CORPORATE FINANCE FOR LONG-TERM VALUE

Chapter 15: Capital structure

Part 5: Corporate financial policies

Chapter 15: Capital structure

The BIG Picture

- How should companies decide on their capital structure?
- Capital structure is the funding mix of equity and debt

Discussion

- In a perfect capital market
  1. capital structure is irrelevant for company value, and
  2. the cost of equity increases with leverage (debt financing)
- In a world with imperfections, like corporate taxes, bankruptcy cost and information asymmetries, capital structure matters to financial value
- Companies generate also asset and liabilities on E and S
- The integrated capital structure (F, S and E) is an indicator of a company's overall risk profile

Financial capital structure

- Financial capital structure is about the funding of the company's business activities
- It refers to the company's distribution of equity, debt and hybrid securities, referred to as leverage:

$$Leverage = \frac{Debt}{Value} = \frac{Debt}{Total\ assets}$$

- Companies with a high proportion of debt on their balance sheet are highly levered / leveraged

Financial capital structure

- Leverage is measured by ratios that express:
  - The distribution of the types of securities – debt-equity ratio or debt-assets ratio
  - The ability to bear the interest burden – interest coverage ratio

F assets	25	F debt	5
		F equity	20
Total F assets	**25**	**Total F liabilities**	**25**

  - Debt-equity ratio = 5 / 20 = 0.25
  - Debt-assets ratio = 5 / 25 = 0.20

Theories on perfect capital markets

- Modigliani and Miller (1958): corporate finance in the real world is a complex topic
- Arbitrage argument: due to buying and selling a company's shares with borrowed funds, price differences on leverage should disappear
- Two MM propositions:
  - MM1: In a perfect capital market, the value of the levered company V_L equals the value of the unlevered company V_U
  - MM2: The cost of capital of levered equity increases with the company's debt-equity ratio (based on market values of debt and equity)

Theories on perfect capital markets

- MM1: In a perfect capital market, the value of the levered company V_L equals the value of the unlevered company V_U

$$V_U = V_L$$

$$V_U = \frac{FCF_U}{r_U} \qquad V_L = \frac{FCF_{equity}}{r_{equity}} + \frac{FCF_{debt}}{r_{debt}}$$

- MM2: The cost of capital of levered equity increases with the company's market value debt-equity ratio

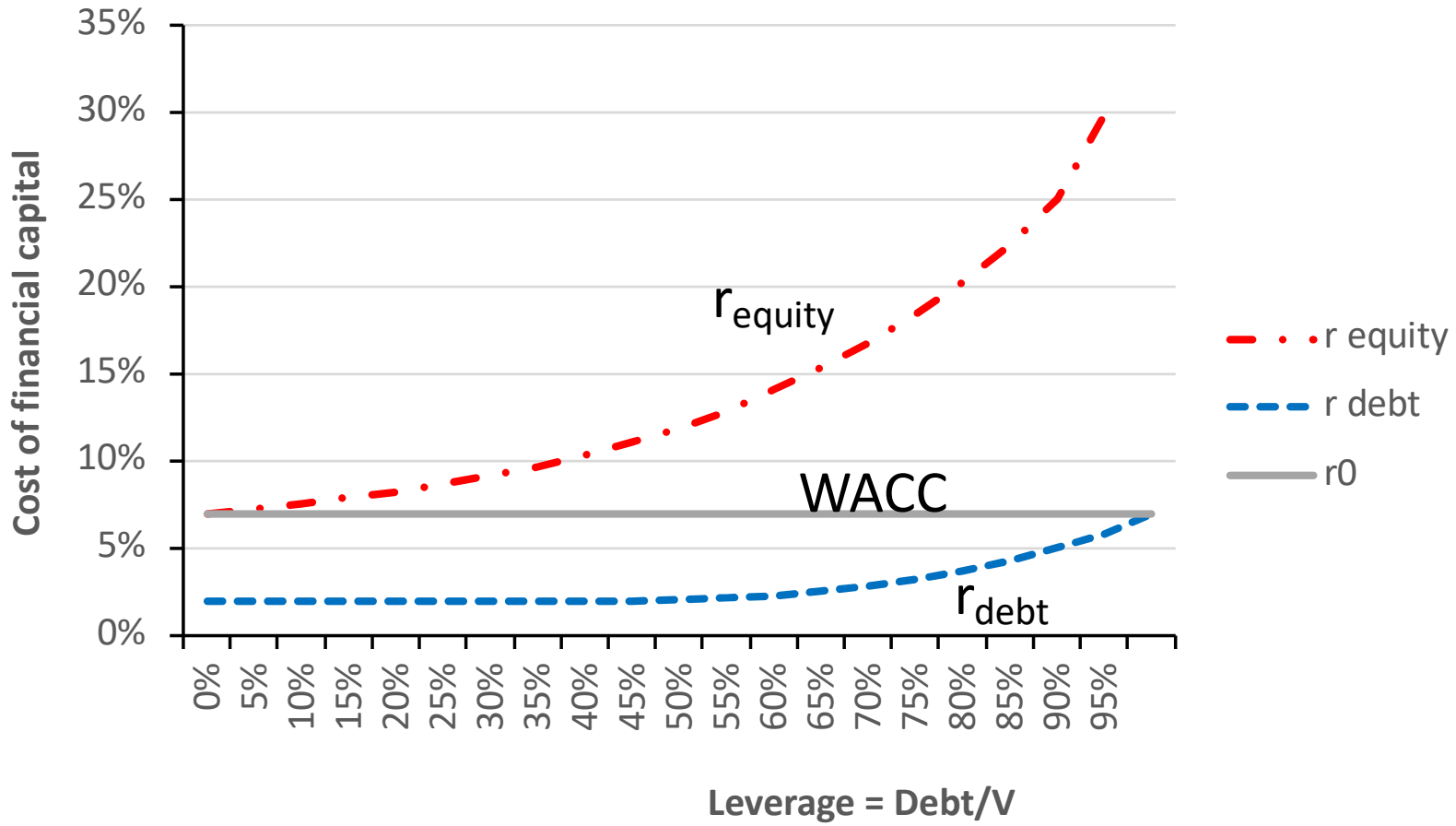
$$r_{equity} = r_U + \frac{debt}{equity} * (r_U - r_{debt})$$

which follows from: $\text{wacc} = r_U = \frac{equity}{V_L} * r_{equity} + \frac{debt}{V_L} * r_{debt}$

Cost of equity with rising leverage

Equity (as %)	Debt (as %)	r_{equity}	r_{debt}	r_U	Equity/V	Debt/V (leverage)	Debt/ Equity	WACC
100	0	**7.0%**	2.0%	7.0%	1	0	0.0	7.0%
90	10	**7.6%**	2.0%	7.0%	0.9	0.1	0.1	7.0%
80	20	**8.3%**	2.0%	7.0%	0.8	0.2	0.3	7.0%
70	30	**9.1%**	2.0%	7.0%	0.7	0.3	0.4	7.0%
60	40	**10.3%**	2.0%	7.0%	0.6	0.4	0.7	7.0%
50	50	**11.9%**	2.1%	7.0%	0.5	0.5	1.0	7.0%
40	60	**14.1%**	2.3%	7.0%	0.4	0.6	1.5	7.0%
30	70	**16.8%**	2.8%	7.0%	0.3	0.7	2.3	7.0%
20	80	**20.2%**	3.7%	7.0%	0.2	0.8	4.0	7.0%
10	90	**25.0%**	5.0%	7.0%	0.1	0.9	9.0	7.0%
0	100	**N/A**	7.0%	7.0%	0	1	N/A	7.0%

Cost of equity with rising leverage



Impact of debt issuance

- A change in capital structure does not mean a change in value (MM1), while it does mean a change in the cost of equity capital (MM2)

Company without leverage

F assets	1,000	F debt	1,000
Total F assets	**1,000**	**Total F liabilities**	**1,000**

Company with leverage

F assets	1,000	F debt	400
		F equity	600
Total F assets	**1,000**	**Total F liabilities**	**1,000**

	No debt	With debt
F assets	1,000	1,000
F equity	1,000	600
F debt	0	400
r_U	10%	10%
r_{debt}	N/A	2%
r_{equity}	10%	15.3%
Free cash flow (FCF)	100	100
Interest	0	8
Cash flow to equity	100	92
Number of shares	200	200
EPS	0.50	0.46
Value per share	5	3

No change in value

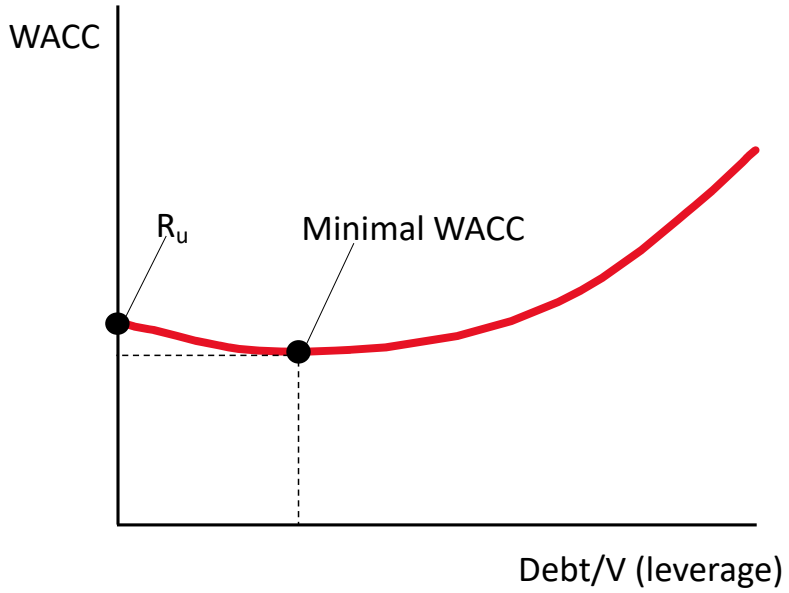
Change in cost of equity capital

Financial capital structure with imperfections

- MM1 shows the *conservation of value principle*: in perfect capital markets, financial transactions do not add or destroy financial value (FV)
- Market imperfections that matter for financial capital structure include:
  - Corporate taxes τ_c and bankruptcy costs (static trade-off theory)
  - Information asymmetries (pecking order theory)

Static trade-off theory

- In perfect capital markets, companies can go bankrupt at zero cost, while in the real world, such losses do occur
- Managers recognise the offsetting effects of tax benefits and bankruptcy costs
- This suggests that there is an optimal point whereby overall cost of capital (WACC) is minimalised



Interest tax shield

- Tax benefits are also known as the interest tax shield

$$Tax\ shield = \tau_c * interest\ payments = \tau_c * r_{debt} * debt$$

$$\text{After-tax } WACC = \frac{equity}{V_L} * r_{equity} + \frac{debt}{V_L} * r_{debt} * (1 - \tau_c)$$

MM1 (with taxes):

$$V_U = V_L + \tau_c * debt$$

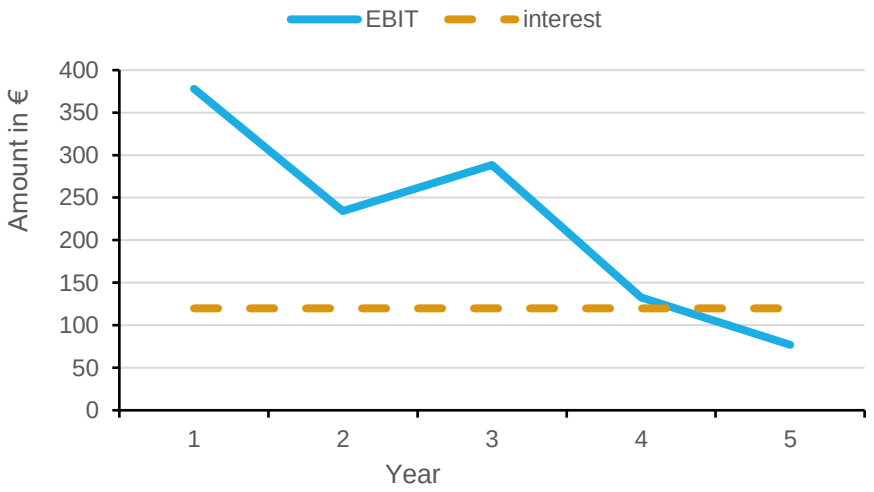
MM2 (with taxes):

$$r_{equity} = r_U + \frac{debt}{equity} * (r_U - r_{debt})(1 - \tau_c)$$

Debt?	No debt	With debt of 400	No debt	With debt of 400
Taxes?	No taxes	No taxes	With taxes	With taxes
Cash flow	100	100	100	100
Interest payments (2%)	0	8	0	8
EBIT	100	92	100	92
Corporate tax rate (τ_c)	0%	0%	25%	25%
Taxes paid	0	0	25	23
Net income	100	92	75	69
Net income + interest	100	100	75	77
Tax shield (τ_c x interest)	0	0	0	2

Bankruptcy costs

- As a company's leverage increases, the chance also rises that it cannot meet its debt obligations
- A company is in distress when it's close to being unable to meet debt obligations
- In a perfect capital market, there are no costs to reorganising the company, but in the real world, there are direct and indirect costs of bankruptcy
  - Direct costs include fees paid to administrators, accountants, investment bankers, lawyers and courts
  - Indirect costs include the value loss of missed sales and investments



Static trade-off theory

- Taxes and bankruptcy costs have opposite implications for capital structure:
  - Taxes give incentives for higher leverage
  - Bankruptcy costs incentivise managers to reduce leverage
- The optimal capital structure:
  - Overall cost of capital is minimalised
    - A sizeable tax benefit is obtained
    - Without excessive bankruptcy costs
- Trade-off theory predicts that companies' debt ratios move towards a target capital structure, which is determined by the balance of tax benefits and bankruptcy/distress costs

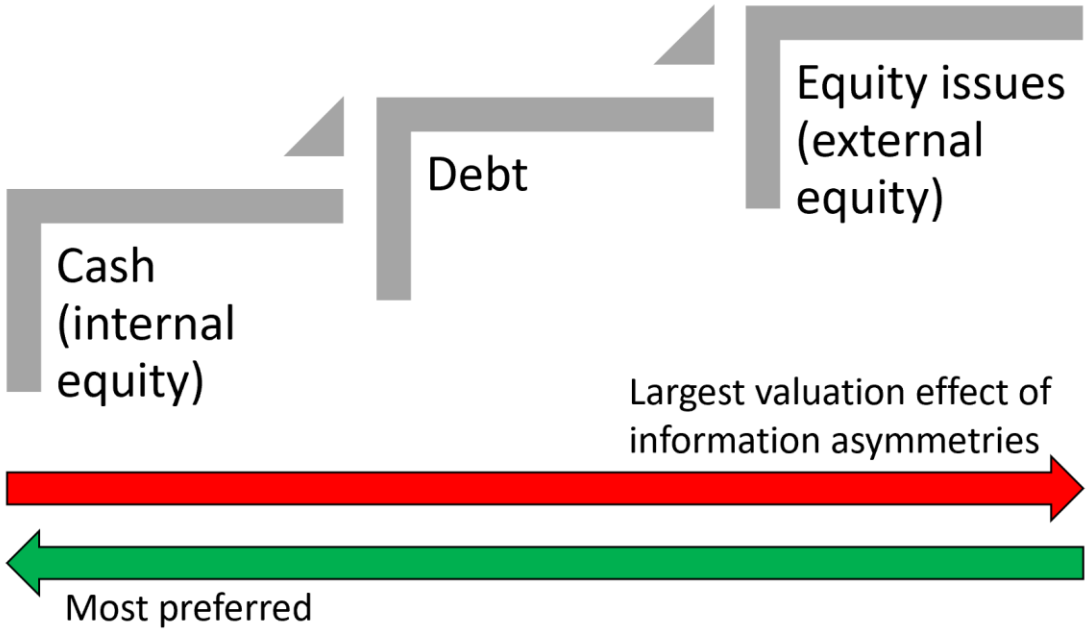
Agency costs

- Agency costs result from the principal-agent conflict, which regards:
  - Tensions between owners/financiers (the principals) and management (the agents)
  - Tensions among financiers (debtholders vs shareholders)
- Information asymmetry: managers know much better what is happening at the company than its financiers
- Higher information asymmetry leads to higher cost of capital
- Information asymmetries are largest for equity issues

Pecking order theory

- Managers prefer:

1. Internal finance (from cash flows and retained earnings)
2. External debt
3. External equity



Behavioural issues in capital structure

- Corporate financial policies such as capital structure choices are also driven by behavioural issues:
  - Those of managers themselves – internal errors
    - Optimistic managers use leverage more aggressively, overestimate cash flows and the interest levels they can afford to pay
    - Optimistic managers tend to think their company's stock is undervalued
    - Optimistic managers are likely to choose higher debt levels than rational managers
  - Those of the markets they operate in – external errors
    - (Temporarily) irrational markets can result in the absence of funding opportunities for positive NPV projects

E and S affecting capital structure

- E and S risks can affect:
  - The business model and operations - which affect interest coverage ratios and project NPVs
  - Investor perceptions – which affect cost of capital, valuation and financial capital structure

E and S affecting the business model of an airline

- With internalisation, E and S risk materialises:
  - Subsidies disappear
  - Carbon taxes increase costs
  - Demand for air travel drops
- Leads to 30% reduction in NPV (total assets: 30 → 21)
  - Increased probability of default leads to 10% drop in value of debt
  - NPV of F assets drops more than debt value, so leverage rises (0.40 → 0.51)

Company before internalisation

F assets	30	F debt	12
		F equity	18
Total assets	**30**	**Total liabilities**	**30**

Debt-assets ratio: 12 / 30 = 0.40

Company after internalisation

F assets	21	F debt	10.8
		F equity	10.2
Total assets	**21**	**Total liabilities**	**21**

12 x 0.9 = 10.8

21 – 10.8 = 10.2

Debt-assets ratio: 10.8 / 21 = 0.51

E and S affecting investor perceptions

- In anticipation of possible internalisation of E and S, investors may perceive higher financial risk
  - Leads to lower asset value due to higher discount rate and/or lower expected cash flows
- Lower expected cash flows result from investors attaching higher probabilities to more negative scenarios
- Higher cost of capital results from higher expected variations in outcomes and sensitivity to market returns

Capital structure of E and S

- Expressing externalities on E and S in capital structure ratios helps in identifying and understanding the size of the risks involved
  - E and S assets indicate value creation by the company for society
  - E and S liabilities (debt) indicate value destruction by the company at the cost of society

S assets	20	S debt	15
		S equity	5
Total assets	**20**	**Total liabilities**	**20**

S assets > S debt, so net value creation on S

S leverage ratio: 15 / 20 = 0.75

E assets	15	E debt	25
		E equity	-10
Total assets	**15**	**Total liabilities**	**15**

E assets < E debt, so net value destruction on E

E leverage ratio: 25 / 15 = 1.67

Integrated capital structure

- The integrated capital structure is the capital structure of E, S and F combined
- Integrated leverage indicates the risk in a company's integrated capital structure

$$Integrated\ leverage = \frac{Integrated\ debt}{Integrated\ assets}$$

S assets	20	S debt	15
		S equity	5
E assets	15	E debt	25
		E equity	-10
F assets	25	F debt	5
		F equity	20
Total integrated assets	**60**	**Total integrated liabilities**	**60**

Leverage ratios	
F debt / F assets	0.20
S debt / S assets	0.25
E debt / E assets	1.67
I debt / I assets	**0.58**

Insight: high integrated leverage

Composition of assets	
F assets / I assets	0.42
S assets / I assets	0.33
E assets / I assets	0.25
Total	**1.00**

Insight: evenly distributed

Composition of debt	
F debt / I debt	0.14
S debt / I debt	0.14
E debt / I debt	0.71
Total	**1.00**

Insight: E is problematic

Peer group analysis

- Packaging company 1 has:
  - A low E leverage ratio compared to the average mining company
  - A high E leverage ratio compared to other packaging companies
  - So the company is at a competitive disadvantage
- Mining company 1 has:
  - A high E leverage ratio compared to the average packaging company
  - A low E leverage ratio compared to other mining companies
  - So the company is at a competitive advantage

Peer group 1	E debt / E assets
Packaging company 1	1.67
Packaging company 2	1.22
Packaging company 3	1.37
Packaging companies average	**1.42**

Peer group 2	E debt / E assets
Mining company 1	3.41
Mining company 2	7.58
Mining company 3	6.19
Mining companies average	**5.73**

Inditex

- Using Inditex's value components, the integrated balance sheet can be generated:
  - Positive SV and EV = assets
  - Negative SV and EV = debt
  - Assets – debt = equity
- Calculating leverage:
  - Financial leverage:
    F debt / F assets = -3 / 79 = **-4%**
  - Integrated leverage:
    I debt / I assets =
    (-3 + 137 + 183) / 362 = **87%**
- **Insight: Inditex is riskier**

IV calculation	Value (€ billions)
FV (company value)	79
Positive SV	283
Negative SV	-137
Negative EV	-183
IV (integrated value)	42

F assets	79	F debt	-3
		F equity	82
S assets	283	S debt	137
		S equity	146
E assets	0	E debt	183
		E equity	-183
Total integrated assets	**362**	**Total integrated liabilities**	**362**

283 – 137 = 146

0 – 183 = -183

Conclusions

- The Modigliani-Miller theorems say that in a perfect world:
  - Financial capital structure is irrelevant for financial value (MM1)
  - The cost of equity increases with leverage (MM2)
- Market imperfections (taxes and bankruptcy costs) explain under what conditions financial capital structure does matter to financial value
- E and S risks affect capital structure through changes in the business model and investor perceptions
- Companies also generate assets and liabilities on E and S
- The integrated balance sheet offers a richer perspective on the company's assets and liabilities than a balance sheet that is limited to F