

# Teach Yourself: Economic Evaluation:

Step 3 of Evaluating the Business/Project

## 2g: Key Drivers & Break Even

# The purpose of this module is to ...

Level 3: Dec

discuss the importance of key drivers  
and break even analysis when

Level 2: Evaluating the business/project

Level 1: Hands-on economic modelling

Spend only a few seconds on most slides.

# Level 2: Evaluating the business/project

Step 1: Find out what is required

Step 2: Create the hands-on model

Step 3: Compute the basket of powerful economic measures: NPV, IRR, Payback, four cash streams, **key drivers, break-evens**, uncertainty, risk, optionality

Step 4: Assess alternatives, flexibility, options, risks, the business, the industry

Step 5: Communicate your message

# Dig deeper to find the underlying business

Your evaluation work to date may have been of one scenario or a range of scenarios and alternatives. These may have been derived from a range of market scenarios, alternative production plans and/or alternative capex-opex configurations.

Hopefully you have played a leading role in getting these scenarios and alternatives created for comparison.

You now may need to work largely alone to better understand the underlying business so you can better characterise it for managers and colleagues.

*Some of these people will not appreciate the significance of this work because it is not about technical items in production, construction and operations. Too many project leaders do not understand they are building a business. Instead they get absorbed by design, schedules, technical reports, cost estimates where they can interact and think they can 'drive performance'. They do not truly appreciate that the humble expert in the back office forecasting market balance and hence prices probably has far, far more impact on the business decision.*

Take time to dig down into the business: what drives it and how close is it to going broke?

# Key drivers ...

This is a straight forward exercise where you change parameters (“drivers”) one at a time or in natural groups to find which are the most important and which are least important to NPV. The most influential are called “key drivers”

*It is surprising how many experts have a distorted view of these drivers of a business. It is common for any expert to think her/his area has a bigger impact than it actually does. The design and cost engineers will presume their area is absolutely key because the project leader gives it so much attention. The environmental engineers may presume that rehab and closure are top because of the extent of the works perceived. Some underground mining engineers are prone to presume their work with geotech is the biggest driver.*

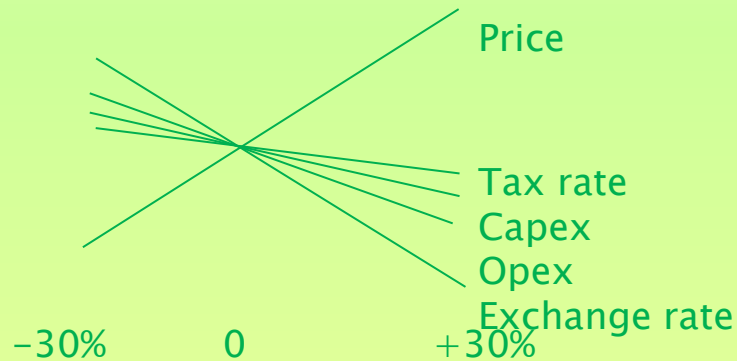
This process of ranking the ‘drivers’ helps bring rationality to the study and to focus where needed.

Research on the Internet.

# This is not “sensitivity testing”

Computing the drivers is not the same as “Sensitivity Testing”.

Some novices at economic evaluation display “sensitivity” diagrams, which are given the nick name of “spider graphs”. They are so predictable that I rarely find them useful.



The parameters that directly impact revenue, such as price, exchange rate, head grade, recovery, etc will change NPV the most so will be steepest.

Capex and Opex usually have middle impact; with their relativity being determined by the configuration of the facilities and operations

Taxes have least impact because they are a minority portion of the surplus revenue after paying out capex and opex.

Next, why is each of these parameters moved by the same 20% or 30%? Prices can move by more than 100%, recoveries probably by smaller percentages, capex and opex could move 30%, taxes may move just a few percent.

Perhaps I am missing something?

# Key drivers ...

Drivers need to be assessed systematically. Work through each of the four cash streams changing the more important parameters one by one or in inter-related groups. Vary them by the amount that your colleagues estimate is likely for each.

For example in the Revenue Cash Stream, it may be decided that recovery of metals in processing may be as follows:-

recoveries	min	low	mid	high	max
Copper	83%	86%	89%	90%	92%
Gold	45%	54%	58%	60%	65%
Silver	20%	28%	33%	36%	40%

Discuss with the processing experts if each of these three metals will behave independently or if they will tend to be in the same clusters of 'min', 'low' ....

Price and foreign exchange rate may need to be paired – as price of commodities increase then so may the A\$ and the C\$.



# Driver Trees ...

Work through your model so that you have a comprehensive array of parameters and their impacts on value. (NPV).

At the end you can create a driver tree (on its side) where you start with NPV in the first column, then the four cash streams in the second column, each cash stream splits into its key parameters in the third column, then each of these into its component parameters in the fourth column, again into fifth column, etc. (or in reverse direction if you prefer). Label each with NPV impacts.

Anyone can trace across the tree from NPV to the branches in the final column seeing the relative impacts on NPV.

# Driver Trees ...

The top portion might look something like

...	<b>1.Revenue</b>	<b>sales</b>	<b>throughput</b>	
			<b>head grade</b>	
			<b>recovery</b>	
		<b>price</b>	<b>US\$ price</b>	
<b>NPV</b>			<b>Forex</b>	
	<b>2. Opex</b>	<b>mining</b>	<b>waste</b>	<b>volume</b>
				<b>unit cost</b>
			<b>ore</b>	<b>volume</b>
				<b>unit cost</b>
			<b>tech services</b>	<b>manning</b>
				<b>salary</b>
		<b>processing</b>		

# Breakeven

Can you concisely describe to your managers and colleagues when the business/project will 'break even'. Under what conditions would the business/project start bleeding cash and need cash injections by its owners?

Does this business/project have high sales margins and so could withstand a major fall in prices or is it surviving on thin margins and vulnerable to a slight fall in prices?

Does this business have a high proportion of fixed operating costs and so is it susceptible to a fall in sales volume, or does it have low fixed costs and can better adapt to market slumps?

You must define the profile of the business/project and educate your managers and colleagues to its vulnerabilities.

# Breakeven

Like driver tree analysis this usually comes down to a systematic testing of the model. After undertaking this analysis a few times on differing businesses/projects you should be able to recognise its breakeven character.

*Generally I would prefer a business/project with high margins and low fixed costs, because it can best survive market slumps and harvest market upturns.*

*By contrast a business/project with low margins and high fixed costs – such as labour intense manufacturing industries – are more likely to be always battling to survive.*

# Breakeven

A most revealing graph is where you plot

- a) breakeven prices across future business years, then
- b) superimpose your company's forecast of prices – min, low, mid, high and max, and
- c) add the historical prices  
(all in real terms)

Where does your estimate of year by year breakeven prices sit?

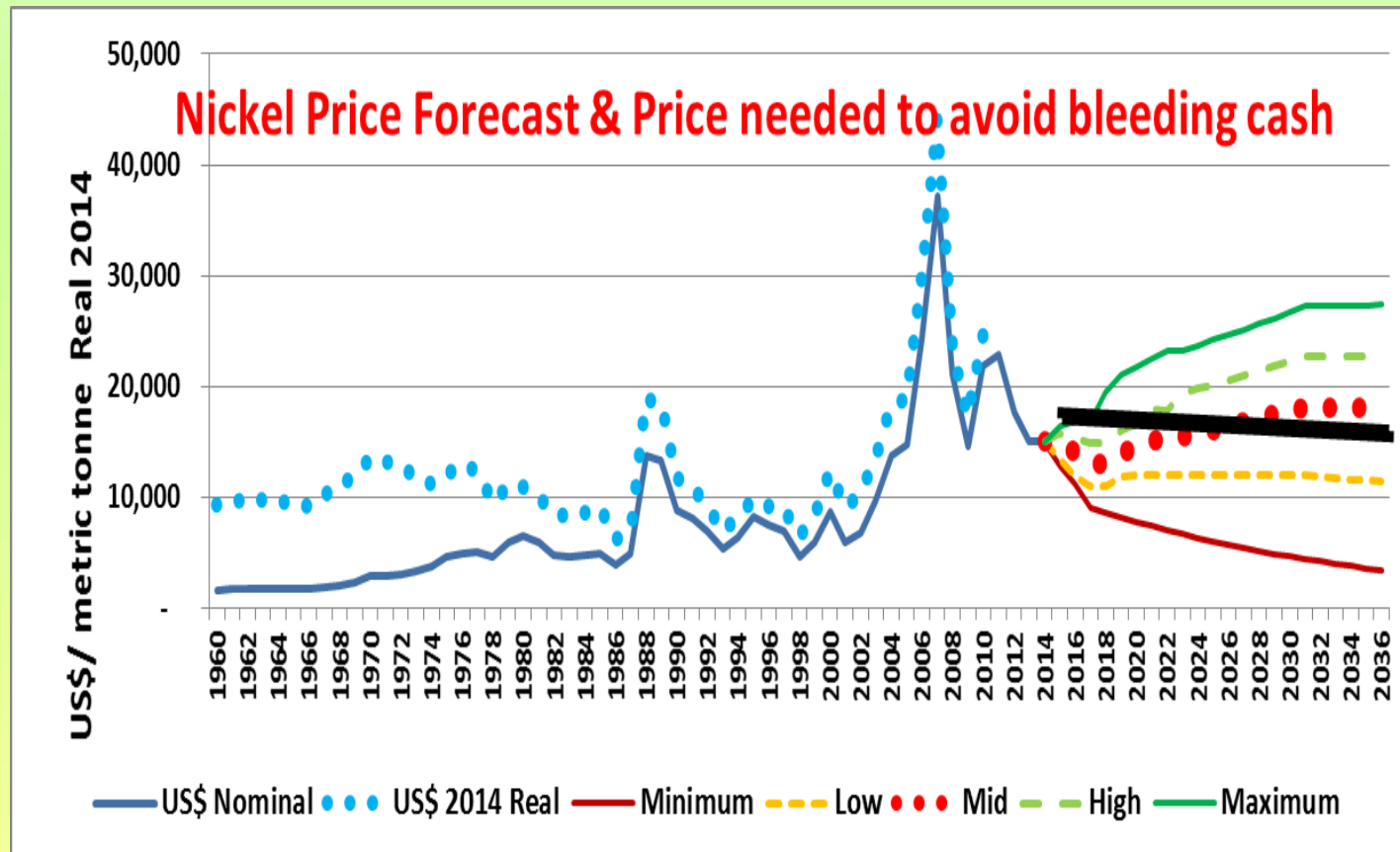
- i. If it is below the minimum you can feel safe
- ii. If it is in the minimum to low range then you can feel OK if for a short time only
- iii. If it is in the low to mid range then start feeling uncomfortable
- iv. If above mid then make sure everyone have their eyes wide open when making a decision.

Similarly, how does the breakeven plot fit against past actual prices in real terms? Is it well below or does it poke above and look vulnerable in down turns.

Again make sure eyes are wide open and not blinded by a positive NPV.

# Breakeven – Saving the best graph for last →

Here is an illustration of the concept extracted from the paper on price forecasting in this website (access via the home page) ...



*This graph can be so powerful in reducing bad investments*

**Driver trees and break even analysis** are so fundamental to understanding the business/project.

- Educate your managers and colleagues using simple business concepts and easy to understand graphs/diagrams.
- *Make their “Eyes wide open”*
- You can leave behind those evaluation specialists who think it is all about creating a ‘trophy’ model and then pumping out NPV using sophisticated mathematics.

**END**