3 Statement Modeling with Iterations

3 Statement Modeling with Iterations Overview

🔔 REMEMBER TO HAVE THE **ITERATION SETTING TURNED OFF** BEFORE STARTING 🔔

|	
1	Input historical data for income statement and balance sheet
2	Calculate ratios and statistics
3	Decide on forecast assumptions
4	Build the forecast income statement except for interest
5	Build the forecast balance sheet except for cash and revolver
6	Build the cash flow statement using the rules of cash
7	Use max/min to fill in balance sheet cash and revolver, linking to cash flow
8	Build the interest calculations
9	Link the interest into the income statement and deal with the circular reference

FINANCIAL EDGE

Historic Data
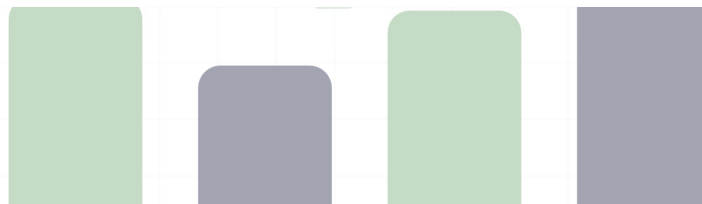
Reorganize data to suit analytical needs

Less time? **Aggregate data**
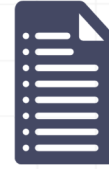
More time? **Disaggregate data**

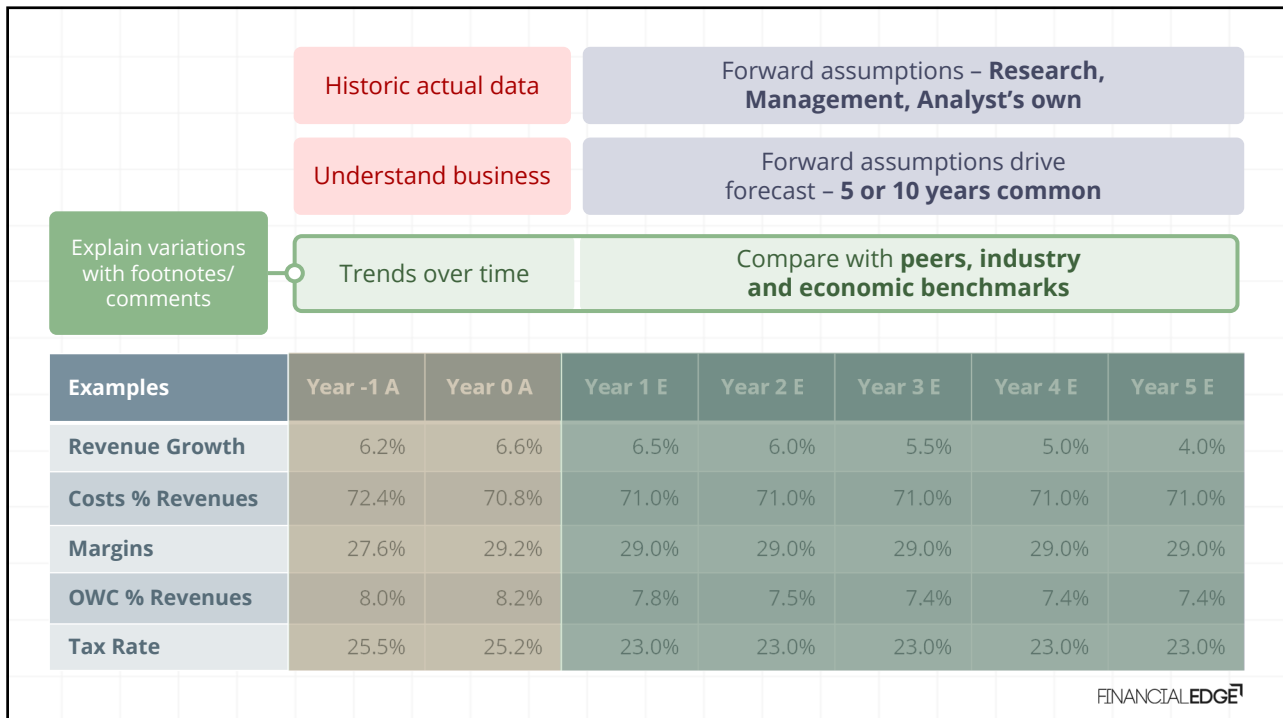Always **calculate** subtotals and **copy** them forward

Cross check: **NI to Source**

Cross check: Assets = **L and E**

Use **ALT** = where possible

Ratios & Forward Assumptions

| Historic actual data | Forward assumptions – **Research, Management, Analyst's own** |
| Understand business | Forward assumptions drive forecast – **5 or 10 years common** |

Explain variations with footnotes/comments

| Trends over time | Compare with **peers, industry and economic benchmarks** |

Examples	Year -1 A	Year 0 A	Year 1 E	Year 2 E	Year 3 E	Year 4 E	Year 5 E
Revenue Growth	6.2%	6.6%	6.5%	6.0%	5.5%	5.0%	4.0%
Costs % Revenues	72.4%	70.8%	71.0%	71.0%	71.0%	71.0%	71.0%
Margins	27.6%	29.2%	29.0%	29.0%	29.0%	29.0%	29.0%
OWC % Revenues	8.0%	8.2%	7.8%	7.5%	7.4%	7.4%	7.4%
Tax Rate	25.5%	25.2%	23.0%	23.0%	23.0%	23.0%	23.0%

Income Statement

Income Statement	Year 0 A	Year 1 E	Year 2 E	Year 3 E	Year 4 E	Year 5 E
Revenues	10,265.3	10,727.2	11,210.0	11,714.4	12,241.6	12,792.4
Operating Costs	8,754.9	9,332.7	9,752.7	10,191.5	10,650.2	11,129.4
EBIT	1,510.4	1,394.5	1,457.3	1,522.9	1,591.4	1,663.0
Interest Income	9.0					
Interest Expense	223.4					
Earnings Before Tax	1,296.0	1,394.5	1,457.3	1,522.9	1,591.4	1,663.0
Tax Expense	304.0	320.7	335.2	350.3	366.0	382.5
Net Income	991.9	1,073.8	1,122.1	1,172.6	1,225.4	1,280.5

Actual

Build forecast, from **assumptions**, for all line items **except interest**

Check Year 1 Forecast

Before copying across

Sense

Structure

Stress

Balance Sheet

Actual		Build forecast for all line items **except cash and revolver**				

Balance Sheet	Year 0 A	Year 1 E	Year 2 E	Year 3 E	Year 4 E	Year 5 E
Cash & Cash Equivalents	2,143.6					
Operating Assets	4,382.2	4,720.0	4,932.4	5,154.3	5,386.3	5,628.7
Long Term Assets	4,351.3	4,277.1	4,224.2	4,191.3	4,177.1	4,180.8
Total Assets	10,877.1	8,997.1	9,156.6	9,345.6	9,563.4	9,809.4
Revolver	606.0					
Operating Liabilities	2,907.3	3,218.2	3,363.0	3,514.3	3,672.5	3,837.7
Long Term Debt	3,743.7	3,443.7	3,443.7	3,093.7	3,093.7	3,093.7
Total Liabilities	7,257.0	3,218.2	3,363.0	3,514.3	3,672.5	3,837.7
Equity	3,620.1	4,049.7	4,498.5	4,967.6	5,457.7	5,969.9
Total Liabilities & Equity	10,877.1	7,267.8	7,861.5	8,481.9	9,130.2	9,807.6
Balance?	0.0	1,714.4	2,148.6	2,230.0	2,660.5	3,091.9

Check Year 1 Forecast	Before copying across

Sense	Structure	Stress

Cash Flow Statement
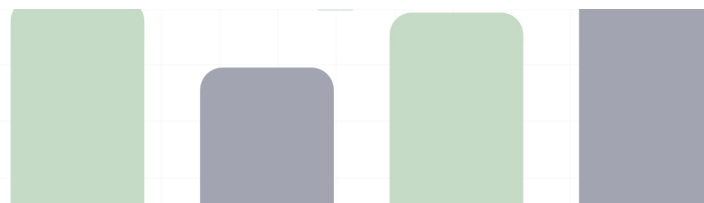
Cash flow statement	Year 0 A	Year 1 E	Year 2 E	Year 3 E	Comment
Net Income		1,073.8	1,122.1	1,172.6	RE up - Cash up
D&A		396.0	389.2	384.4	PP&E down – Cash up
Change In OWC		(26.9)	(67.6)	(70.6)	OWC up – Cash down
Operating Cash Flow		1,442.9	1,443.8	1,486.4	Subtotal
Capex		(321.8)	(336.3)	(351.4)	PP&E up – Cash down
Investing Cash Flow		(321.8)	(336.3)	(351.4)	Subtotal
Dividends Paid		(644.3)	(673.3)	(703.6)	RE down – Cash down
Debt Issuance / (Repayment)		(300.0)	0.0	(350.0)	Debt down – Cash down
Financing Cash Flow		(1,550.2)	(673.3)	(1,053.6)	Subtotal
Net Cash Flow		(429.2)	434.2	81.4	Operating, Investing, Financing
Beginning Cash & Cash Equivalents net of Revolver		2,143.6	1,714.4	2,148.6	From prior period
Ending Cash & Cash Equivalents net of Revolver	2,143.6	1,714.4	2,148.6	2,230.0	Beginning + flow = Ending

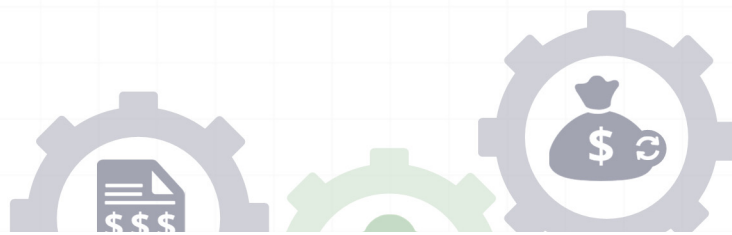Equals cash and cash equivalents less the revolver from the Balance Sheet
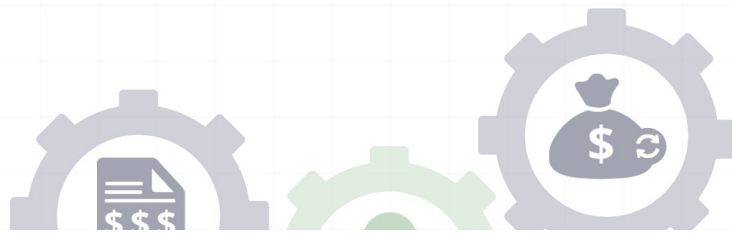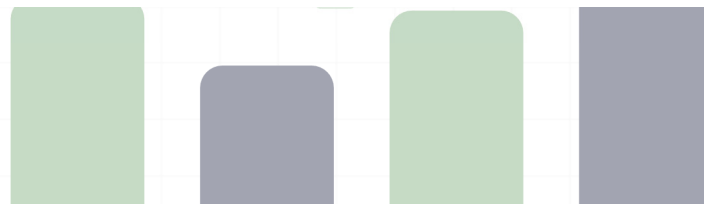
Cash & Revolver

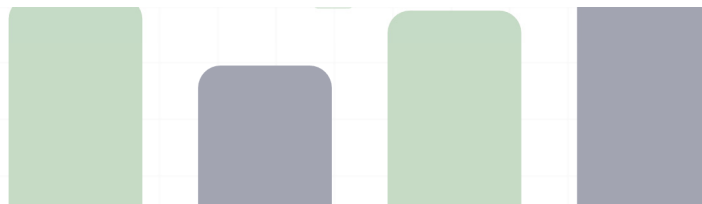| Cash Flow Statement Extract	Year 0 A	Year 1 E	Year 2 E	Year 3 E	Comment
Net Cash Flow		(150.0)	40.0	30.0	
Ending Cash / Revolver	100.0	(50.0)	(10.0)	20.0	

If ending cash is **negative**, must show **as a liability** (revolver) on **balance sheet**

If ending cash is **positive,** must show **as an asset** (cash) on **balance sheet**

Balance Sheet Extract	Year 0 A	Year 1 E	Year 2 E	Year 3 E	Comment
Cash	100.0	0.0	0.0	20.0	= MAX (0, ending amount on CFS)
Revolver	0.0	50.0	10.0	0.0	= -MIN (0, ending amount on CFS)

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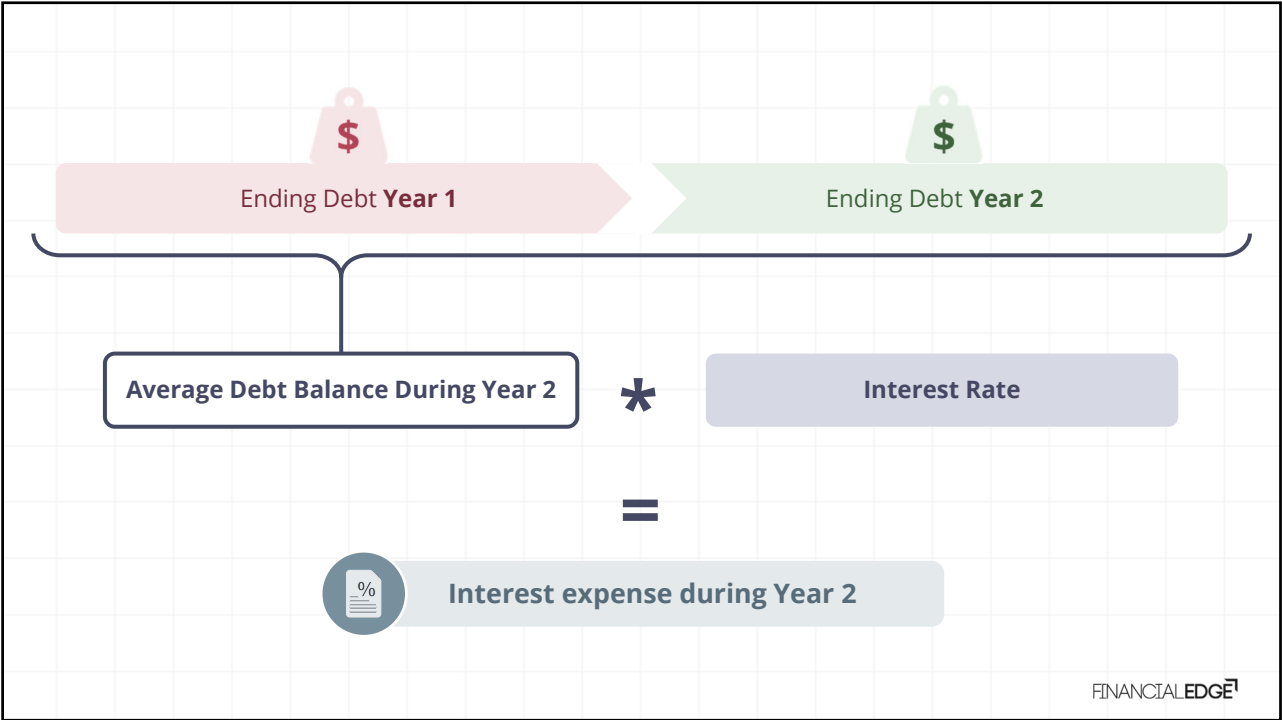
Interest Calculations

Interest & Circular Preferences

Net Interest Expense

Problems with **circular references**

Model is unstable and may **"blow up"**

#REF, #VALUE, #NAME **error messages appear**

To fix – turn circular formula into a **linear one momentarily**

Slide 1
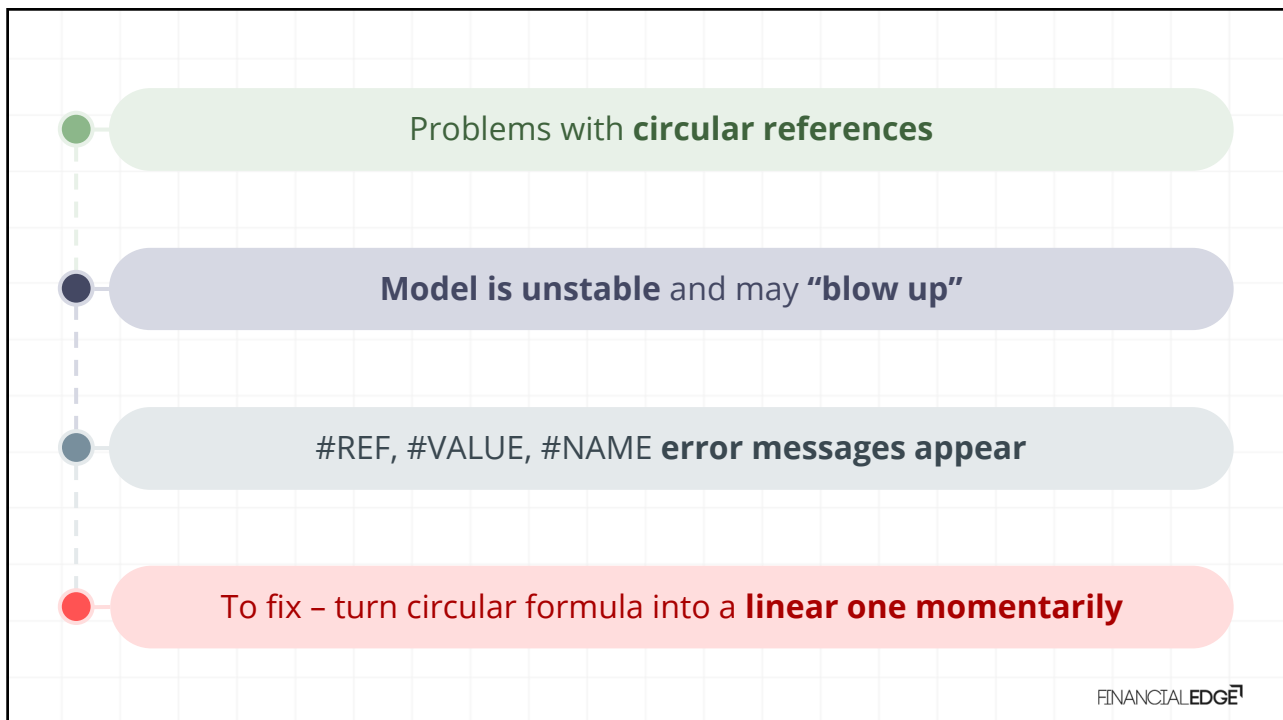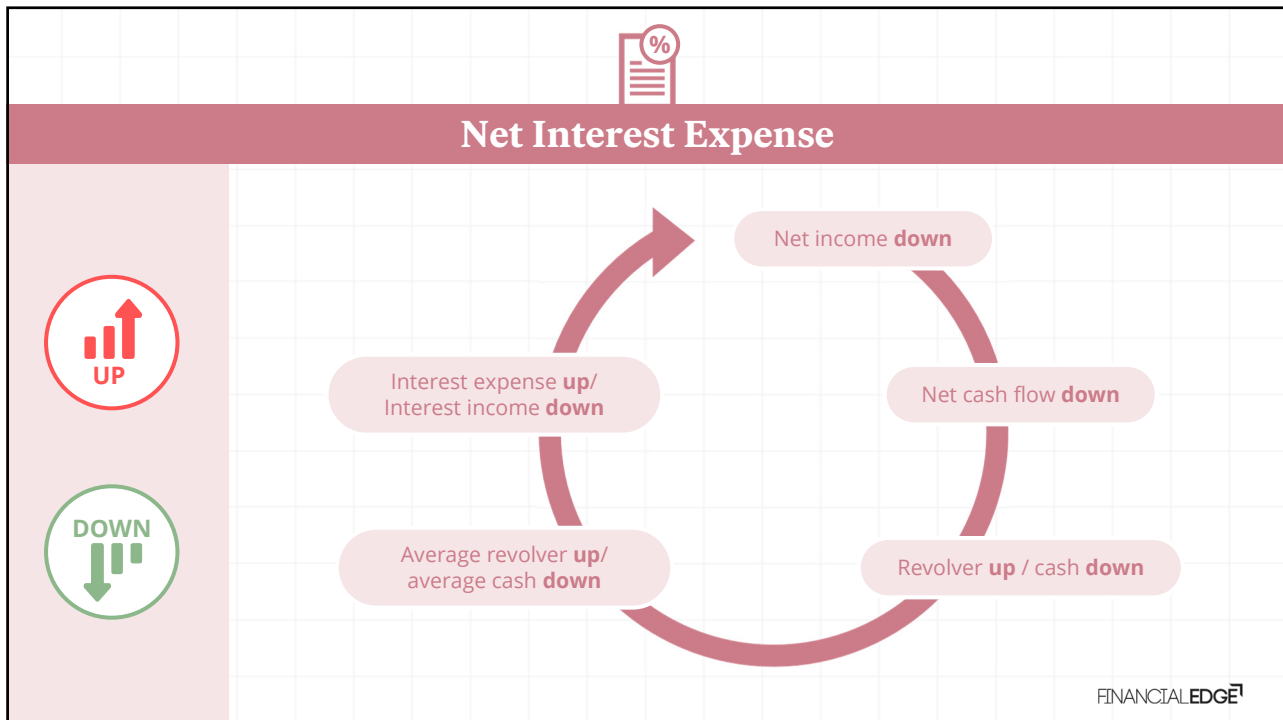
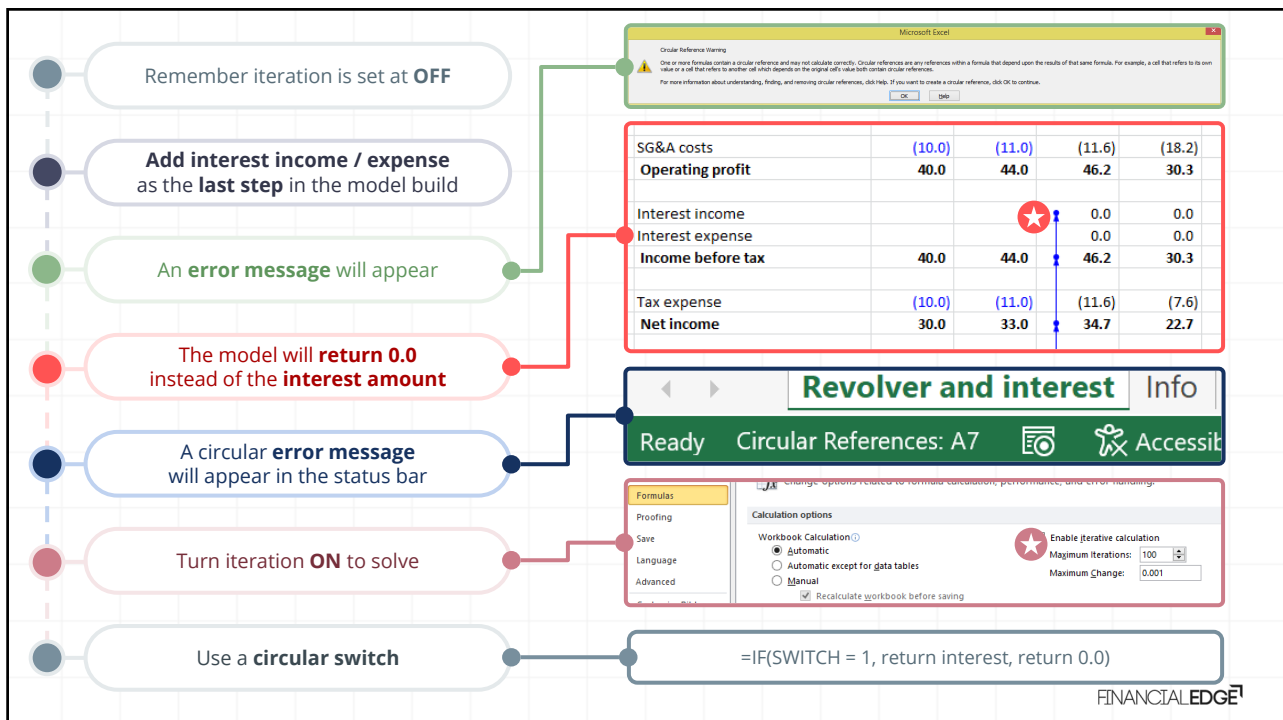To fix – turn circular formula into a **linear one momentarily**

FIX 1

Select and delete

FIX 2

Use circular switch = IF (SWITCH =1, net interest expense, 0)
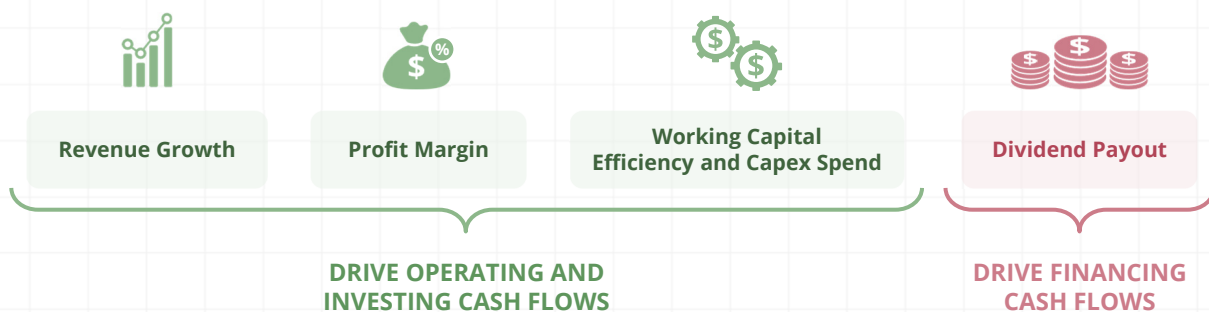
Best Practice **– Use a Circular Switch**

Slide 2

Remember iteration is set at **OFF**

Add interest income / expense as the **last step** in the model build

An **error message** will appear

The model will **return 0.0** instead of the **interest amount**

A circular **error message** will appear in the status bar

Turn iteration **ON** to solve

Use a **circular switch**

Microsoft Excel

Circular Reference Warning

One or more formulas contain a circular reference and may not calculate correctly. Circular references are any references within a formula that depend upon the results of that same formula. For example, a cell that refers to its own value or a cell that refers to another cell which depends on the original cell's value both contain circular references.

For more information about understanding, finding, and removing circular references, click Help. If you want to create a circular reference, click OK to continue.

OK   Help

SG&A costs	(10.0)	(11.0)	(11.6)	(18.2)
Operating profit	**40.0**	**44.0**	**46.2**	**30.3**
Interest income			0.0	0.0
Interest expense			0.0	0.0
Income before tax	**40.0**	**44.0**	**46.2**	**30.3**
Tax expense	(10.0)	(11.0)	(11.6)	(7.6)
Net income	**30.0**	**33.0**	**34.7**	**22.7**

◀ ▶   **Revolver and interest**   Info

Ready   Circular References: A7   Accessib

Formulas
Proofing
Save
Language
Advanced

Calculation options

Workbook Calculation ⓘ
◉ Automatic
○ Automatic except for data tables
○ Manual
☑ Recalculate workbook before saving

Enable iterative calculation
Maximum Iterations: 100
Maximum Change: 0.001

=IF(SWITCH = 1, return interest, return 0.0)

Understanding Model Drivers
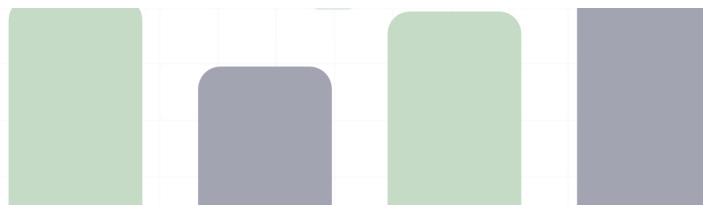
Forecast cash flows are underpinned by the same drivers, regardless of the model's complexity

Revenue Growth	Profit Margin	Working Capital Efficiency and Capex Spend	Dividend Payout

DRIVE OPERATING AND INVESTING CASH FLOWS

DRIVE FINANCING CASH FLOWS

Prepare for Handoff
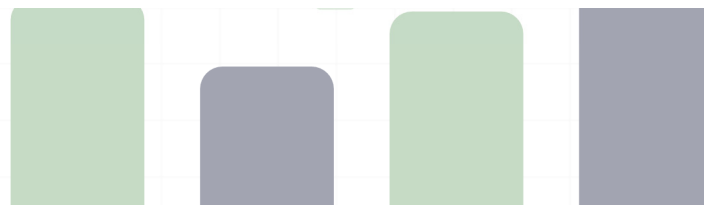
1	Check that the **output looks reasonable** based on assumptions	✓
2	Ensure consistency of formatting: **formulas black, hard numbers blue**	✓
3	Is the layout **intuitive?**	✓
4	Are complex calculations broken down into **steps?**	✓
5	Is the model **documented where necessary?**	✓
6	Is the **circular switch ON,** are **iterations ON?**	✓
7	Is the model beauty saved? **(Ctrl + Home on every sheet)**	✓

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