



ACCESS ANALYTIC

Turn the Tables on Excel
An Introduction to the power of Data Tables

White Paper

Introduction

This document outlines how Data Tables in Excel can be used to save hours, even days of time when performing “What if?” analysis on financial forecasts.

If you use financial forecasting models in your business then Data Tables can be very powerful tools in identifying key profit drivers.

Where scenarios are used in making investment decisions Data Tables can save hours of running and collating results. The risks of maintaining multiple spreadsheets for multiple scenarios can be avoided and neatly collated results can easily be produced.

Data Table results are automatically updated when the underlying formulae or assumptions in a model change. This saves hours of re-work where “What if?” analysis has previously been performed.

In the pages that follow, you’ll find details on what Data Tables are, how to set up a Data Table, and how they can be used in conjunction with scenarios to provide a powerful time-saving tool.

We encourage you to share this document with your colleagues and pass it on to anyone you know who may benefit from understanding how their everyday tasks can be made easier.

Data Tables are just one of the features in Excel that once understood can provide valuable insight into key business drivers and save hours of unnecessary work.

So turn the Tables on and you’ll be amazed at the results.

About the Author:

Wyn Hopkins is a Senior Business Analyst at Access Analytic

Wyn gained his Chartered Accountant qualification at PricewaterhouseCoopers in the UK in 2000.

Wyn is a certified Excel Expert, skilled in financial analysis, strategic financial modelling, management reporting and forecasting

He has extensive Business Analyst experience in FTSE 100 financial services companies (HBOS and Barclays in the UK) as well as a range of industries in Perth and Sydney.



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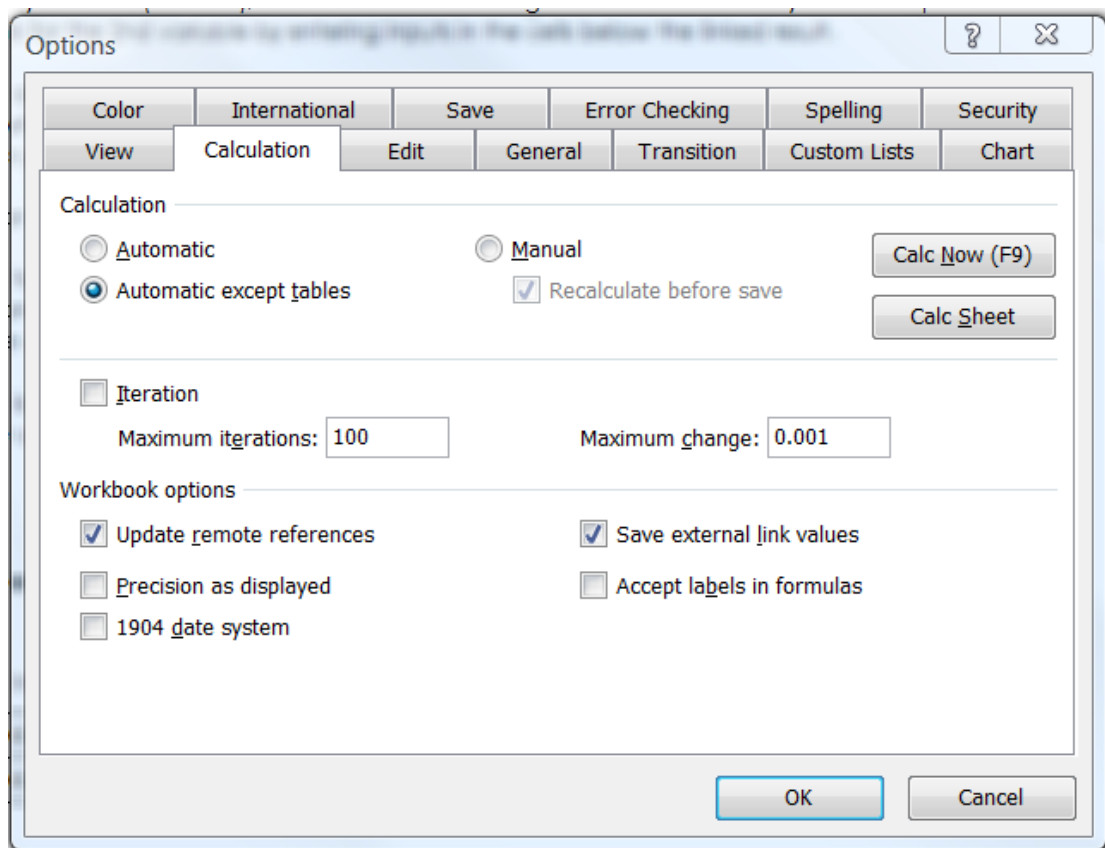
Before you begin

Data Tables (Sensitivity Tables) allow you to quickly see the result of trying various different inputs in a formula or model without having to manually re-run the formula or model each time.

They are highly effective tools in assessing which are the most sensitive inputs of a model (i.e. have the greatest impact on the outputs of the model).

Unfortunately, when used in large models, Tables will take a while to run and will run every time a change is made to the spreadsheet which can be very frustrating. To avoid this, the following first step is very important:

Tools -> Options -> Calculations Tab -> Select Automatic except tables



You will then need to remember to press F9 to manually recalculate your tables whenever required.

Setting Up a Data Table

The "Table" functionality in Excel allows you to show how changing inputs affect the results of a calculation or model.

For Example, a simple formula with 2 inputs A and B gives a single result of \$61.00

	A	B	C
1			
2	Input A	\$4.00	Row Inputs
3	Input B	\$7.00	Column Inputs
4			
5	$C = 10A + 3B$	\$61.00	Result (Cell B5)

Data Tables are used to vary the inputs and run through the formula instantaneously rather than you having to manually type over the inputs each time

The following steps will take you through how to set up a Data Table that will run multiple inputs through the formula above and collate the resulting output.

3 STEPS TO SET UP YOUR TABLE

1. Firstly set up a link to your result (i.e. =B5), then in the cells to the right of this enter as many different inputs as you like (Row Inputs). Repeat this for the 2nd variable by entering inputs in the cells below the linked result (Column Inputs)

It's good practice to set the expected input as the middle figure and then have increasing / decreasing values either side.

2. Highlight the range of cells from the top left corner of your table (i.e. the cell linked to the results) to the bottom right corner (which therefore highlights your column and row input cells). The dotted line illustrates this in Fig 1.0

Note: The table will be empty until you finish Step 3

(Fig 1.0)

\$61.00	\$2.00	\$3.00	\$4.00	\$5.00	\$6.00
\$3.00	\$29.00	\$39.00	\$49.00	\$59.00	\$69.00
\$5.00	\$35.00	\$45.00	\$55.00	\$65.00	\$75.00
\$7.00	\$41.00	\$51.00	\$61.00	\$71.00	\$81.00
\$9.00	\$47.00	\$57.00	\$67.00	\$77.00	\$87.00
\$11.00	\$53.00	\$63.00	\$73.00	\$83.00	\$93.00

3. Then on the menu bar select Data followed by Table.

You will be prompted to enter a reference to the row input cell and the column input cell.

Row Input - This is one of the input cells that you want to vary in the formula (e.g. Input A). The values that you have entered into the same **row** as the linked result will be used in this cell.

Column Input - This is one of the input cells that you want to vary in the formula (e.g. input B). The values that you have entered into the same **column** as the linked result will be used in this cell.

The Table is then automatically populated with the results of combining the various column and row inputs and running them through the formula / model.

As you can see this is vastly quicker than manually amending the inputs and collating the results.

The beauty of Tables is that, should the formula change, a simple press of F9 (recalculate) will quickly provide you with an updated table of results. This can save hours if not days of time re-running scenarios when calculations or assumptions change.

Additional flexibility can be introduced by adding a simple sensitivity range table

	Actual Input	Middle Value	Incremental Change
Input A	\$4.00	\$4.00	\$1.00
Input B	\$7.00	\$7.00	\$2.00

The mid-row input of the DATA Table is then linked to the "Middle Value" in the sensitivity range table

The cells either side of this mid-row cell are then linked to this mid-row cell + or - a link to the incremental change

This is repeated for the column inputs

This sensitivity range table can then be used to quickly update the Data Table with a change of inputs / incremental values.

But that's just the start.....

Most commonly the figures entered in the Data Table row and column are actually used in the calculation.

Alternatively, Tables become very powerful when used to run multiple scenarios in conjunction with the Offset function.

Instant Scenario Analysis

Data Tables provide a shortcut for calculating multiple "What if?" scenarios in one operation and a way to view and compare the results of all of the different variations together on your worksheet.

Major Advantages

- Speed
- Automatic re-working if underlying assumptions / calculations change
- Ability to apply probability % easily to get a probability weighted outcome.

Simple Income and Cost Scenarios: (Fig 2.0)

Income		2008	2009	2010	2011	Likelihood
1	Best Case	180	300	300	500	5%
2	Base Case	100	200	200	300	50%
3	Low Case	80	70	70	80	40%
4	Worst Case	20	20	18	12	5%
						100%

Cost		2008	2009	2010	2011	Likelihood
1	Best Case	(60)	(80)	(70)	(100)	5%
2	Base Case	(80)	(100)	(110)	(130)	50%
3	Low Case	(100)	(200)	(210)	(300)	40%
4	Worst Case	(170)	(280)	(260)	(400)	5%
						100%

A simple Net cashflow calculation is then created using the Offset function to select which scenario is used for Income and Cost. A discount factor is then applied and the NPV of the cashflows is calculated giving \$776.

Cashflow		Offset Switch	2008	2009	2010	2011
Income	Best Case	1	180	300	300	500
Cost	Best Case	1	(60)	(80)	(70)	(100)
Net			120	220	230	400

Discount Rate	8%
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NPV Calc (on Net C/flow)	\$776	per Best Case Income and Best Case Costs
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The Data Table is then set up with the Offset Switches for Income and Cost as shown below in Fig 3.0. An offset of 1 gives the best case; an offset of 2 gives the expected case etc.

Each scenario will then be automatically run through the calculation and an NPV produced for each combination.

(Fig 3.0)

		Data Table: \$				
		Best	Base	Low	Worst	
		Offset Switch (Income)				
		776	1	2	3	4
Best	Offset Costs	1	776	390	(5)	(194)
Base		2	687	301	(94)	(284)
Low		3	378	(8)	(403)	(592)
Worst		4	132	(255)	(649)	(839)
						Σp (13.9)

301 = most likely outcome (based on probability table - see workings)

Σp = Probability weighted NPV (see workings)

So in the situation above the most likely result is \$301 but the overall probability weighted NPV is negative indicating a high risk result.

The probability weighted NPV calculation is detailed in the following section:

Workings: Probability Weighted NPV

A single figure is easier to focus on so a probability or risk weighted result is often a useful figure to identify, along with the “most likely” result.

Probabilities of occurrence can be assigned to each scenario. Where there are two non-mutually exclusive variables, as is the case here, these can be combined by multiplying one probability by the other.

These probabilities can then be multiplied by the expected results to give probability weighted outcomes. These are then summed up to give an overall probability weighted result.

Assigned Probability (per Likelihood inputs on figure 2.0)

		Income				100%
		5%	50%	40%	5%	
Costs	5%	0.3%	2.5%	2.0%	0.3%	100%
	50%	2.5%	25.0%	20.0%	2.5%	
	40%	2.0%	20.0%	16.0%	2.0%	
	5%	0.3%	2.5%	2.0%	0.3%	
		100%				100%

Probability Weighted NPV (Probability % above x NPV per Data Table)

		Income				
		Best Case	Expected Case	Low Case	Worst Case	
Costs	Best Case	1.9	9.8	(0.1)	(0.5)	Σ = (13.9)
	Expected Case	17.2	75.2	(18.8)	(7.1)	
	Low Case	7.6	(1.6)	(64.5)	(11.8)	
	Worst Case	0.3	(6.4)	(13.0)	(2.1)	

Summary

Hopefully, this paper has provided you with an understanding of how to set-up Data Tables in Excel. Once you apply this to a real-life model you'll be able to see the fantastic potential they offer.

- Data Tables allow you to quickly collate the results of flexing model inputs
- Accessed via Data -> Tables on the menu bar
- Row input cell will use the figures in the **top row** of the data table
- Column input cell will use the figures in the **left column** of the data table
- Flexibility can easily be added using a sensitivity range
- Use in conjunction with scenarios to provide speedy insightful analysis

For further assistance with Data Tables or any Financial Modelling, Reporting or Excel training requirements, please contact Access Analytic on +61 8 6210 8500 or www.accessanalytic.com.au

About Access Analytic

Access Analytic provides financial modelling, management reporting, and business analysis for companies that need to make decisions with confidence.

Our key skill is the ability to bridge the gap between business and information technology, thereby providing value through our understanding of both areas.

We add value by translating complex business issues into Excel-based models, systems, procedures, and processes.

Contact Access Analytic

Consulting

If you're considering the advantages of using independent, experienced Consultants to assist you improve your reporting and analysis capabilities, contact Wyn Hopkins at Access Analytic.

We have many years of experience in providing independent help and objective advice about financial modelling, reporting, and spreadsheet development to businesses of all sizes and industries.

So why not use our expertise and leverage our Consultants' experience to ensure you are getting the best information for your business.

Contact Wyn Hopkins to arrange a confidential discussion of your needs and transform your reporting process!

Training

We provide a range of training courses specifically for accounting and finance staff.

Courses include Advanced Excel, VBA programming and Financial Modelling.

Details at www.accessanalytic.com.au/training

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Key Staff

Jeff Robson, Principal Business Analyst

BCom (Accounting & Information Systems), CISA, AIMM, A Fin, Masters (Applied Finance) - Current, MS Excel Expert

Jeff holds a Certified Information Systems Auditor from the Information Systems Audit and Control Association.

He has 10 years experience with Microsoft Excel, 6 years experience in Information Systems Audit, and worked for 4 years in external audit at a Chartered Accounting firm.

He has been involved in many Excel development projects for clients around the world including sophisticated spreadsheet modelling, spreadsheet auditing and review, and advanced macro programming.

Jeff holds a Bachelor of Commerce degree from Curtin University with a double major in Accounting and Information Systems, and he is a Microsoft Certified Excel Expert.



Neale Blackwood, Senior Business Analyst
CPA, B.Bus (Accounting)

Neale is a CPA with over 15 years experience in accounting, budgeting, management reporting, and developing spreadsheet applications.

Neale has extensive experience across a broad range of industries including mining, education, property, forestry, government, and construction.

Neale is a regular contributor to the CPA magazine regarding spreadsheets and related subjects, and writes a monthly column for this publication. He is also a sought-after speaker and trainer regarding the use of Excel, particularly by accountants.



Wyn Hopkins, Senior Business Analyst
B.Sc. (Hons) Accounting & Financial Management, CA, Excel Expert

Wyn gained his Chartered Accountant qualification at PricewaterhouseCoopers in the UK in 2000.

He has extensive Business Analyst experience in FTSE 100 financial services companies (HBOS and Barclays in the UK) as well as GESB in Perth and telecommunications companies industry in Australia.

Wyn is skilled in financial analysis, strategic financial modelling, management reporting and forecasting, and value-based management techniques.



Rachel Gregory, Senior Business Analyst
BCom (Finance & International Business), MPA, Excel Expert

Rachel previously worked as a Senior Accountant in the Business Recovery and Insolvency division of an International Chartered Accounting firm.

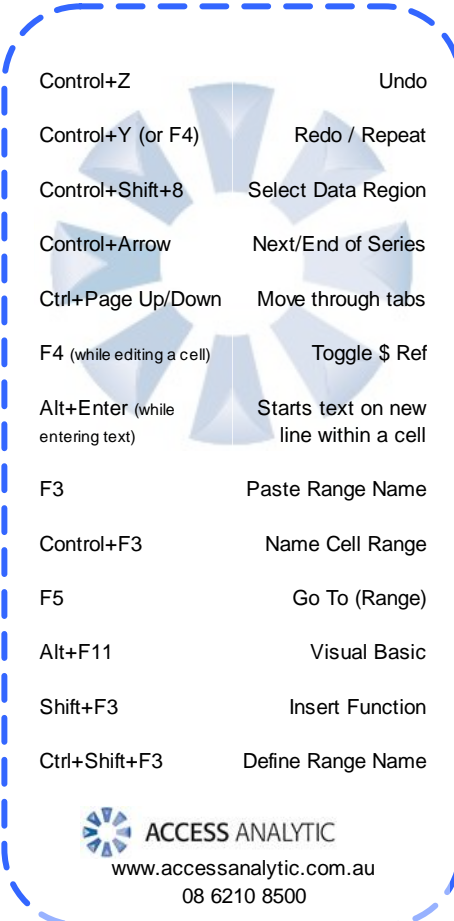
Rachel then moved to commerce, working with an international energy company as a Business Analyst.

Rachel brings a high level of expertise in financial modelling, budgeting/forecasting and management reporting. She is also an experienced and energetic communicator who specialises in training and presentations.



Additional Resources

Area	Resources
Financial Modelling and Management Reporting	<p>We provide Excel-based financial modelling, management reporting, and business analysis services to help businesses make decisions with confidence.</p> <p>To see how we could help your business, call us on +61 8 6210 8500 or visit http://www.accessanalytic.com.au</p>
Excel Mentoring	<p>Personalised mentoring in your office, using your files, solving your issues.</p> <p>http://www.accessanalytic.com.au/services_mentor.php</p>
Training Courses	<p>We provide high-powered training in Financial Modelling, VBA and advanced Excel for accounting and finance professionals throughout the Asia-Pacific region.</p> <p>For more information, visit http://www.accessanalytic.com.au/training</p>



Control+Z Undo

Control+Y (or F4) Redo / Repeat

Control+Shift+8 Select Data Region

Control+Arrow Next/End of Series

Ctrl+Page Up/Down Move through tabs

F4 (while editing a cell) Toggle \$ Ref

Alt+Enter (while entering text) Starts text on new line within a cell

F3 Paste Range Name


Control+F3 Name Cell Range

F5 Go To (Range)

Alt+F11 Visual Basic

Shift+F3 Insert Function

Ctrl+Shift+F3 Define Range Name

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