Capital structure of the firm

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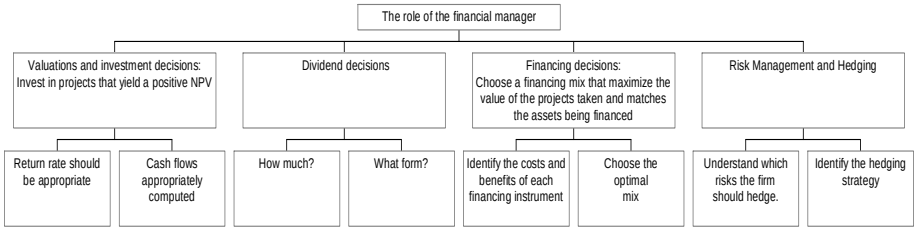
Corporate finance



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Sources of capital

- **Internal vs. external**
- **Type of instruments**
  - debt vs. equity
  - other securities

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Characteristics of debt and equity

	DEBT	EQUITY
RISK	Promise to make pre-specified payments.[1] Payments are therefore low (no) risk.	Payments determined by the outcome of the investment projects. Payments are affected by the business risk of the firm.
MATURITY	Specified maturity, not too far into the future.[2]	No maturity, although, stock can be repurchased.
PRIORITY	Priority: early (first if senior debt).	Priority: last. Equity is the residual claimant.
DECISION POWER	No decision making control, except through bond covenants.	Decision making control. Equity votes for board of directors who make the important decisions. This is important only if non-optimal investment decisions are being made.
TAXES	Interest payments are tax deductible	Dividend payments are not tax deductible

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Modigliani & Miller Irrelevance Proposition

- **Assumptions.**
  - **No change in investment policy.**
  - **No transaction costs**
  - **Perfect capital markets**
    - **Information is symmetric**
    - **Financial markets are efficient.**
  - **No taxes**
  - **Managers maximize shareholder's wealth.**
  - **Zero Bankruptcy Costs**

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Modigliani & Miller Irrelevance Proposition

- **Under the above assumption the capital structure of the firm is irrelevant**
- **The value of the firm is independent from the debt ratio**

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How MM theory works

- We show that when we change the capital structure the value of the firm does not change.We will apply a no arbitrage condition.
- Case 1:
- Consider two firms with same assets, same cash flows but,
  - one is all equity financed (i.e. $V_F = V_E$)
  - one is financed partially with debt with a face value of 4 due next year (zero coupon) (i.e. $V_E = V_F - V_D$)

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The cash flow of the firm is:

	All-Equity Firm		Firm with Debt (Promised Payment 4)	
	Good State	Bad State	Good State	Bad State
Cashflow	10	4	10	4

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Consider the cash flows to the stakeholders of the firms:

	Good State	Bad State	Good State	Bad State
Equity	10	4	6	0
Debt			4	4
Portfolio's Cashflow	10	4	10	4

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Consider the cash flows to the stakeholders of the firms:

	All-Equity Firm		Firm with Debt (Promised Payment 5)	
	Good State	Bad State	Good State	Bad State
Equity	10	4	5	0
Debt			5	4
Portfolio's Cashflow	10	4	10	4

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An example

- All equity firm:
  - cash=$60
  - The firm has only one project that requires a investment of $60 and uncertain cash flow of $60 or $100
  - market price of risk=8.4%
  - risk free=6.6%
  - Beta of the assets=1
  - How much is the return on assets?

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Value of the project

$$NPV_{Project} = -60 + \frac{.5(60) + .5(100)}{1 + .15} = -60 + \frac{80}{1 + .15} = 9.6$$

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The value of the firm
Value of the firm=Value of equity

$$NPV_{Firm} = 60 + (-60 + \frac{80}{1+.15}) = 69.6$$

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Now let's change the capital structure

- The firm issues 30 dollars in bonds.
- The beta of debt is 0
- The risk free interest rate is 6.6%
- The firm distributes 30 dollars in dividends
- Midterm exam question: analyze the debt characteristics

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Analyze the characteristics of debt

- What is the promised rate of return ?
- Is debt risk free?

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Change the capital structure

	Today	Next Year		
		Bad State	Good State	Expected Cashflow
Total Free Cash Flows	0	60	100	80
Free Cash flow to Debt				
Free Cash Flows to equity				

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Change the capital structure

	Today	Next Year		
		Bad State	Good State	Expected Cashflow
Total Free Cash Flows	0	60	100	80
Free Cash flow to Debt	-30	32	32	32
Free Cash Flows to equity	30	28	68	48

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Compute value of debt, the new value of equity.

- The value of debt is 30 dollars (discount at 6.6%)
- The value of the equity has to be discounted at the appropriate discount rate (levered firm).
- Value of Equity= $48/(1+r_{equity})$
- What is r_{equity}?

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Finding the right r_{equity} …..

$$E = 48 / (1+r_E)$$

$$r_E = r_A + \frac{D}{E}(r_A - r_D) = 15\% + \frac{30}{E}(15\% - 6.6\%)$$

- Two equations two unknown …
- E=39.6
- $r_{E=}21.4\%$

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Compute the new firm value

$V_{firm}=E+D=39.6+30=69.6$

Bottom line:

- The old shareholder's wealth has not changed. They have now a 30 dollars dividends +39.6=69.6

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Takeaway

- Under what conditions does capital structure have effect on the value of the firm or the wealth of shareholders?
- **No transactions costs**
- **Taxes are not equal** (lecture 9)
- **Bankruptcy costs are not zero** (lecture 10)
- **Capital markets are not perfect** (lecture 11)
- **Managers do not always maximize shareholder wealth** (lecture 12).

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