Module 4

# Alternative Approaches to Valuation and Investment

## The Problem with NPV (It **always** works… except when it doesn't…)

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## The issue

Let's assume that you are an entrepreneur with what you think is a great business idea – the establishment of a pastizzi manufacturing business in Lancaster, England.

You are going to start out of your own kitchen and then expand into a full-size factory.

## The issue

You estimate that it will cost you £50,000 to commence operations out of your own kitchen.
You also estimate that if you go ahead with the expansion into a full manufacturing process in a year's time, then the possible scenarios – and present value of cash flows today – that you face are as follows:

| Outcome | Likelihood | PV(Cash flows) |
|---|---|---|
| Great success | 30% | £200,000 |
| Moderate Success | 40% | £100,000 |
| Failure | 30% | −£200,000 |

$$NPV = -£50,000 + (0.3)(£200,000) + (0.4)(£100,000) + (0.3)(-£200,000)$$

$$NPV = -£10,000$$

And we would of course walk away from this project…

## But what if…

… the initial pastizzi pilot project gave you information about the state of the market **before** you expanded into the factory…?

Now:

$$NPV = -£50,000 + (0.3)(£200,000) + (0.4)(£100,000) + (0)$$

$$NPV = £50,000$$

PV = 0 because when we face this state of the world we choose not to proceed!

## Another example

A new mineral – Debranium – is discovered at Newport Beach, California.

You estimate that:

$PV^{\text{Extraction Costs}} = \$100\text{ m}$

$PV^{\text{Revenues}} = \$80\text{ m}$

The U.S. government puts out to tender the *right* to extract the Debranium. *What would you bid for that right?*

## Another example

Standard NPV analysis:

NPV = PV(Inflows) − PV(Outflows)

= \$80 m − \$100 m

= − \$20 m

*So does that mean that you wouldn't pay \$1 for the right – but not the obligation – to extract Debranium?*

## The value of uncertainty

So ask yourself… *What sort of things might change to make this a positive NPV project?*

Examples:

- Technology
- Usage and value of Debranium.

*Would greater uncertainty about the value of Debranium in the market in the next 5 years make you pay more or less for the license to extract it from Newport Beach?*

## Summary

NPV analysis tends to answer a very specific question:

*WHAT WOULD BE THE WEALTH IMPACT TODAY OF GOING AHEAD WITH THIS INVESTMENT?*

That is, it treats projects as "now-or-never" opportunities.

It fails to account for the value associated with managerial flexibility and the value gained (destroyed) when that flexibility is created (removed).

## Source list

Slide 2:

Pastizzi (https://flic.kr/p/8CxFwS) by Charles Haynes (https://www.flickr.com/photos/haynes/). Licenced under Creative Commons (CC BY-SA 2.0) (https://creativecommons.org/licenses/by-sa/2.0/).

Slides 3 & 4:

Example adapted from Dixit, A. K. and Pindyck, R. S, The options approach to capital investment, Harvard Business Review, 73 (3), 105–115 (May/June 1995).

Slide 5:

Newport Beach Pier by YoTuT [CC BY 2.0) (https://creativecommons.org/licenses/by/2.0/)] (https://flic.kr/p/6VBUDX)