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TRICKY TOPICS DECIPHERED

DECISION MAKING TECHNIQUES: DISCOUNTED CASH FLOW

Suppose Chelsea offers her son, Dax, £2,000 today to buy a car, or £2,200 in two years' time towards Dax's first home. Assuming that Dax is savvy with money and doesn't actually need help with the car, which should he choose? Money changes value over time, so Dax should quietly do some maths. If Dax can invest £2,000 at 5% interest, then at the end of one year he will have earned £100, giving him £2,100. In year two, Dax will earn another 5% or £105 giving him £2,205, more than the £2,200 Chelsea is offering. However, if Dax can only get an interest rate of 3%, the money will only be worth £2,122 in two years' time (£2,000 x 1.03 x 1.03).

We can consider the same problem from the opposite direction. If Dax calculates the present value of the £2,200 expected in two years' time, based on the 5% interest rate, the value is £1,995 (£2,200 ÷ 1.05 ÷ 1.05). If interest rates are 3% then it is £2,074. Dax's decision should be based on what interest rate he can get.

How does this apply to business? Well, capital costs money, either because we borrow it at a rate of interest, or because we can use it elsewhere to generate money. If we are reviewing the costs and revenues for a project, we can discount the cash inflows by the cost of capital to see if the project is worth doing. Let's consider buying a printing machine that is expected to cost £100,000 and then generate cash inflows over a five year period of £112,000, giving an overall cash inflow of £12,000.

Year	Cash flow £
0	- 100,000
1	25,000
2	36,000
3	21,000
4	20,000
5	10,000
Net cash flow	12,000

Let's now discount the inflows for a 5% cost of capital. Year three's £21,000 of income (or savings) will be divided by 105% (or 1.05) three times to get £18,141, year four's £20,000 will be divided by 105% four times and so on.

In practice, as calculations can get quite long, we multiply by discount factors instead. It gives the same answer and is easier to use. The discount factor for four years at 5% is 0.8227 (1 ÷ 1.05 ÷ 1.05 ÷ 1.05 ÷ 1.05), you will be given this in an exam.

If we discount all the income figures for their required number of years, we get a net present value (NPV) for the project of £-1,107.

Year	Cash flow £	Discounted cash flow £
0	- 100,000	- 100,000
1	25,000	23,810
2	36,000	32,653
3	21,000	18,141
4	20,000	16,454
5	10,000	7,835
Net present value (NVP)		- 1,107

In other words, the project is not going to make a profit of £12,000 but a loss of £1,107 at the present value of money. The project should not go ahead.

However, if the cost of capital is only 3%, the project would have a positive NPV:

Year	Cash flow £	Discounted cash flow £
0	- 100,000	- 100,000
1	25,000	24,272
2	36,000	33,933
3	21,000	19,218
4	20,000	17,770
5	10,000	8,626
Net present value (NVP)		3,819

In this case, the project can go ahead – unless there is a competing project, in which case, the one with the best NPV should be chosen.

As for Dax, I suspect that he will take the money now and then hope to persuade Chelsea to give him more when he buys his first home.

Compiled by Cath Littler, accountancy learning specialist working with AAT and Mindful Education.