Module 4

The Language and Tools of Financial Analysis

Discounting Cash Flows (Not every dollar is equal)

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Discounted cash flow (DCF) analysis

Which of the following would you prefer?

$100 now or a promise of $100 a year from now?

Why?

There are at least three reasons:

1. Expected inflation
2. Risk
3. Opportunity cost

We can't directly compare cash flows that occur at different points in time without thinking about expected inflation, risk and opportunity cost!

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DCF to Present value

The way that we account for the *time value of money* is by systematically *discounting* future cash flows.

$$PV = \frac{Cash\ Flow_n}{(1+r)^n}$$

This results in future cash flows being re expressed in terms of their *present value* today!

As present values are recorded at the same point in time (now) they can be compared added together.

DCF to Present value

<u>Example:</u>

What is the present value of \$100 expected in one year's time, assuming a discount rate of 5% p.a.?

$$PV = \frac{Cash\ Flow_n}{(1+r)^n} = \frac{\$100}{(1.05)^1} = \$95.24$$

What is the intuition here?

What if the cash flow was expected in two years' time instead (rather than one)?

$$PV = \frac{Cash\ Flow_n}{(1+r)^n} = \frac{\$100}{(1.05)^2} = \$90.70$$

Intuition?

Compounding to Future value

Instead of **discounting** future cash flows to the present, we can also **compound** present cash flows to the future.

What is the future value of $100 today in two years' time, assuming a discount rate of 5% p.a.?

$$FV_n = Cash\,Flow_0 \times (1+r)^n = \$100 \times (1.05)^2 = \$110.25$$

Why would we want to do that?

$$PV = \frac{FV_n}{(1+r)^n} \quad or \quad FV_n = PV \times (1+r)^n$$

Choosing the discount rate

The discount rate *r* accounts for:

- risk-free interest rate
- rates of return on 'similar' risky investments
- or risk premia
- opportunity cost
- expected inflation

The greater the influence of these factors, the greater the discount rate applied to the future cash flows and the smaller the present value.

DCF – Impact of the discount rate

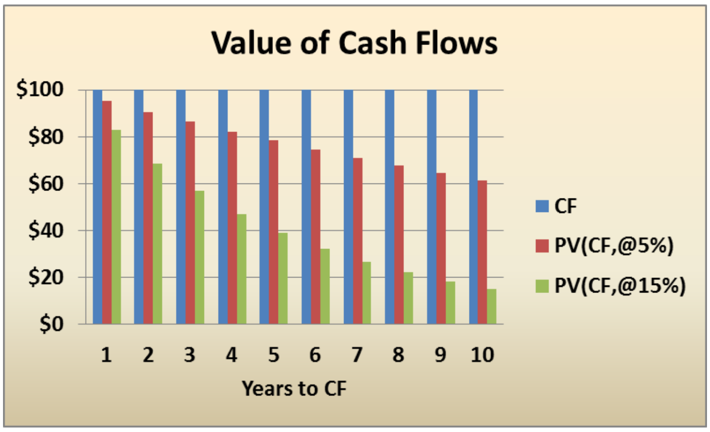
Example continued:

Going back to our expectation of \$100 in one year's time – what would happen to the PV if the discount rate was 15% p.a. instead of 5% p.a.?

$$PV = \frac{Cash\ Flow_n}{(1+r)^n} = \frac{\$100}{(1.15)^1} = \$82.82$$

Intuition?

DCF – impact of the discount rate



Summary

- Cash flows expected to occur at different points in time aren't directly comparable.
- This is because of *risk*, *opportunity cost* and *expected inflation.*
- Discounting expected cash flows back to their present values solves this problem.
- *Discounted Cash Flow (DCF)* analysis is the basis of the most popular project evaluation methods.

Source List

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