**Time Value of Money**

**Compounding:** \( FV = PV \times (1 + r)^n \) - Figures out the compound interest where \( FV = \) future value, \( PV = \) present value, \( r = \) interest, \( n = \) number of periods.

Discounting is sort of the same as Compounding, but £1 tomorrow is viewed less than £1 today.

Discounting:

\[ PV = FV \times \frac{1}{(1 + r)^n} \]

Future cash flows need to be discounted in order to take into account the opportunity cost of an investment (OCI)
- Funds tied up in investment projects could have been used elsewhere to earn a return
- Funds tied up in investment are costly, since returns are required by the providers of finance

**Net Present Value**

It involves discounting all future cash flows to their present value. The sum of all present values less the initial costs gives the net present value (NPV).

**Decision rule:**
- Accept project if NPV > 0
- Accept project with the highest NPV.

<table>
<thead>
<tr>
<th>Year</th>
<th>Discount factor (10%)</th>
<th>Project A</th>
<th>Project B</th>
<th>Project C</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>CF £</td>
<td>PV £</td>
<td>CF £</td>
</tr>
<tr>
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<td>-1,000</td>
<td>-1,000</td>
<td>-1,000</td>
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</tbody>
</table>

**Internal Rate of Return (IRR)**

It is equivalent to the discount rate \( (r) \) that will cause the NPV of an investment to be zero (0).

**Decision rule:**
- Accept project if IRR ≥ company’s cost of capital
- Accept project with the highest IRR

\[
IRR = r_1 + \frac{NPV_1}{NPV_1 + NPV_2} (r_2 - r_1)
\]

\( r_1 = \) discount rate that gives a positive \( NPV_1 \)
\( r_2 = \) discount rate that gives a negative \( NPV_2 \)
\( NPV_1 = \) the positive NPV obtained by applying discount rate \( r_1 \)
\( NPV_2 = \) the negative NPV obtained by applying discount rate \( r_2 \)