How to Finance a Company

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	Debt	**Equity**
What is it?	Borrowing	Selling part of your company
Source of funds	Banks, bondholders	Business partners, employees, venture capitalists, shareholders

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Priority	Senior	Junior
Cost	"Cheap"	"Expensive"

Outside Equity Financing

Unlevered Firm	Good State	Bad State
V = 500	V = 600	V = 400
D = 0	D = 0	D = 0
E = 500	E = 600 (+20%)	E = 400 (-20%)

Outside Equity	Good State	Bad State
V = 500	V = 600	V = 400
OE = 400	OE = 480	OE = 320
IE = 100	IE = 120 (+20%)	E = 80 (-20%)

The Effect of Debt Financing

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- "Debt is bad because it makes the company riskier"

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The Effect of Debt

- Debt adds risk – probability that firm goes bankrupt and shareholders get nothing
- But much higher returns in the good state
  - Incentives for manager to bring about the good state

Is Debt Better Than Equity?

- You set up GreshCo, which will generate earnings of £1,500 forever
- GreshCo will pays out all its earnings, so dividends are £1,500
- Shareholders require a 15% return (obtained from CAPM: see Lecture 4)
- Value of GreshCo is $V_0 = \frac{D_1}{r-g} = \frac{£1{,}500}{15\%} = £10{,}000$
- You can sell 1,000 shares for $\frac{£10{,}000}{1{,}000} = £10$ each
- Sanity check: dividends per share are $\frac{£1{,}500}{1{,}000} = £1.50$, so a shareholder obtains a $\frac{£1.50}{£10} = 15\%$ return

Is Debt Better Than Equity?

- The bank offers to lend £5,000 to you at 10%: the *cost of debt* is 10%
- This is less than the *cost of equity* of 15%, so debt seems cheaper
- If the bank lends £5,000, shareholders' stake in the firm is now £10,000 - £5,000 = £5,000
- You can now only sell 500 shares at £10 (not 1,000 shares)
  - Sanity check: since you need to pay interest, shareholders will only be willing to pay £10 if the post-interest earnings are shared with fewer other owners

Is Debt Better Than Equity?

- Earnings per share are now $\frac{£1{,}500 - £5{,}000 \times 10\%}{500} = \frac{£1{,}500 - £500}{500} = £2$
- Earnings and dividends per share have now gone up!
  - Using debt is EPS accretive (opposite is "dilutive")
  - Because debt is cheaper than equity

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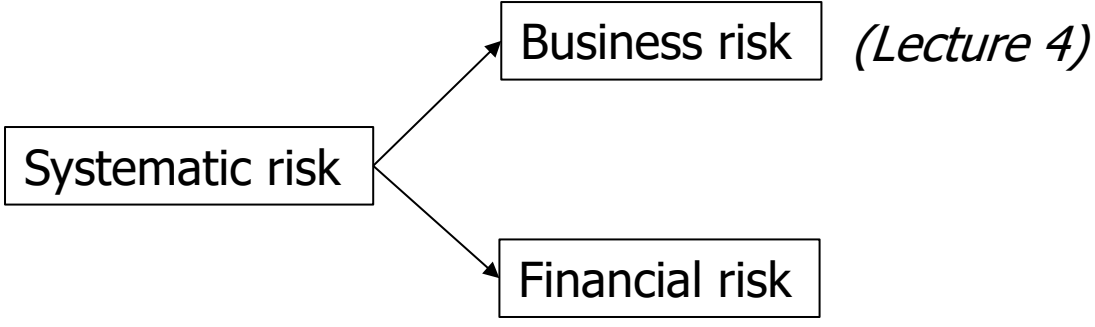
- Earnings and dividends per share have now gone up!
  - Using debt is EPS accretive (opposite is "dilutive") Because debt is cheaper than equity
- If cost of debt were 15% (same as equity):
- Earnings per share would be $\frac{£1{,}500-£5{,}000\times15\%}{500}=\frac{£1{,}500-£750}{500}=£1.50$

Are Higher Earnings and Dividends Better For Shareholders?

- Shareholders care not only about return, but (systematic) risk



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- "Debt is bad because it makes the company riskier"

How Much Return Should Shareholders Get For Financial Risk?

- The cost of equity rises with financial risk
- $r_L = r_U + (r_U - r_D)\frac{D}{E}$
  - r_U is return shareholders should get from an unlevered firm
  - r_L is return shareholders should get from a levered firm with D of debt and E of equity
- $r_L = 15\% + (15\% - 10\%)\frac{£5{,}000}{£5{,}000} = 20\%$
- $P_0 = \frac{D_1}{r-g} = \frac{£2}{20\%} = £10$, exactly as before

The Irrelevance of Capital Structure

- *Capital structure* is the choice between debt and equity
- Modigliani and Miller (1958): under certain conditions, firm value is independent of capital structure
  - Companies should focus on *what they do*, not *how they finance it*
  - A company's value comes from its *real* activities, not its *financial* activities
  - Capital structure changes how the pie is split, not the size of the pie
- Irrelevance makes sense: investors get what they pay for
- Applies to other financing decisions, e.g. dividends, share buybacks

The Irrelevance of Capital Structure?

- But capital structure seems to be relevant in the real world
  - Stock prices fall when a company issues equity
  - Stock prices rise when a company raises debt to buy back equity
  - Private equity firms increase debt when taking a company private
- Role of capital market imperfections
  - Other parties take from the pie

The Benefits of Debt: Tax Shields

- Interest is tax deductible for the company; dividends aren't

	Unlevered Firm
Operating Income	1,500
Interest	0
Profit Before Tax	1,500
Tax @ 20%	(300)
Net Income	1,200
Number of shares	1,000
Earnings per share	£1.2
Share price	£1.2/15% = £8

The Benefits of Debt: Tax Shields

- Interest is tax deductible for the company; dividends aren't

	Unlevered Firm	Levered Firm
Operating Income	1,500	1,500
Interest	0	(500)
Profit Before Tax	1,500	1,000
Tax @ 20%	(300)	(200)
Net Income	1,200	800
Number of shares	1,000	1,000 - £5000/£9 = 444
Earnings per share	£1.2	£1.8
Share price	£1.2/15% = £8	£1.8/20% = £9

Tax shield of 100

The Benefits of Debt: Incentives

Unlevered Firm	Good State	Bad State
V = 500	V = 600	V = 400
D = 0	D = 0	D = 0
E = 500	E = 600 (+20%)	E = 400 (-20%)

Levered Firm	Good State	Bad State
V = 500	V = 600	V = 400
D = 400	D = 400	D = 400
E = 100	E = 200 (+100%)	E = 0 (-100%)

The Costs of Debt: Bankruptcy Costs

- Why is bankruptcy costly?

Unlevered Firm	Bad State
V = 500	V = 400
D = 0	D = 0
E = 500	E = 400

Levered Firm	Bad State
V = 500	V = 400
D = 450	D = 400
E = 50	E = 0

The Costs of Debt: Bankruptcy Costs

- Why is bankruptcy costly?

Unlevered Firm	Bad State
V = 500	V = 400
D = 450	D = 400
E = 50	E = 0

Levered Firm	Bad State
V = 500	V = 400
D = 450	D = ~~400~~ 350 as lawyers' fees
E = 50	E = 0

The Costs of Debt: Bankruptcy Costs

- Why is bankruptcy costly?

Unlevered Firm	Bad State
V = 500	V = 400
D = 450	D = 400
E = 50	E = 0

Levered Firm	Bad State
V = 500	V = 400
D = 450	D = ~~400~~ 250 as intangible assets
E = 50	E = 0

The Costs of Debt: Bankruptcy Costs

- Why is bankruptcy costly?

Unlevered Firm	Bad State
V = 500	V = 400
D = 450	D = 400
E = 50	E = 0

Levered Firm	Bad State
V = 500	V = 400
D = 450	D = ~~400~~ 200 as fire sales
E = 50	E = 0

The Effects of Bankruptcy Costs

- How do lenders respond to the possibility of bankruptcy costs?
  - Charge a higher interest rate (rises from 10%)
  - Impose covenants
- Both are costly to shareholders

The Trade-Off Theory of Capital Structure

- Amount of debt is a trade-off between its benefits and costs
- Tax benefits of debt
  - High in profitable, stable companies
  - Low in start-ups or volatile companies
- Incentive benefits of debt
  - High in mature companies with lots of excess cash
  - Low in start-ups
- Bankruptcy costs
  - High in start-ups or companies with intangible assets
  - High in companies with investment opportunities
  - Low in profitable, stable companies

The Trade-Off Theory of Capital Structure

- Modigliani-Miller is relevant not because capital structure is irrelevant, but because it tells us what capital structure should depend on
  - Not "debt is cheaper than equity"
  - Taxes, incentive effects, bankruptcy costs

Industry	Global	US	Europe	Emerging Market
Biotechnology	10	12	10	4
Computer services	17	29	12	11
Food processing	21	26	16	20
Building materials	23	23	20	25
Retail	27	20	57	29
Utility	45	40	49	75
Air transport	43	42	41	48
Shipbuilding and marine	45	33	40	46

Source: Prof. Aswath Damodaran's webpage, Jan 2020

Summary

- Debt is senior to equity. Is promised a return, and has a higher priority in bankruptcy
  - As a result, debtholders get a lower return than equityholders
- Because debt is "cheap", raising debt rather than equity increases earnings (and thus dividends) per share
- But *financial risk* rises, so the *cost of equity* rises, fully offsetting the higher dividends. The stock price is unchanged
- Capital structure is relevant in the real world due to imperfections
  - Benefits of debt: tax shields, incentives
  - Cost of debt: bankruptcy risk
- These costs and benefits differ across companies, leading to a diversity of capital structures