Using Scenario Manager

Data tables are useful, but they have a few limitations:

- You can vary only one or two input cells at a time.
- Setting up a data table is not intuitive.
- A two-input table shows the results of only one formula cell (although you can create additional tables for more formulas).
- In many situations, you're interested in a few select combinations, not an entire table that shows all possible combinations of two input cells.

The Scenario Manager is a fairly easy way to automate some aspects of your what-if models. You can store different sets of input values (called *changing cells* in the terminology of Scenario Manager) for any number of variables and give a name to each set. You can then select a set of values by name, and Excel displays the worksheet by using those values. You can also generate a summary report that shows the effect of various combinations of values on any number of result cells. These summary reports can be an outline or a PivotTable.

For example, your annual sales forecast may depend on several factors. Consequently, you can define three scenarios: best case, worst case, and most likely case. You then can switch to any of these scenarios by selecting the named scenario from a list. Excel substitutes the appropriate input values in your worksheet and recalculates the formulas.

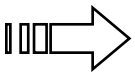
Defining scenarios

To introduce you to Scenario Manager, this section starts with an example that uses a simplified production model, as shown in Figure 31.10.

FIGURE 31.10

A simple production model to demonstrate Scenario Manager

	A	B	C	D
1	**Resource Cost Variables**			
2	Hourly labor cost	30		
3	Material cost	57		
4				
5				
6		**Product A**	**Product B**	**Product C**
7	Hours per unit	12	14	24
8	Material per unit	6	9	14
9	Cost to produce	$702	$933	$1,518
10	Sales price	$795	$1,295	$2,195
11	Unit profit	$93	$362	$677
12	Units produced	36	18	12
13	**Total profit per product**	**$3,348**	**$6,516**	**$8,124**
14				
15	**Total Profit**	**$17,988**		



This workbook, named `production model scenarios.xlsx`**, is available on this book's website at** `www.wiley.com/go/excel2019bible`.

This worksheet contains two input cells: the hourly labor cost (cell B2) and the unit cost for materials (cell B3). The company produces three products, and each product requires a different number of hours and a different amount of materials to produce.

Formulas calculate the total profit per product (row 13) and the total combined profit (cell B15). Management—trying to predict the total profit but uncertain what the hourly labor cost and material costs will be—has identified three scenarios, which are listed in Table 31.1.

TABLE 31.1 Three Scenarios for the Production Model

Scenario	Hourly Cost	Materials Cost
Best Case	30	57
Worst Case	38	62
Most Likely	34	59

The Best Case scenario has the lowest hourly cost and the lowest materials cost. The Worst Case scenario has high values for both the hourly cost and the materials cost. The third scenario, Most Likely, has intermediate values for both of these input cells. The managers need to be prepared for the worst case, however, and they're interested in what would happen under the Best Case scenario.

Choose Data ➪ Forecast ➪ What-If Analysis ➪ Scenario Manager to display the Scenario Manager dialog box. When you first open this dialog box, it tells you that no scenarios are defined, which is not too surprising because you're just starting. As you add named scenarios, they appear in the Scenarios list in this dialog box.

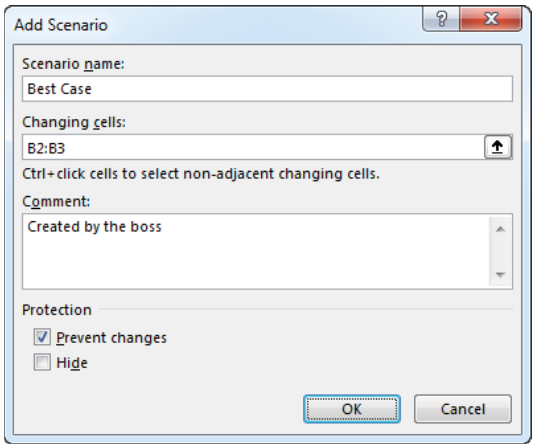
TIP

It's a good idea to create names for the changing cells and all of the result cells that you want to examine. Excel uses these names in the dialog boxes and in the reports that it generates. If you use names, keeping track of what's going on is much easier; names also make your reports more readable.

To add a scenario, click the Add button in the Scenario Manager dialog box. Excel displays its Add Scenario dialog box, shown in Figure 31.11.

FIGURE 31.11

Use the Add Scenario dialog box to create a named scenario.



This dialog box consists of four parts:

Scenario Name You can give the scenario any name you like.

Changing Cells These are the input cells for the scenario. You can enter the cell addresses directly or point to them. If you've created a name for the cells, type the name. Nonadjacent cells are allowed; if pointing to multiple cells, press Ctrl while you click the cells. Each named scenario can use the same set of changing cells or different changing cells. The number of changing cells for a scenario is limited to 32.

Comment By default, Excel displays the name of the person who created the scenario and the date it was created. You can change this text, add new text to it, or delete it. If you name the scenario well, you may not need much of a comment. However, some scenarios are so complex that more information will be useful both to you and to others who use your workbook.

Protection The two Protection options (preventing changes and hiding a scenario) are in effect only when you protect the worksheet and choose the Scenario option in the Protect Sheet dialog box. Protecting a scenario prevents anyone from modifying it; a hidden scenario doesn't appear in the Scenario Manager dialog box.

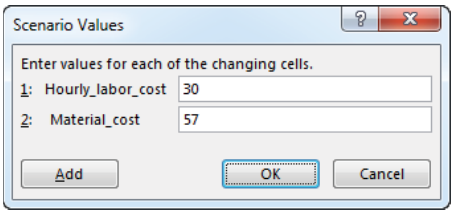
In this example, define the three scenarios that are listed in Table 31.1. The changing cells are Hourly cost (B2) and Materials cost (B3).

After you enter the information in the Add Scenario dialog box, click OK. Excel then displays the Scenario Values dialog box, shown in Figure 31.12. This dialog box displays one field for each changing cell that you specified in the previous dialog box. Enter the values for each cell in the scenario. If you click OK, you return to the Scenario Manager dialog

box, which then displays your named scenario in its list. If you have more scenarios to create, click the Add button to return to the Add Scenario dialog box.

FIGURE 31.12

You enter the values for the scenario in the Scenario Values dialog box.

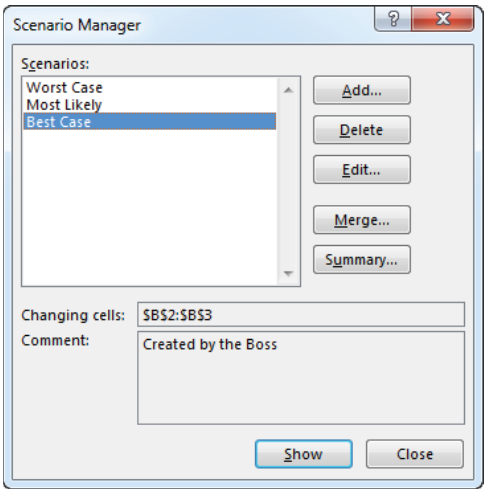


Displaying scenarios

After you define all the scenarios and return to the Scenario Manager dialog box, the dialog box displays the names of your defined scenarios. Select one of the scenarios and then click the Show button (or double-click the Scenario name). Excel inserts the corresponding values into the changing cells and calculates the worksheet to show the results for that scenario. Figure 31.13 shows an example of selecting a scenario.

FIGURE 31.13

Selecting a scenario to display



Using the Scenarios Drop-Down List

The Scenarios drop-down list shows all the defined scenarios and enables you to display a scenario quickly. Oddly, this useful tool doesn't appear on the Ribbon. But if you use Scenario Manager, you can add the Scenarios control to your Quick Access toolbar. Here's how to do it:

1. **Right-click the Quick Access toolbar, and choose Customize Quick Access Toolbar from the shortcut menu.** The Excel Options dialog box appears with the Quick Access Toolbar tab selected.
2. **From the Choose Commands From drop-down list, select Commands Not in the Ribbon.**
3. **Scroll down the list and select Scenario.**
4. **Click the Add button.**
5. **Click OK to close the Excel Options dialog box.**

Alternatively, you can add the Scenarios control to the Ribbon. See Chapter 8, "Customizing the Excel User Interface," for additional details on customizing the Quick Access toolbar and the Ribbon.

Modifying scenarios

After you've created scenarios, you may need to change them. To do so, follow these steps:

1. **Click the Edit button in the Scenario Manager dialog box to change one or more of the values for the changing cells of a scenario.**
2. **From the Scenarios list, select the scenario that you want to change and then click the Edit button.** The Edit Scenario dialog box appears.
3. **Click OK.** The Scenario Values dialog box appears.
4. **Make your changes and then click OK to return to the Scenario Manager dialog box.** Notice that Excel automatically updates the Comments box with new text that indicates when the scenario was modified.

Merging scenarios

In workgroup situations, you may have several people working on a spreadsheet model, and several people may have defined various scenarios. The marketing department, for example, may have its opinion of what the input cells should be, the finance department may have another opinion, and your CEO may have yet another opinion.

Excel makes it easy to merge these various scenarios into a single workbook. Before you merge scenarios, make sure that the workbook from which you're merging is open:

1. **Click the Merge button in the Scenario Manager dialog box.**
2. **From the Merge Scenarios dialog box that appears, choose the workbook that contains the scenarios you're merging in the Book drop-down list.**

3. **Choose the sheet that contains the scenarios you want to merge from the Sheet list box and click Add.** Notice that the dialog box displays the number of scenarios in each sheet as you scroll through the Sheet list box.
4. **Click OK.** You return to the previous dialog box, which now displays the scenario names that you merged from the other workbook.

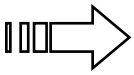
Generating a scenario report

If you've created multiple scenarios, you may want to document your work by creating a scenario summary report. When you click the Summary button in the Scenario Manager dialog box, Excel displays the Scenario Summary dialog box.

You have a choice of report types:

Scenario Summary The summary report appears in the form of a worksheet outline.

Scenario PivotTable The summary report appears in the form of a PivotTable.



See Chapter 27, "Creating and Using Worksheet Outlines," for more information about outlines, and see Chapter 29, "Introducing PivotTables," for an introduction to PivotTables.

For simple cases of scenario management, a standard Scenario Summary report is usually sufficient. If you have many scenarios defined with multiple result cells, however, you may find that a Scenario PivotTable provides more flexibility.

The Scenario Summary dialog box also asks you to specify the result cells (the cells that contain the formulas in which you're interested). For this example, select B13:D13 and B15 (a multiple selection) to make the report show the profit for each product plus the total profit.

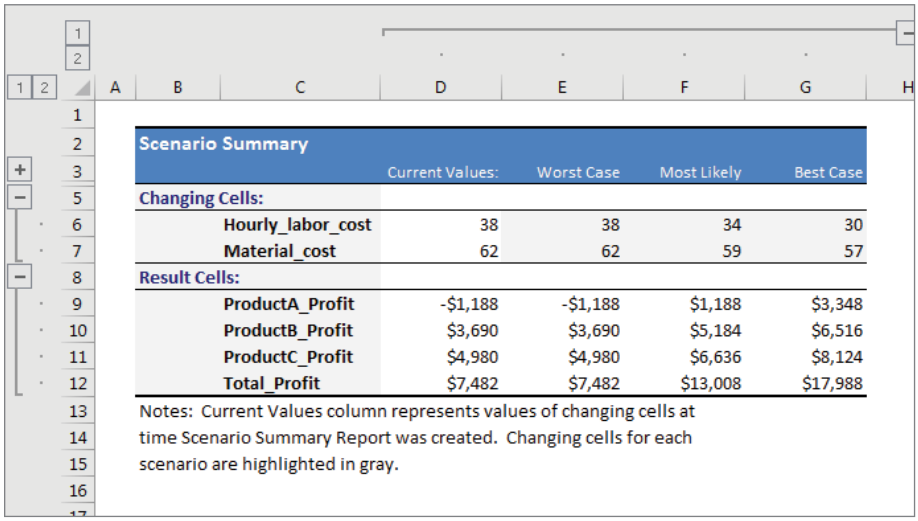
NOTE

As you work with Scenario Manager, you may discover its main limitation, namely, that a scenario can use no more than 32 changing cells. If you attempt to use more cells, you get an error message.

Excel creates a new worksheet to store the summary table. Figure 31.14 shows the Scenario Summary form of the report. If you gave names to the changing cells and result cells, the table uses these names; otherwise, it lists the cell references.

FIGURE 31.14

A Scenario Summary report produced by Scenario Manager



Scenario Summary	Current Values:	Worst Case	Most Likely	Best Case
Changing Cells:				
Hourly_labor_cost	38	38	34	30
Material_cost	62	62	59	57
Result Cells:				
ProductA_Profit	-$1,188	-$1,188	$1,188	$3,348
ProductB_Profit	$3,690	$3,690	$5,184	$6,516
ProductC_Profit	$4,980	$4,980	$6,636	$8,124
Total_Profit	$7,482	$7,482	$13,008	$17,988

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.