The costs of financial distress are the costs arising from bankruptcy or distorted business decision before bankruptcy.

Value of the firm = Value if all equity financed + PV of tax shield - PV of financial distress

**Trade-Off Theory**

- The theory that capital structure is based on the trade-off between tax savings and distress costs of debt.
- The Target debt ratios vary from firm to firm, with High tech industries favouring lower tangibles so lower debt, whilst Tangible heavy industries favour higher debt.
- Proposed originally by Kraus and Litzenberger (1973)

**Example 6**

H International Ltd is a shipping firm.

Current Share price: £5.50
Shares outstanding: 10 million

*There are plans to lower corporate taxes by borrowing £20 million and repurchasing shares.*

\[
V_u = V_t \\
V_u = 5.50 \times 10m = £55m \\
V_t = D + E \\
£55m = £20m + E \\
E = £35m \\
\]

Number of shares repurchased:

\[
£20m \text{ debt/}£5.50 = 3.636m \text{ shares} \\
E / \text{ remaining shares} \\
£35m / (10m - 3.636m) = £5.50 \\
\]

However, *is you suppose that H International Ltd pays 30% in corporate tax.*

\[
V_u = V_t + Dt \\
V_u = 5.50 \times 10m = £55m \\
Dt = £20m \times 0.30 = £6m \\
V_t = £55m + £6m \\
£61m = £20m + E \\
E = £41m \\
\]

Number of shares repurchased:

\[
£20m \text{ debt/}£5.50 = 3.636m \text{ shares} \\
E / \text{ remaining shares} \\
£41m / (10m - 3.636m) = £6.44 \\
\]

The only imperfections are corporate taxes and financial distress costs. The share price rises to £5.75 after the announcement, what is the PV of financial distress costs?

\[
£6.44 \text{ (calculated share price)} - £5.75 \text{ (actual share price)} = £0.69 \times 6.363m \text{ (remaining shares)} = £4.39m \\
\]

£4.39m is the cost of financial distress.

Therefore, the value of the firm is = £55m (all equity financed) + £6m (PV tax shield) - £4.39m (PV financial distress) = £56.61m

\[
V_t = D + E \\
E = 5.75 \times 6.363m \text{ shares} = £36.59m \\
D = £20m \\
V_t = £36.59m + £20m = £56.69m \\
\]
**Investment Decision:** Ignore gearing! Take a geared beta for a company in the same industry as the project, de-gear it. Insert the un-g geared beta into CAPM to find un-g geared cost of equity. Use the un-g geared Ke to discount project cash flows.

**Financing Decision:** Find the PV of financing costs and benefits, discounted at Pre-tax cost of debt.

Typical financing costs: Issue costs on debt and/or equity,

Typical financing benefits: Tax relief on debt interest, Value of a subsidised loan for saving of interest and loss of tax shield on interest saved.

---

**Example 7**

Initial Investment: £400,000 (No residual value)  
Annual net cash flows AT over 3 years: £175,000

20% of the initial investment will be equity (£400,000 * 20%) = £80,000

40% will be financed by subsidised loan at 5% (£400,000 * 40%) = £160,000

Interest rate payments (5% of £160,000) = £8,000

40% financed by loan at rate of 9% (£400,000 * 40%) = £160,000

Interest rate payments (9% of £160,000) = £14,400

Issue costs for equity expected to be 3%, debt issue costs is zero. (3% of £80,000) = £2,400

Equity beta: 1.7  
Avg debt:equity ratio: 1:3  
RFR: 5% (AT)  
MR: 13% (AT)  
Corporate tax: 30%

**Step 1: Calculate base case NPV @ Keu**

\[
\beta_{eu} = \beta_{eg} \left( \frac{V}{V_E + V_D (1 - T)} \right)
\]

\[
\beta_{eu} = 1.70 \left( \frac{3}{3 + 1(1 - 0.30)} \right) = 1.38
\]

\[
K_{eu} = r_f + \beta_{eu}(r_m - r_f)
\]

\[
K_{eu} = 0.05 + 1.38(0.13 - 0.05) = 0.1604
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash flow (£'000)</th>
<th>DF @ 16%</th>
<th>PV (£'000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(400)</td>
<td>1</td>
<td>(400)</td>
</tr>
<tr>
<td>1</td>
<td>175</td>
<td>0.862</td>
<td>150.85</td>
</tr>
<tr>
<td>2</td>
<td>175</td>
<td>0.743</td>
<td>130.025</td>
</tr>
<tr>
<td>3</td>
<td>175</td>
<td>0.641</td>
<td>112.175</td>
</tr>
</tbody>
</table>

**Step 2: Financing costs of Equity and Debt, including Tax relief gained @ Pre-tax cost of debt (3 year annuity)**

PV of Issue costs and Interest rate payments above.

PV of tax shield on normal loan interest, **Tax relief gained**: £14,400 * 0.30 = £4,320

\[
£4,320 * 2.531 (3 year annuity at 9%) = £10,934
\]

PV of tax shield on subsidised loan interest, **Tax relief gained**: £8,000 * 0.30 = £2,400

\[
£2,400 * 2.531 (3 year annuity at 9%) = £6,074
\]

**Step 3: Interest saved on Subsidised loan and tax relief lost on the interest saved.**

Interest saved: £14,400 - £8,000 = £6,400

\[
£6,400 * 2.531 (3 year annuity at 9%) = £16,198
\]

Tax relief lost: £16,198 * 0.30 = £4,680
Stock Market anomalies and Competing theoretical views

The January effect

- Stocks that underperform in the 4th quarter, over compensate and outperform the market in January of the following year.
- Usually because the company may sell poorly performing stock to offset losses for tax purposes in the 4th quarter.
- The selling may drive down prices to such an extent that it becomes attractive in the following month.

Day of the week effect

- Research suggests that stocks move more on Fridays than Mondays, and that movements tend to be more positive on Friday than Monday.
- Closing prices on Monday tend to be lower than on Friday.
- Although movement is small, it does exist. There appears to be no reason other than behavioural.

Turn of the month effect

- Stock prices rise on the last day of the month and first three days of the following month.

<table>
<thead>
<tr>
<th>Rolls-Royce May to Sept 2014</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn of the month</td>
<td>2.61%</td>
<td>-0.84%</td>
<td>-1.9%</td>
<td>-0.29%</td>
<td>-1.60%</td>
</tr>
<tr>
<td>Rest of the month</td>
<td>0.78%</td>
<td>-0.81%</td>
<td>-0.94%</td>
<td>-0.3%</td>
<td>-5.61%</td>
</tr>
</tbody>
</table>

Calendar or seasonal anomalies

- Represent one of the most important existing anomalies in the markets.
- These excess-returns cannot be captured by equilibrium asset pricing models such as CAPM.
- Can be exploited by rational investors to gain above-average returns.
- These anomalies violate weak-form efficiency and random walk hypothesis.

Small size and Value effect

- Smaller size equals smaller capitalisation. Studies found that smaller firm’s shares outperformed, due to the fact that a large company needs to find billions extra to grow 10%, whilst a small company may only need a few million to grow at the same rate.
- Low price-earnings ratio shares generally generate abnormal returns, there is a dispute whether it is the small size-effect that is really being observed.
- Investors place emphasis on short term earnings data, because unusually cheap stocks attract investors and then encounter mean reversion.