Chapter 4: The Classical Model (OPTIONAL)

In this chapter:

Read this first: The procedures described in this chapter are not essential to your understanding of econometrics or to using EViews to reproduce the results published in *UE*. The purpose of describing the procedures in this chapter is to familiarize you with the Monte Carlo Simulation process described in (*UE* 4.3.2, p. 102).

Demonstrate that the estimated βs are drawn from a normal distribution (*UE* 4.3.2, pp. 101-102):

Follow these steps to complete the process described in (*UE* 4.3.2):

Step 1. Open EViews and type the following commands in the command window, hitting **Enter** after each command:

```
CREATE MONTECARLO U 1 15
MATRIX(20,1) BETA
SERIES X=10+NRND
```

What does this do? The first command creates an undated workfile named *MONTECARLO* with 15 observations, the second command creates a matrix named *BETA* with 20 rows[1] and one column to store the sample βs, and the third command creates a series named *X* equal to 10 plus a random number drawn from a normal distribution with zero mean and unit variance.

Step 2. Type the following commands in the command window, press **Enter** after each command:

```
SERIES Y=X+0.25*@RNORM
EQUATION EQ1.LS Y X
BETA(1)=@COEFS(1)
```

What this does: The first command generates a random number named *y* (*UE*, Equation 4.11, p. 101), the second command estimates the regression with *y* as the dependent variable and *x* as the independent variable (no constant), and the third command saves the β coefficient on *x* in the first row of the matrix named *BETA*. You have to repeat **Step 2** for each new sample β. However, you don't have to re-type each line, each time. Just put the cursor on the command line and press **Enter**. Change the number (in parenthesis after beta in the command BETA(1)=@COEFS(1)) to the next higher number so you don't overwrite the previous sample β. The next iteration should look like this:

```
SERIES Y=X+0.25*@RNORM
EQUATION EQ1.LS Y X
BETA(2)=@COEFS(1)
```

[1] Enter the number that equals the number of sample βs you plan to estimate. The number 20 was selected for this example, but for a realistic Monte Carlo simulation, this number should be much larger.

Step 3. Type the following commands in the command window, press **Enter** after each command:

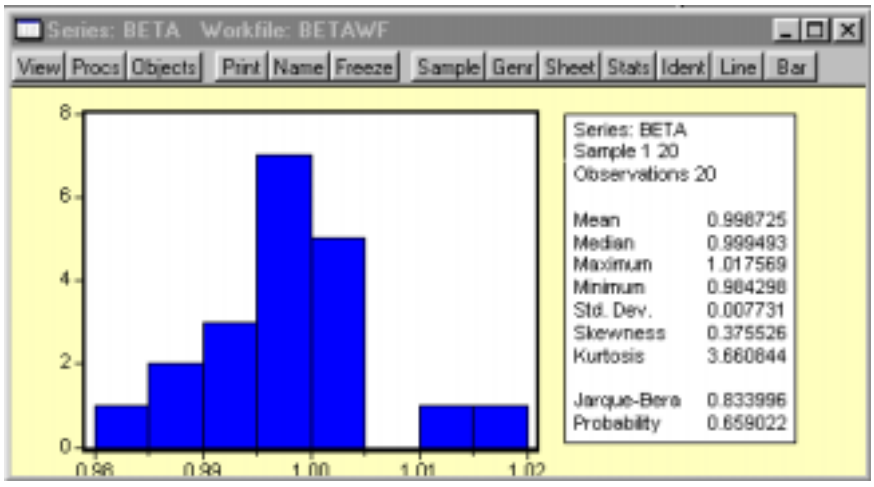
```
BETA.WRITE(T=XLS) EXCEL
CREATE BETAWF U 1 20
READ(T=XLS) EXCEL 1
RENAME SER01 BETA
BETA.HIST
SAVE
```

The first command writes the matrix named *BETA* as a series to an Excel file named *EXCEL*, the second command creates a new undated EViews workfile named *BETAWF* with 20 observations,[2] the third command reads the series named *excel* into the EViews workfile and names it *SER01*, the fourth command renames *SER01* to *BETA*, the fifth command creates a histogram of the sample βs, and the last command saves the EViews file.

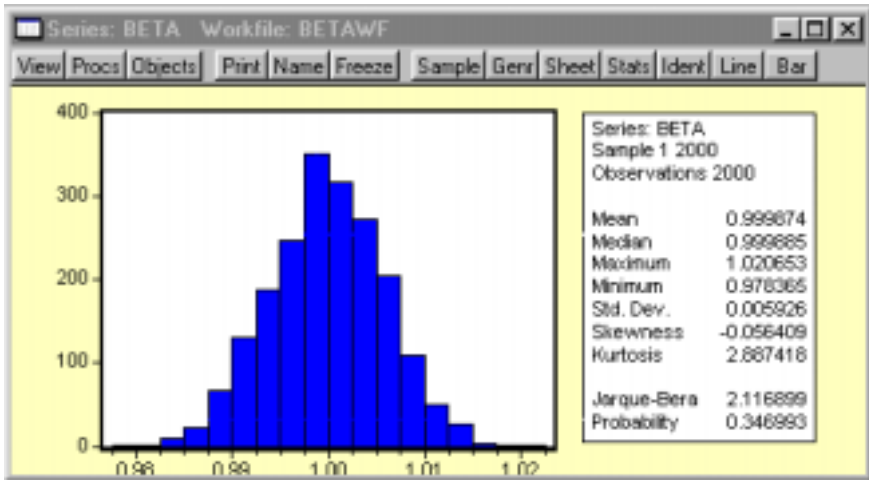
[2] This number should be set equal to the number of rows in the matrix named *beta*. See footnote 1.

The three figures below show how the probability distribution of the estimated sample β series more closely approximates the normal distribution as the number of observations increase from 20 to 2,000 and finally to 8,000. For an explanation of the histogram and descriptive statistics represented, see Chapter 16.

The graphic on the right shows the **View/Descriptive Statistics/Histogram and Stats** EViews for beta with 20 observations.



The graphic on the right shows the **View/Descriptive Statistics/Histogram and Stats** EViews for beta with 2,000 observations.



The graphic on the right shows the **View/Descriptive Statistics/Histogram and Stats** EViews for beta with 8,000 observations.