



Multi-asset Modelling
Tutorial
February 2017

1.0 General

Please note the following guidance and instruction is to be used as an accompaniment to the 'Multi-asset modelling' Excel file.

Please feel free to get in touch at contact@lentransolutions.com if you would like additional guidance or to discuss the methodologies represented here and in the Excel file.

2.0 Tutorial

2.1 Aim and audience

The aim of this tutorial is to illustrate how a financial model can be built to accommodate multiple assets or business divisions in a structured way that ensures modelling consistency between assets / divisions and efficiency in model development.

The intended audience are for those analysing or preparing forecasts who seek to understand and analyse financial performance at both a group/consolidated and asset/division level.

2.2 Introduction and tutorial conventions

Many companies often manage or own a portfolio of assets, projects or divisions. If a company is required to analyse financial performance at both group and asset level, rather than having to build an individual model for each asset, a company can consolidate all of these assets into a single financial model – usually known as a multi-asset/division, consolidated or portfolio model.

If all of the assets can be defined within a common framework of assumptions, then the financial model can be structured in a highly efficient and consistent manner to the benefit of both the developer and user.

The terms division, project or assets are used interchangeably in this tutorial. And the terms company, head entity, group or conglomerate are also used interchangeable in this tutorial. Sheet references are displayed as '**Sheet**' while section headings and line references are displayed as '*Item*'.

Please note that even where assets have as many (assumption) differences as commonalities methods here can still be applied into your modelling.

2.3 Purpose

There are many reasons and advantages to building an efficient multi-asset model with a few of them outlined below:

Consolidation

- As previously discussed, multiple assets can be consolidated or aggregated to have their financials analysed on a consolidated or group basis.

- As an example, a head entity that owns or operates a number of divisions such as a conglomerate with multi-divisions (i.e. a consumer goods company with many divisions globally)

Portfolio

- Similar to consolidation where it consolidates all assets within a portfolio, while also allowing for the evaluation of financials at an asset level.
- As an example, a property fund with a portfolio of property assets across Australia.

Marginal / incremental analysis

- A conglomerate can analyse the contributions of certain divisions to the group to determine those that are over or underperforming.
- A company that is considering of acquiring a new project can analyse whether it improves the company's bottom line or returns as a whole.
- Examples include an oil and gas company determining whether to include a new project being explored or to stop production for an existing project which is proving to be a drag on the company's overall financial performance.

2.4 Assumptions

We will now look at how it should be set up starting with assumptions (**Inputs**), broken down into 3 groups:

- Set-up
- Individual asset
- Global

2.4.1 Set-up

These are normally the key assumptions to ensure that all assets have been setup in a correct manner within a multi-asset model:

- Names for each division is entered in here and given an 'Assumption' style and linked to the rest of the labels in the model – *C9:C13*
- Duration for each asset are included to reflect the forecast period. Note that this is optional given that in certain circumstances, all divisions may have the same forecast period (i.e. a single evaluation period for all divisions) – *F9:F13*
- Switches to turn on / off each of the assets for either reporting or incremental analysis purposes – *E9:E13*

6	Tutorial inputs		
7	Set-up		
8	Divisions		
9	Division 1	Year(s)	
10	Division 2	Year(s)	
11	Division 3	Year(s)	
12	Division 4	Year(s)	
13	Division 5	Year(s)	
14	Consolidated	Year(s)	

Include?	Duration
Yes	7 Yr(s)
Yes	7 Yr(s)
Yes	7 Yr(s)
Yes	7 Yr(s)
Yes	7 Yr(s)
	7 Yr(s)

2.4.2 Individual asset

These are normally asset specific operational assumptions.

Rather than laying out the assumptions by asset, assumptions should be laid out by category. For example, sale price assumption for all divisions are laid out in a table – rows 17:22

1	Assumptions				
2	Tutorial: Multi-asset modelling				
3					
17	Price (nominal)		Op Yr 1	Op Yr 2	Op Yr 3
18	Division 1	AUD / unit	53.00	54.00	55.00
19	Division 2	AUD / unit	52.00	53.00	54.00
20	Division 3	AUD / unit	48.00	49.00	50.00
21	Division 4	AUD / unit	46.00	47.00	48.00
22	Division 5	AUD / unit	51.00	52.00	53.00

Note that individual asset assumptions need to be set up with an identical framework to ensure that calculations can be picked up in a straight forward manner later on.

Hint: given the 'common structure' constraint for a multi-asset model, even where there are assumptions in say two divisions but which are not in the other three divisions, the assumptions must be included (and calculations modelled) for the two to ensure the consistency across all divisions. That is, the other divisions should still be represented in the block assumptions, but obviously with their input areas blanked out – usually with a purposeful formatting to underline their exemption.

2.4.3 Global

These are global assumptions that are either:

- Group level assumptions such as financing assumptions. For example, assumptions for a borrowing base facility or a corporate loan borrowed at a group level.
- Macroeconomic assumptions such as escalation rates, interest rates or foreign exchange that are the same across all divisions.

In the attached spreadsheet, the overhead cost is an example of a global assumption – row 47

2.5 Calculations

We will now cover how the individual division and consolidated calculations sheet should be set up and the formulas structured.

2.5.1 Individual asset calculations sheet

These should be set up, starting with the 1st division (1) as:

- 1 asset per sheet where every sheet should be identical (except for the asset reference number – to be explained below)



- A unique single asset reference number for each sheet. The reference number will drive all calculations within the respective asset sheet.



- The asset reference number is then used as the row positioning input in the OFFSET¹ formula in order to reference the corresponding individual asset assumption from the 'Inputs' sheet. For example, the formula in H11 is:

= OFFSET(Inputs!E\$17,\$A\$1,0)*H\$7

In other words, the OFFSET formula is referencing *i* row(s) below the table headings in **Inputs** row 17, which corresponds with division *i*'s price (where *i* represents the asset reference number and divisions number).

Note: this dynamic formula should also be applied to asset related labels or headers as well – C1

	A	B	C	D	E	F	G	H	I	J
1	1	Calculations: Division 1								
2		Tutorial: Multi-asset modelling								
3		Forecast months	Num		Yes			1	2	3
8										
9		Operations								
10		Revenue								
11		Price	AUD / unit					53.00	54.00	55.00
12		Volume	Units '000				350	50.00	50.00	50.00
13		Revenue	AUD '000				19 600	2 650	2 700	2 750

- This calculation should then be repeated in the rest of the asset sheet before replication the asset sheet – rows 11:12, 16 & 19
- Steps in building the asset calculation sheets (2,3,4,5):
 1. Create the 'first' asset calculation sheet (i.e. asset reference = 1)

¹ See our OFFSET and SUM(OFFSET) tutorial for more guidance on these key Excel functions.

2. Test the completed first asset calculation sheet with other references to make sure it is now dynamic and fully driven off the asset reference number.
3. Replicate the sheets and update the asset reference number. The number of sheets should equal the total number of assets with each sheet having a unique asset reference number.

Note: when edits need to be made to a single or all asset sheets (**1,2,3,4,5**), ensure that all sheets are selected so that changes are applied across all sheets. Please see section 2.6 for tips on selecting multiple sheets.

2.5.2 Consolidated calculation sheet

The consolidated calculation sheet (**Consol**) sums the cashflows of the individual assets and calculates any group / portfolio level calculations:

- Summing cashflows of individual assets can be done efficiently by:
 1. first applying a SUM formula
 2. Selecting the cell of the first asset cashflow
 3. Holding down 'Shift'
 4. Selecting the cell of the last asset cashflow (thereby choosing all of the cashflow cell between the first and last asset)

Thus, the formula in *H10* will return **'=SUM('1:5'!H22)'**

- Group / portfolio level calculations are then included. In this spreadsheet example, overheads is a group level cost, therefore is only modelled in here – row 13

1	Calculations: Consolidation							
2	Tutorial: Multi-asset modelling							
3	Forecast year	Num		1	2	3	4	5
8								
9	Profit and Loss (until EBITDA)							
10	Revenue	AUD '000	91,812	12,375	12,622	12,869	13,116	13,363
11	Variable costs	AUD '000	(48,363)	(6,168)	(6,415)	(6,662)	(6,909)	(7,156)
12	Fixed costs	AUD '000	(19,110)	(2,730)	(2,730)	(2,730)	(2,730)	(2,730)
13	Overheads	AUD '000	(5,005)	(700)	(705)	(710)	(715)	(720)
14	EBITDA	AUD '000	19,334	2,777	2,772	2,767	2,762	2,757

2.6 Tips on selecting multiple sheets

To select multiple sheets:

- One at a time; click on the sheet tab and while holding down 'Ctrl', click on the next sheet you want to select.
- All at once; click on the sheet tab of the first sheet and while holding down 'Shift', click on the last sheet.

Warning: please note when using sheet grouping to make changes to a number of selected sheets concurrently, the undo function in Excel stops working. Hence, as a precaution please save your worksheet before using

Tip: the tab colour will lighten and the word '[Group]' appears as part of the file name. Make sure you have exited this mode when you wish to stop grouped changes – you can do this a number of ways including, but not limited to:

1. Go to a sheet which is not part of your grouped selection
2. Right click with mouse and select Ungroup Sheets