The Gain-Loss Spread

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Variance, correlation, standard deviation…words pretty much guaranteed to lose the interest of your audience in double quick time. Risk is all pervasive but explaining it is extremely difficult to do in a way that makes it relevant to your corporate colleagues. This first article in a short series of two explores the presentation of risk in the corporate investment environment.

While it is fair enough to say that foreign exchange, interest rate, commodity and liquidity risks are absolutely core arears that Treasury departments must address, the most fundamental risk facing any firm is where it invests its capital. Getting the strategic direction of capital flow right in the medium to longer term is ultimately what determines if the firm will succeed, survive or fail. It's this marriage between strategy and risk in the context of investment appraisal that I wish to talk about, and introduce a very straight forward, effective, yet little known technique for presenting risk called the gain-loss spread[1].

What bothers decision makers?

When I interviewed the late Richard Cousins, former CEO of Compass, on the topic of corporate investment decision making he was cynical about the way modern corporate finance had left things. It was almost as though there was only half a job done with theory not quite addressing the practice. He felt many participants had a poor understanding of what they were really presenting and that there was a little transparency around the risks imbedded in a static set of numbers. Mr Cousins was an exceptional leader and clearly a great decision maker as his record testifies and I think his views sum up a general suspicion in the corporate world about where modern corporate finance thinking has left us. Part of the problem is presenting risk in a transparent and simple manner. The quality of risk analysis in investment evaluation is variable and often inconsistent and confusing. Many companies are wrestling with the best way to present risk in a transparent and simple manner. Gain/Loss spread is one tool that should be added to the toolbox.

In theory those putting together the business case for investment analysis will have considered the key influences on things going better or worse than expected. However, in the context of discounted cash flow analysis for example a common response from decision makers is to increase the discount rate used. The problem with this is twofold:

1. It is the lazy way out as the temptation is then to ignore what might go wrong (or right) within the cash flows on the basis that the discount rate has taken care of this.

2. Those championing the investment may take an "optimistic" view of the cash flows because they know these will be discounted at the higher rate.

[1] Gain-loss spread was introduced by Estrada in the following publication: *"The Gain-Loss Spread: A New and Intuitive Measure of Risk, Javier Estrada, Jnl of Applied Corporate Finance, Vol 21, no. 4, Fall 2009"*

The truth of the matter is that executives making investment decisions are hugely concerned about the risks they are taking on and yet frustrated by the tools available to them to measure risk.

Consider the following conversation:

CEO: "So the NPV of this project is £15m, but how risky is that figure?"

EYFM[2]: "Well the standard deviation of returns is 20%"

CEO: "Ok, what does that mean?"

EYFM: "It means that the square root of the average quadratic deviation around the arithmetic mean of outcomes is 20%"

CEO[3]: "You're fired"

What does the decision maker really want to know? Well it's probably along the lines of:

1. What are the chances of the investment destroying value
2. If it destroys value how much?
3. Can we turn the project off if it goes wrong and how much will this cost?
4. What are the biggest risks, how are we going to monitor them and how do we mitigate them?

Good investors worry more about the losers than the winners. Avoiding big losses keeps you in the game and allows the successful investments to accumulate wealth and create value over time. How much investment analysis performed in the corporate environment gets close to answering the questions listed above?

Consider this conversation, now with some input from Gain-Loss spread analysis:

CEO: "So the NPV of this project is £15m, but how risky is that figure?"

EYFM: "Well we looked at the main risk areas to the project, those being supply disruptions, wage inflation and the response of competitors, and using some straightforward estimates of how those factors could influence outcomes we come up with some probabilities of how our base case might vary. We believe the project could be value destructive around 25% of the time. If this should occur the average downside is approximately £10m."

CEO: "Ok, what have we learnt from carrying out this analysis?"

EYFM: "This analysis has identified certain key indicators we should monitor and we have also priced in some mitigating actions which give us some flexibility to terminate the project should it appear to be heading in the wrong direction. These are included in the NPV of the project. We have looked at the risks in the context of our competencies as a firm and believe the project is a good fit with these."

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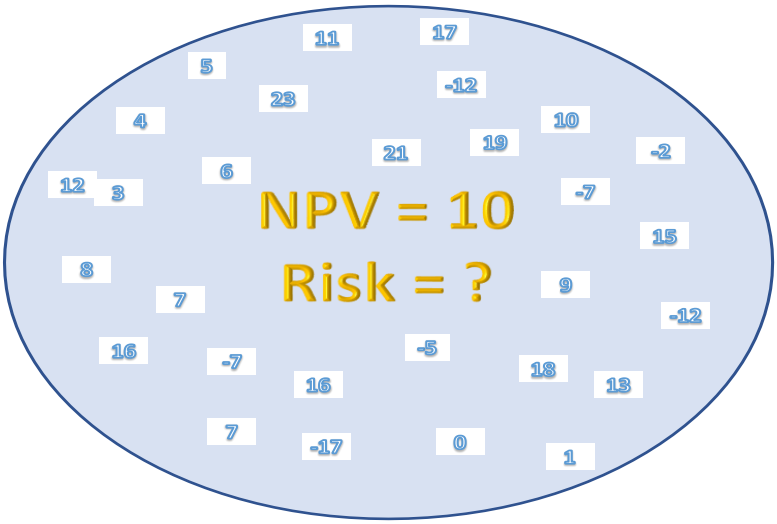
[2] Eager Young Finance Manager
[3] Alan Sugar

CEO: “Your analysis has added some real value to the decision-making process. You’re hired!”

The gain-loss spread

The concept of the “gain-loss” spread was introduced by Estrada in the context of portfolio investment. However, the concept can easily be used in the corporate environment. The technique is simple and best illustrated by an example. Figure one shows a situation where a range of potential project outcomes been derived. We will cover ***how*** to derive a data set of potential outcomes in the next article on Monte Carlo simulation. There are two ways to set this project up: a low cost, high risk route and a high cost, low risk route.



	NPV	Probability of gain	Average gain	Weighted gain	Probability of loss	Average loss	Weighted loss	**Gain-loss spread**	**Standard deviation**
High risk implementation	27	54%	132	71	46%	(95)	(44)	**115**	**129**
G-L Index								**4**	
Low risk implementation	9	88%	11	10	12%	(2)	(0)	**10**	**9**
G-L Index								**1**	

Figure one: project with two implementation strategies compared on a gain-loss basis

First to note is that the average outcome is the Net Present Value as this represents the expected cash flow result. A gain-loss spread analysis of the results would then split the results into two camps: those with a positive and a negative value. Dividing outcomes like this then allows a simple calculation of probability of the project creating or destroying value. Further, the average level of gain and loss can be calculated which informs as to the size of the potential loss should things go badly. Lastly the gain-loss spread which is the weighted gain to weighted loss range is a measure of overall riskiness.

The low-cost, high risk route has a NPV of 27, but half the time it makes a loss. The average gain is 132 and the average loss is 95 giving a G-L spread of 115. The high cost, low risk route has an NPV of only 9, but loses value only 12% of the time and when it does this is on average only a loss of 2. Would management accept a project that would destroy value half the time? The point is really that at least the risk is now presented in a transparent manner and the decision maker can make a more informed choice.

Some other uses for this Gain-Loss output include:

1. Liquidity planning as the average loss informs as to a sensible level of headroom to have in place.

2. A useful way of ranking projects where resources are limited. For instance, management time could be completely dominated by a higher risk project. In the interests of maximising the total value created this can be an important consideration.

Article two of this short series explores ways of addressing the second major criticism of investment analysis: that of being able to better reflect the complex and ever changing real world environment into which the firm's capital is invested.