Computer Notes on Conducting Sensitivity Analysis

It is in the area of sensitivity analysis and break-even analysis that the electronic spreadsheet truly reveals its power. Conceptually, a NPW distribution can be simulated using manual labor (pencil, paper, and calculator). However, computers have the advantage of being able to handle large amounts of data rapidly, so risk analysis is rarely done manually.

The Excel spreadsheet in Exhibit 1 has been structured in the format of Table 14.1, the after-tax cash flow BM C’s transmission-housings project. However, the sales, price, variable cost, fixed cost, and salvage have been keyed to a percent change, as shown in columns E and G of Exhibit 1. For example, the cell formulas for entries in the following locations are as follows:

- **Unit price**— cell D17: =$C$3*(1 + $G$5)
- **Demand**— cell D18: =$C$4*(1 + $G$6)
- **Sales revenue**— cell D19: = D17*D18
- **Unit variable cost**— cell D21: =$C$5*(1 + $G$7)
- **Variable cost**— cell D22: = D21*D18
- **Fixed cost**— cell D23: = $C$6*(1 + $G$8)
- **Taxable income**— cell D26: = D19 – D22 – D23 – D24
- **Income taxes**— cell D27: = D26*$C$8
- **Net income**— cell D29: = D26 – D27
- **Salvage value**— cell H38: =$C$7*(1 + $G$9)
- **Gains tax**— cell H39: =(H38 – (-C37 – SUM(D35:H35)))*$C$8
- **Net cash flow**— cell C41: =C34 + C35 + C37 + C38 + C39
- **Net present value**— cell G11: =NPV(C9,D41,E41,F41,G41,H41) + C41

Note that the NPW at 15% is shown in G11 and that for zero change for all variables (the base-case values), the NPW should be $40,169, as calculated in Example 14.2.

Since all the variables whose values we wish to investigate are keyed to the percent change, all we have to do to calculate a new NPW is to change the percent change for the variable of interest. As we vary in the percent deviations for price (2% increase), demand (3% decrease), variable unit cost (5% decrease), fixed cost (10% increase), and salvage value (20% decrease) from the base values, we see instantly a new NPW of $38,375 appears in location G11. By varying the input values, we can answer various “what-if” questions in a matter of minutes from this spreadsheet.
Exhibit 1 A typical Excel worksheet design that performs sensitivity and break-even analyses (Example 14.2)