



BUILD A SCENARIO MANAGER

Introduction

You may have heard about a Scenario Manager being useful in modelling. You may even have created one. Either way this tutorial shows you how to build one similar to that in our public training courses. A good scenario manager allows you to look at a different 'world' in the model by changing just one cell. When combined with our 1-D Data Table approach the results of the Scenarios are shown without pressing any buttons!

Scenario analysis is the process of analyzing alternative outcomes and is best performed within the same version of the model.

In Project Finance in particular, an analyst might want to know what would happen to the key project ratios or project's return if some of the key drivers were altered particularly in the downside / worse case scenarios such as:

- Construction is delayed by 6 months
- Production volume -10%
- Product Price path which is different from Base Case
- Operating expenditure +10%
- Base Interest Rate + 100 bp
- Combination of the above

So lets take a look at how can scenario analysis be incorporated into a typical Project Finance model. Our aim in this tutorial is to provide guidance in developing a practical scenario manager that allows us to switch between each of the identified cases. When each 'case' is selected we want the differences to the Base Case to flow through the entire model.

We have developed a workbook on how to create a Scenario Manager for project finance models. The screenshot below illustrates a typical Scenario Manager

Screenshot 1: Scenario Manager

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
4														
5														
6														
7		Selected Scenario:		1										
8						1	2	3	4	5	6	7	8	
9						▼	x	x	x	x	x	x	x	
10		Assumption		Base Case		Base Case	Product ion	Price	Opex	CapEx	Interest Rates	Spare	Spare	
11		Production	Base Case * (1+X%)	0.00%		0.00%	-10.00%							
12														
13		Price												
14		Price Path	Select	Base Case		Base Case	Bank Price							
15		Price	Selected * (1+X%)	0.00%		0.00%	-5.00%							
16														
17		OpEx	Base Case * (1+X%)	0.00%		0.00%		10.00%						
18														
19		CapEx												
20		Expansion CapEx	Base Case * (1+X%)	0.00%		0.00%			10.00%					
21		Exploration CapEx	Base Case * (1+X%)	0.00%		0.00%			10.00%					
22														
23		Interest Rate	Base Case + X%	0.00%		0.00%					2.00%			
24														

Setting up Scenario Manager

Refer to the attached worksheet / Screenshot 1 for cell references.

- Cell B9: Begin with creating the title Assumption
- Col B: Include all the variables we would like to flex, e.g. Production, Price, OpEx, CapEx, Interest Rates
- F7:M7: Create list of scenario numbers from 1 to X running horizontally across the page
- F9:M9: Insert the names of the different scenarios, with number 1 being the Base Case
- F9:M9: You might want to have a number of "Spares" which can be used to later enter more scenarios if you so choose
- D7: Create a "switch" with a Data Validation list using all the numbers you have just created above
- The above "Switch" will allow us to switch / choose between particular scenario
- F8:M8 (optional): To make our "choice" clear we could create a flag to highlight the particular chosen scenario using conditional formatting
- In the heart of the table input the values for the Base Case and each respective scenario
- We could enter a value, percentage or even data validation (e.g. Price Path has a data validation of various prices such as Base Case, Bank Price, etc.)
- D9: Enter formula that will create a title that corresponds to the particular scenario that is chosen

=OFFSET(F9,0,\$D\$7-1)

- Col D: Under the title in D9 we want to bring-in the data from the table using the formula below

=IF(OFFSET(F11,0,\$D\$7-1)<>"",OFFSET(F11,0,\$D\$7-1),F11)

- The above formula tells us to pick up the Base Case unless the scenario chosen is not the Base Case

We now have created a Scenario Manager that allows us to enter a particular scenario of our choice by clicking cell D7.



Linking in Flex Cells

To allow us to see the variables we would like to flex flowing through the entire model, we have to link "Col D" into various sections of the model. This would be best illustrated through examples.

Example 1: Production Volume

How to link cell D11 in Scenario sheet?

- Cell D11 could be linked to cell F12 in Inputs sheet
- The Inputs sheet in Base Case will look like Screenshot 2
- If for example Scenario 2 is selected, the inputs sheet will look like Screenshot 3.
- Row 13 will flow through various calculations in the model

F12 =Scenario!D11

	A	B	C	D	E	F	G	H	I
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

Tutorial Assumptions				
Revenue & OpEx				
		Op Year-1	Op Year-2	Op Year-3
Production				
Volume	t	5,000	4,750	4,950
Flex	%	0.00%	0.00%	0.00%
Applied	t	5,000	4,750	4,950

Screenshot 2: Inputs – Production Volume (Base Case)

F12 =Scenario!D11

	A	B	C	D	E	F	G	H	I
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

Tutorial Assumptions				
Revenue & OpEx				
		Op Year-1	Op Year-2	Op Year-3
Production				
Volume	t	5,000	4,750	4,950
Flex	%	-10.00%	-10.00%	-10.00%
Applied	t	4,500	4,275	4,455

Screenshot 3: Inputs – Production Volume (Scenario 2)

Example 2: Product Price

There are 2 cells in Scenario sheet: Cell D14 (Price Path) and Cell D15 (Flex). How to link these cells?

- Cell D14 (Price Path) in Scenario can be linked to cell C16 in Inputs sheet
- Cell C16 in Inputs will then be linked to F18:F21 in Inputs
- Enter formula in Row 22 which tells us to pick-up the selected Price Path
- Cell D15 (Flex) in Scenario can be linked to F23 in Inputs and follow the same logic as in Example 1
- The Inputs sheet in Base Case will look like Screenshot 4
- If for example Scenario 3 is selected, the inputs sheet will look like Screenshot 5.
- Row 24 will flow through various calculations in the model.

G22 =SUMPRODUCT(\$F18:\$F21,G18:G21)

	A	B	C	D	E	F	G	H	I
4									
5									
6									
7									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Tutorial Assumptions				
Product Price				
Base Case				
		Op Year-1	Op Year-2	Op Year-3
Base Case	AUD/t	14.50	15.00	15.20
Bank Price	AUD/t	14.00	14.25	14.68
Spare 1	AUD/t			
Spare 2	AUD/t			
Selected	AUD/t	14.50	15.00	15.20
Flex	%	0.00%	0.00%	0.00%
Applied	AUD/t	14.50	15.00	15.20

Screenshot 4: Inputs – Product Price (Base Case)

G24 =G22*(1+G23)

	A	B	C	D	E	F	G	H	I
4									
5									
6									
7									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Tutorial Assumptions				
Product Price				
Bank Price				
		Op Year-1	Op Year-2	Op Year-3
Base Case	AUD/t	14.50	15.00	15.20
Bank Price	AUD/t	14.00	14.25	14.68
Spare 1	AUD/t			
Spare 2	AUD/t			
Selected	AUD/t	14.00	14.25	14.68
Flex	%	-5.00%	-5.00%	-5.00%
Applied	AUD/t	13.30	13.54	13.94

Screenshot 5: Inputs – Product Price (Scenario 3)

Scenario Data Table

The only thing that now remains is to get a better idea of how the change influences the output, in this case the, key project ratios. We want a clear, concise summary of what that scenario change actually meant. To do this, we will make use of a 1-D data table such as in Screenshot 6. The data table enables us to compare the results of a number of permutations to our original data together in the one table. How to create data table in Excel is covered in its own tutorial.

Scenario	Construction			DSCR		Funding
	Total CapEx	Debt	Equity	Average	Min	Check
1 Base Case	97,000	70,500	26,500	1.63 x	1.35 x	Ok
2 Production	97,000	70,500	26,500	1.29 x	1.04 x	Ok
3 Price	97,000	70,500	26,500	1.37 x	1.04 x	Ok
4 Opex	97,000	70,500	26,500	1.49 x	1.22 x	Ok
5 CapEx	106,700	70,500	36,200	1.60 x	1.30 x	Ok
6 Interest Rates	97,000	70,500	26,500	1.56 x	1.29 x	Ok
7 Spare	97,000	70,500	26,500	1.63 x	1.35 x	Ok
8 Spare	97,000	70,500	26,500	1.63 x	1.35 x	Ok

Screenshot 6: Scenario Data Table

About Navigator Project Finance

Founded in 2004, Navigator Project Finance Pty Ltd (Navigator) is the project finance modelling expert. Headquartered in Sydney, Australia, Navigator is raising the global benchmark in financial modelling services to the project finance sector. Navigator designs and constructs financial models for complex project financings, offers training courses throughout the Middle East, Asia and Europe, and conducts independent model reviews of project finance transaction models. Navigator delivers fast, flexible and rigorously-tested project finance services that provide unparalleled transparency and ease of use.

Customers include market leaders such as Deutsche Bank, ANZ Investment Bank, Bovis Lend Lease, Oxiana, Mirvac Property, Westpac and the Commonwealth Bank of Australia, together with leaders from the finance, mining, property, utilities, banking, chemical and infrastructure sectors.

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