

Chapter-17 Working with What-If Analysis Data Table in MS Excel

What-If Analysis in Excel offers various tools to explore different scenarios based on changing input values. One of the most powerful and flexible tools within this feature is the **Data Table**. Data Tables allow you to evaluate how changes in one or two input variables affect the results of a formula.

A **Data Table** is particularly useful when you want to analyze multiple scenarios or compare the impact of different input values on a formula's output. This tool is commonly used in financial modeling, forecasting, and optimization problems.

Types of Data Tables in Excel

1. **One-Variable Data Table:** This allows you to change one input value and see how it affects the output.
2. **Two-Variable Data Table:** This allows you to change two input values simultaneously and see how they affect the output.

One-Variable Data Table

A **One-Variable Data Table** is used when you want to see how varying one input (the independent variable) affects the output of a formula.

Steps to Create a One-Variable Data Table

1. **Set Up the Formula:**
 - You need a formula that depends on a specific input. For example, if you are calculating the total cost based on units sold and price per unit:
 - **A1:** Units Sold (input)
 - **A2:** Price per Unit (input)
 - **A3:** Total Cost (calculated by the formula $=A1 * A2$).
2. **Create the Data Table Structure:**
 - In a new column or row, enter the list of possible values for the input that you want to vary (e.g., different unit prices or sales volumes).
 - For instance, you might enter different sales units (e.g., 1,000, 2,000, 3,000) in cells **B2:B5**.
3. **Link the Formula:**
 - In the cell next to the first value in the Data Table (e.g., **C2**), enter the reference to the formula cell (e.g., $=A3$), where **A3** contains the formula for Total Cost.

4. **Create the Data Table:**
 - Select the range including the column of input values and the column with the formula references (e.g., **B2:C5**).
 - Go to the **Data** tab on the ribbon.
 - In the **Forecast** group, click **What-If Analysis** and then select **Data Table**.
5. **Input Row or Column in the Data Table Dialog:**
 - In the **Data Table** dialog box, you only need to specify the **Row Input Cell** or **Column Input Cell**, depending on whether the data is arranged in rows or columns.
 - If your input values are listed vertically (in a column), enter the cell reference for the variable you're changing (e.g., **A1** for units sold).
 - If your input values are listed horizontally (in a row), you would use the **Row Input Cell** and enter the reference to the variable you're changing (e.g., **A2** for price).
6. **Click OK:**
 - After clicking **OK**, Excel will fill in the table with the corresponding output values for each input value.

Example: One-Variable Data Table

Let's say you want to calculate how total cost changes when the number of units sold changes.

- **A1:** 1,000 (Units Sold)
- **A2:** \$50 (Price per Unit)
- **A3:** =A1 * A2 (Total Cost)

Steps:

1. List possible sales values (e.g., 1,000, 2,000, 3,000) in **B2:B5**.
2. In **C2**, reference the formula cell (e.g., =A3).
3. Select **B2:C5**, then go to **Data > What-If Analysis > Data Table**.
4. In the **Data Table** dialog, input **A1** (Units Sold) as the **Column Input Cell**.
5. Click **OK** to generate the table.

The result will show how the total cost changes for each level of units sold.

Two-Variable Data Table

A **Two-Variable Data Table** is used when you want to see how two input values impact a result simultaneously. For example, you may want to analyze how changes in both **units sold** and **price per unit** affect **total cost**.

Steps to Create a Two-Variable Data Table

1. **Set Up the Formula:**
 - Use a formula that depends on two variables. For example:

- **A1:** Units Sold
 - **A2:** Price per Unit
 - **A3:** Total Cost (Formula =A1 * A2).
2. **Create the Data Table Structure:**
 - In one row, list possible values for one input (e.g., price per unit).
 - In one column, list possible values for the other input (e.g., units sold).
 - For example, in **B2:F2**, you might enter different prices: \$40, \$50, \$60, \$70, \$80.
 - In **A3:A7**, enter different quantities for units sold: 1,000, 2,000, 3,000, 4,000, 5,000.
 3. **Link the Formula:**
 - In the cell where the row and column intersect (e.g., **B3**), enter the formula that calculates the total cost (=A1 * A2).
 4. **Create the Data Table:**
 - Select the entire range (e.g., **A2:F7**).
 - Go to the **Data** tab, click **What-If Analysis**, and select **Data Table**.
 5. **Input Row and Column in the Data Table Dialog:**
 - In the **Row Input Cell**, specify the cell reference for the first input variable (e.g., **A2** for price).
 - In the **Column Input Cell**, specify the second input variable (e.g., **A1** for units sold).
 6. **Click OK:**
 - After clicking **OK**, Excel will fill the table with the results for every combination of the input values.

Example: Two-Variable Data Table

Let's say you want to calculate how total cost changes with varying **units sold** and **price per unit**.

- **A1:** Units Sold
- **A2:** Price per Unit
- **A3:** =A1 * A2 (Total Cost)

Steps:

1. In **A3:A7**, list possible units sold: 1,000, 2,000, 3,000, 4,000, 5,000.
2. In **B2:F2**, list possible prices: \$40, \$50, \$60, \$70, \$80.
3. In **B3**, enter the formula =A1 * A2.
4. Select **A2:F7**, then go to **Data > What-If Analysis > Data Table**.
5. In the **Data Table** dialog:
 - Enter **A1** as the **Column Input Cell** (for units sold).
 - Enter **A2** as the **Row Input Cell** (for price).
6. Click **OK** to generate the table.

This will display how the **Total Cost** changes for every combination of **Units Sold** and **Price per Unit**.

Advantages of Using Data Tables

- **Efficiently Analyze Multiple Scenarios:** Data Tables allow you to test and compare multiple scenarios at once without manually changing input values.
 - **Time-Saving:** They save you time by quickly showing the relationship between variables and their impact on the result.
 - **Visual Clarity:** They organize your data neatly and make it easier to analyze different scenarios side-by-side.
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Limitations of Data Tables

- **Static Data:** Once you set up a Data Table, it is static. If you change the structure (e.g., the location of your input values), you may need to recreate the table.
- **Performance:** Large Data Tables can slow down your workbook, especially if you're working with many input values.