Excel Data Tables

The single most powerful Excel feature this side of VBA for automating repetitive spreadsheet calculations.

You want to be familiar with the Excel Data Table
Excel is very powerful at making calculations.

Loan Payments:

\[ \text{PMT}(\text{rate}, \text{nPeriods}, \text{pValue}) \]

What if we want to see how our calculations change as we change the parameters?

Options:
(i) We can manually adjust values and try to remember earlier results
(ii) We can copy the formula across many cells and use different inputs for each copy
(iii) We can use the best approach: the Excel Data Table

Two different types of Data Tables:

One-way Data Tables: Allows you to change one parameter.

Two-way Data Tables: Allows you to change two parameters.

### One-Way Data Tables

How to create one-way data tables:

#### Creating a Data Table (example)
- We have a parameter stored in Q5 and our formula f().
- We want to see how the result changes when we use val1, val2, val3 instead of val.
- We first create a table set-up.
- Then, choose all the cells in the set-up table.
- Go to: Menu Data -> Table (in old Excel).
- Go to: Menu Data -> What-if Analysis -> Data Table (in Excel 2010).
- Equate the top cell to the cell containing the formula.
- Write down the values that we use instead of val.
Example: Car Loan Payments

- Let’s create a 1-way Data Table: Car Loan Payments
- Download Practice-advExcel-DataTables.xlsx from the course website

We borrow $20000 from a creditor to buy a car.
Annual interest rate is 5%.
We plan to pay the loan in 36 months.
Our monthly payments can be calculated by PMT function:

\[
\text{Monthly Payment} = \text{PMT}(5/12, 36, 20000)
\]

How do our payments change as the interest rate changes?

Two-Way Data Tables

Excel Data Tables lets us see the impact of change in parameters.
Two-way Data Tables: Allows to change two parameters.

How to create two-way data tables:

- We have two parameters stored in R5 and R6. And, our formula uses both of these parameters.
- We want to see how the result changes when we use val1, val2, val3 instead of val, and para1, para2 instead of para.
- We first create a table set-up.
- Then, choose all the cells in the set-up table.
- Go to: Menu Data -> Table (in old Excel).
- Go to: Menu Data -> What-if Analysis -> Data Table.

(in Excel 2010)
Two-Way Data Tables: Examples

- Let’s create a couple two-way data tables as examples:
  - Mortgage Payments
  - Marketing Problem
- Again we will use Practice-advExcel-DataTables.xlsx from the course website

Example 2: Mortgage Payments

We borrow $300000 from a creditor to buy a house.
Annual interest rate is 5%.
We plan to pay the loan in 120 months.
Our monthly payments can be calculated by \textbf{PMT} function:

\[
\text{Monthly Payment} = \text{PMT}(5/12,120,300000)
\]

How do our payments change relative to changes to both the \textit{interest rate} and/or \textit{payment period}?
Example 3: Marketing Problem

We start a business with an initial investment of $20,000. We incur $2 to produce a good. We need to set a price for our product, say p. We also need to decide on our advertising budget, say A. Given p and A, total demand for our product is:

$$2000 + 4\sqrt{A} - 20 * p$$

Which p and A maximize our profit?