successfully installed TSP. Separate documents available from TSP International provide instructions for installation. The usual shared or networked installation is either a unix system (see Appendix F), or a networked Windows installation (see Appendix D).

2.2. A little vocabulary

Very little knowledge of computers is required to use TSP, but you will need to know the following computer terms to understand this manual:

1. **Memory**. A computer has millions of characters of high-speed memory. As your TSP job runs, all your data are in your computer's memory so that they can be reached quickly. At the conclusion of the run, the computer forgets everything in memory.

2. **Disk**. To save information between runs, the computer has space to store millions of characters on magnetic disks. The time required to find something on disk is several orders of magnitude longer than the time for memory, so anything which will be used intensively is moved from disk to memory at the beginning of a run.

3. **File**. Information on disk is stored in "files". TSP uses *input files* containing commands and data, *plain data files* for use by different input files, and *output files* containing your results. Normally TSP input files have the extension tsp and TSP output files have the extension out. Data files may have any extension.

Some basic TSP concepts that you will need to know are:

1. **Series**. A series is a set of observations on a variable, usually evenly spaced over time. Annual observations on GNP are an example we will use frequently. Monthly sales of a firm are another example. Cross-sectional, survey, and panel data are also referred to as series.

2. **Command (or Statement)**. To communicate your wishes to TSP, you use commands. A command has a short, easy to remember name such as PRINT or OLSQ, followed in most cases by a list of series.

3. **Program**. You assemble a group of commands into a program, and then ask TSP to execute the program all at once. A program can consist of just a few commands, each to be executed once, or a large number of commands and a sophisticated structure for repeating some of them.

4. **Input file**. The input file contains your TSP program and the data required to run it, or instructions as to where to find the data.

5. **Output file**. TSP creates an output file as it executes your program. The file contains messages describing what TSP thinks are errors in your program or data, memos to you about what TSP has done in the course of executing your program, and your regression and other substantive results. When your computer has finished the TSP run, you should examine the output file with your text editor. If you are using TLG, this is easily done by mouse-clicking Error on the Run menu.

2.3. A simple regression example

In the rest of this chapter, we present a simple example of running a regression in TSP. The function of the commands are described briefly to give you a feel for using TSP. Using this very simple TSP program as an example, you should be able to set up a regression run of your own. The output for the program is shown in **Example 2.1**. To learn more about the basics of TSP, continue on to Chapter 3.

In the example run, we read in two series of annual time series data (a sales variable and Gross National Product (GNP) for 1976 to 1985), take their natural logarithms, compute their means and standard deviations, and run a simple linear regression of the log of sales on the log of GNP. Here is the example:

```
OPTIONS CRT;   ? simple example
FREQ A;  SMPL 76,85;
LOAD SALES,GNP;
11.7 1706
13.7 1901
11.4 2151
12.3 2391
19.4 2608
20.4 2956
18.2 3051
25.3 3261
24.3 3639
28.3 3843
LSALES = LOG(SALES);  LGNP = LOG(GNP);
MSD LSALES,LGNP;
OLSQ LSALES C,LGNP;
```

```
                                TSP Version 4.4
                      Copyright (C) 1997 TSP International
                                ALL RIGHTS RESERVED
                                 07/30/97 8:24 PM
                In case of questions or problems, see your local TSP
                consultant or send a description of the problem and the
                associated TSP output to:
                                 TSP International
                             P.O. Box 61015, Station A
                                Palo Alto, CA 94306
                                       USA
         PROGRAM
LINE  ***************************************************************
1  OPTIONS CRT;  ? simple example
2  FREQ A; SMPL 76,85;
4  LOAD SALES,GNP;
4  11.7 1706
4  13.7 1901
4  11.4 2151
4  12.3 2391
4  19.4 2608
4  20.4 2956
4  18.2 3051
4  25.3 3261
4  24.3 3639
4  28.3 3843
4  LSALES = LOG(SALES); LGNP = LOG(GNP);
7  MSD LSALES,LGNP;
8  OLSQ LSALES C,LGNP;
         EXECUTION
***************************************************************************

Current sample:  1976 to 1985

                              Univariate statistics
                              =====================

Number of Observations: 10
                    Mean       Std Dev       Minimum       Maximum
LSALES          2.86666       0.33996       2.43361       3.34286
LGNP            7.88696       0.27326       7.44191       8.25401

                     Sum      Variance      Skewness      Kurtosis
LSALES         28.66657       0.11558     -0.053501      -1.67063
LGNP           78.86961      0.074670      -0.30857      -1.04519


                                    Equation   1
                                    ============
                      Method of estimation = Ordinary Least Squares

Dependent variable: LSALES
Current sample:  1976 to 1985
Number of observations:  10

       Mean of dep. var. = 2.86666      LM het. test = 1.86919 [.172]
  Std. dev. of dep. var. = .339965     Durbin-Watson = 2.13492 [.424,.744]
Sum of squared residuals = .171653  Jarque-Bera test = 1.15536 [.561]
   Variance of residuals = .021457   Ramsey's RESET2 = 1.38103 [.278]
Std. error of regression = .146481   F (zero slopes) = 40.4785 [.000]
               R-squared = .834978    Schwarz B.I.C. = -3.60435
      Adjusted R-squared = .814351    Log likelihood = 6.13495

           Estimated    Standard
Variable  Coefficient     Error       t-statistic   P-value
C          -6.09956      1.41004       -4.32581      [.003]
LGNP       1.13684       .178685       6.36227       [.000]

***************************************************************************

END OF OUTPUT.
```

Example 2.1: Simple TSP Job

continuation of a command across several lines. If you are using TSP interactively, the semicolon at the end of each command is not required, and the \ key is used to continue a long command to the next line:

```
LOAD  LABOR LABOR2 CAPITAL CAPITAL2 MATERIAL \
MATER2
```

If you are using TSP in batch mode, the semicolon at the end of each command *is* required, and the \ key **cannot be** used:

```
LOAD  LABOR LABOR2 CAPITAL CAPITAL2 MATERIAL
MATER2 ;
```

The function of each command in the simple TSP program above is as follows:

OPTIONS CRT;	Keeps the output file width under 80 columns
? simple example	A comment that is ignored by TSP
FREQ A;	Specifies annual frequency for the data
SMPL 76,85;	Sets the range of data -- from 1976 to 1985
LOAD SALES,GNP;	Reads two time series from the numbers following
LSALES = LOG(SALES);	Creates a new variable as the log of SALES
MSD LSALES,LGNP;	Computes means and other statistics
OLSQ LSALES C,LGNP;	Regresses LSALES on LGNP and a constant term