TABLE 15.2 SAMPLE COMPUTER PRINTOUT

Y = CONSTANT + C1 · X1 + C2 · X2

RSQ = 0.8953	SER = 3.2338	F(2,11) = 47.0
RSQC = 0.8762	% SER = 7.86	DW = 1.69

Variable	Coeff.	St. Error	T-Stat	Mean
CONSTANT	49.06899	9.67267	5.07	41.16071 (dep. var.)
X1	−1.07049	0.23464	−4.56	21.00714
X2	0.35775	0.13400	2.67	40.75357

Index	Actual	Fitted	Residual	% Deviation
1	35.90000	35.25925	0.64075	1.82
2	52.70000	54.54910	−1.84910	−3.39
3	46.30000	50.74680	−4.44680	−8.76
4	34.20000	36.98609	−2.78609	−7.53
5	51.30000	46.15574	5.14426	11.15
6	44.20000	44.02220	0.17780	0.40
7	33.90000	29.70675	4.19325	14.12
8	31.30000	30.54304	0.75696	2.48
9	31.70000	32.74207	−1.04207	−3.18
10	29.90000	31.58795	−1.68795	−5.34
11	51.10000	49.76981	1.33019	2.67
12	56.10000	51.62468	4.47532	8.67
13	43.90000	45.56465	−1.66465	−3.65
14	33.7500	36.99187	−3.24187	−8.76

the software package used, but the output will generally be very similar to this illustration. At this juncture, most of Table 15.2 should be comprehensible. However, it may be helpful to interpret the key statistics of this table.

1. The regression equation is $Y = 49.06899 - 1.07049\,(X1) + 0.35775\,(X2)$. To get a point forecast for Y, one would merely plug in the estimated values of $X1$ and $X2$. For example, if $X1 = 20$ and $X2 = 40$, the predicted Y value would be 41.969. In practice, it will be more convenient to use mnemonic symbols for the variables instead of Y, $X1$, and $X2$.
2. $R^2 = 0.8953$, which means that $X1$ and $X2$ explain 89.53 percent of the total variation in Y. The CR^2, which is adjusted downward for lost degrees of freedom, is 0.8762.
3. SER = 3.2338. This would be a key figure of merit in comparisons with alternative models. The SER could also be used to construct a crude confidence interval for an individual forecast based on the assumption that all the independent variable values are equal to their

respective means. This confidence interval would be[6]:

$$\hat{Y}_f - t \cdot s\sqrt{1 + \frac{1}{n}} < Y_f < \hat{Y}_f + t \cdot s\sqrt{1 + \frac{1}{n}}$$

where s = SER = 3.23
n = 14
t = 2.201 (t value for two-sided test at 0.05 level of significance for 11 df)

$$\hat{Y}_f - 2.201\,(3.23)\,(1.0351) < Y_f < \hat{Y}_f + 2.201\,(3.23)\,(1.0351)$$

$$\hat{Y}_f - 7.3588 < Y_f < \hat{Y}_f + 7.3588$$

Using the point estimate for Y_f of 41.969 derived in #1 above, the 95 percent confidence interval would be

$$34.610 < Y_f < 49.328$$

This would mean a 95 percent probability that the actual value will fall in the stated range if the forecast is based on independent variables equal to their respective means. Of course, this will never be the case. Consequently, the actual confidence interval will always be wider. Nevertheless, given this understanding, the simplified confidence interval provides at least a rough sense of the potential variability of the forecast.

4. The %SER = SER ÷ $\overline{Y}$. The %SER provides a figure that is intuitively meaningful and can be used instead of the SER if all model comparisons involve the same dependent variable.
5. The F value for 2 df in the numerator and 11 df in the denominator = 47.0, which is well above the listed F value of 7.21 at the 0.01 significance level. Again, the F test will almost invariably verify that the equation is significant.
6. DW stands for Durbin-Watson (a measure discussed in Chapter 16).
7. The t statistic is equal to the coefficient values divided by the respective standard error. In this example, all the coefficients are significant (t value at the 0.05 level of significance for a one-tailed test with 11 df is 1.796).
8. The Actual column in Table 15.2 lists the actual observations of Y, and the Fitted column lists the corresponding values indicated by the regression equation. The difference between these two figures for each observation is listed in the Residual column. (The Percent Deviation column is equal to the residual divided by the fitted value.) Thus far, we have only discussed the meaning of the overall summary statistics for the regression equation. As will be detailed in the next chapter, the individual residual values also contain extremely important information and should be carefully analyzed.

[6]See the section, Confidence Interval for an Individual Forecast.