15.415 Foundations of Modern Finance

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Lecture 4: Introduction to Corporate Finance

- Corporate financial decisions
- Opportunity cost of capital and Net Present Value (NPV)
- Objective of financial manager
- Value maximization
- Additional issues

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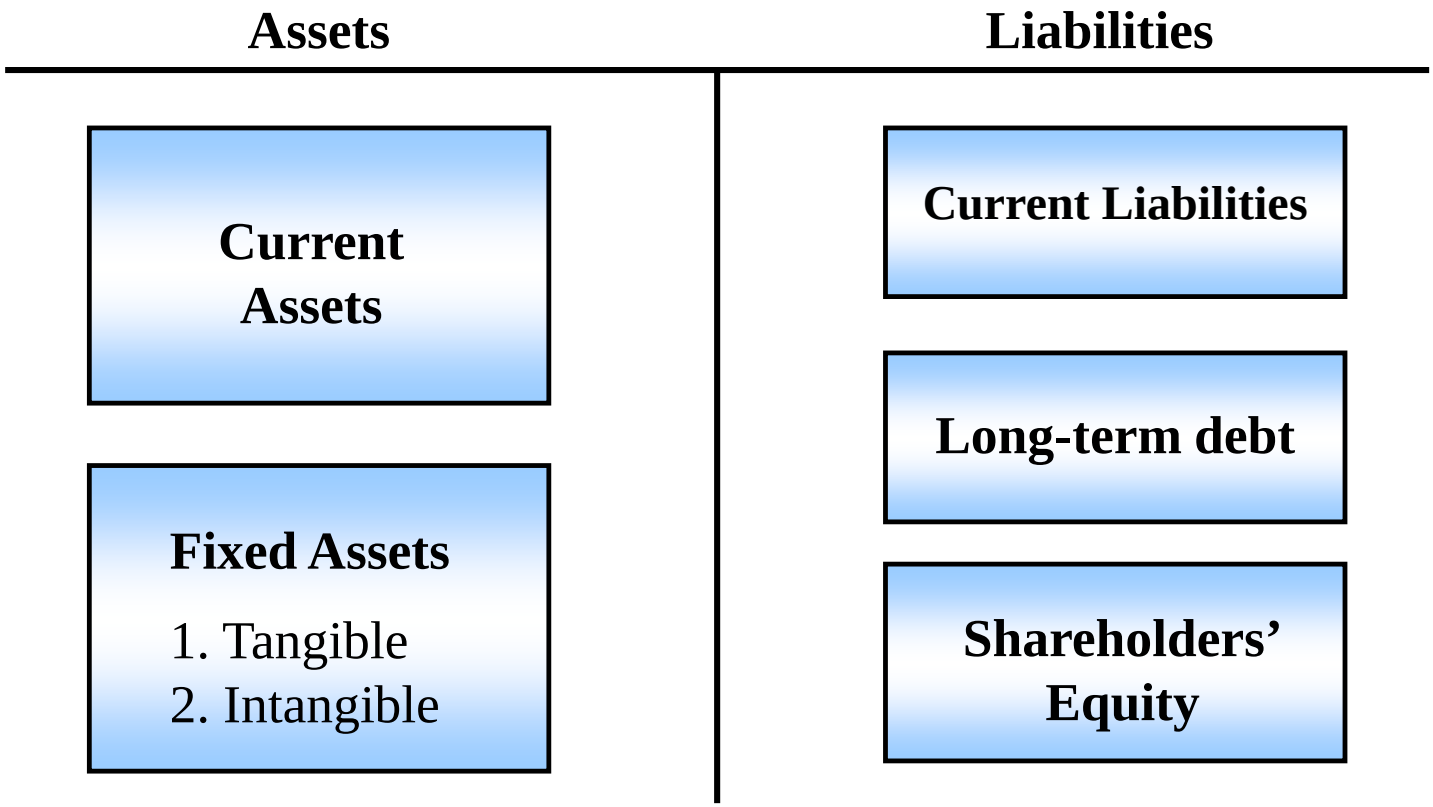
Using the principles and tools we have developed, we would like to know how corporations should make their financial decisions:

- Capital budgeting: What projects (real investments) to invest in?
  - Expansions, R&D, new products, new businesses, acquisitions, …
- Financing: How to finance a project?
  - Selling financial assets/securities/claims (bank loans, public debt, stocks, convertibles, …)
- Payout: What to pay back to shareholders?
  - Paying dividends, buyback shares, …
- Risk management: What risk to take/to avoid and how?

Balance sheet view of a firm



- Asset side (LHS): Real investments
- Liability side (RHS): Financing and cash management

Amazon.com (1996 – 1997) (in thousands)

	Assets		Liabilities	
1996	Cash and securities	6,248	Accounts payable	2,852
	Inventories	571	Accrued expenses	2,018
	Pre-paid expenses	321	Debt	---
	Fixed assets	1,131	Net worth (Equity)	3,401
	Total assets	**8,271**	**Total liab + Net worth**	**8,271**
1997	Cash and securities	125,066	Accounts payable	32,697
	Inventories	8,971	Accrued expenses	9,621
	Pre-paid expenses	3,298	Debt	78,202
	Fixed assets	11,671	Net worth	28,486
	Total assets	**149,006**	**Total liab + Net worth**	**149,006**

Amazon.com (2018) (in thousands)

	Assets		Liabilities	
2018	Cash and securities	31,750,000	Accounts payable	61,855,000
	Inventories	17,174,000	Accrued expenses	6,536,000
	Net receivables	16,677,000	Debt	23,495,000
	Fixed assets	61,797,000	Other liabilities	27,213,000
	Other assets	11,202,000	Net worth (Equity)	43,549,000
	Total assets	**162,648,000**	**Total liability + Net worth**	**162,648,000**

(Source: http://www.nasdaq.com/symbol/amzn/financials?query=balance-sheet)

THE WALL STREET JOURNAL.

Amazon to Buy Whole Foods for $13.7 Billion

Whole Foods would continue to operate stores under its brand

Amazon Sells $16 Billion of Bonds to Finance Whole Foods Deal

In rare trip to bond market, Amazon is greeted with strong demand from investors

Amazon.com Inc. AMZN +0.65% ▲ sold $16 billion of bonds Tuesday to help fund its purchase of Whole Foods Market Inc., meeting strong demand from investors as it made a rare trip to the debt market.

August 15, 2017

Three parts on corporate finance:

A. Investment – Capital budgeting
   1. Capital budgeting
   2. Discount rates
   3. Real options

B. Financing – Capital structure
   1. Capital structure
   2. Interaction between investments and financing

C. Payout and risk management

We consider topic A.1 first, and A.2, A.3, B and C later.

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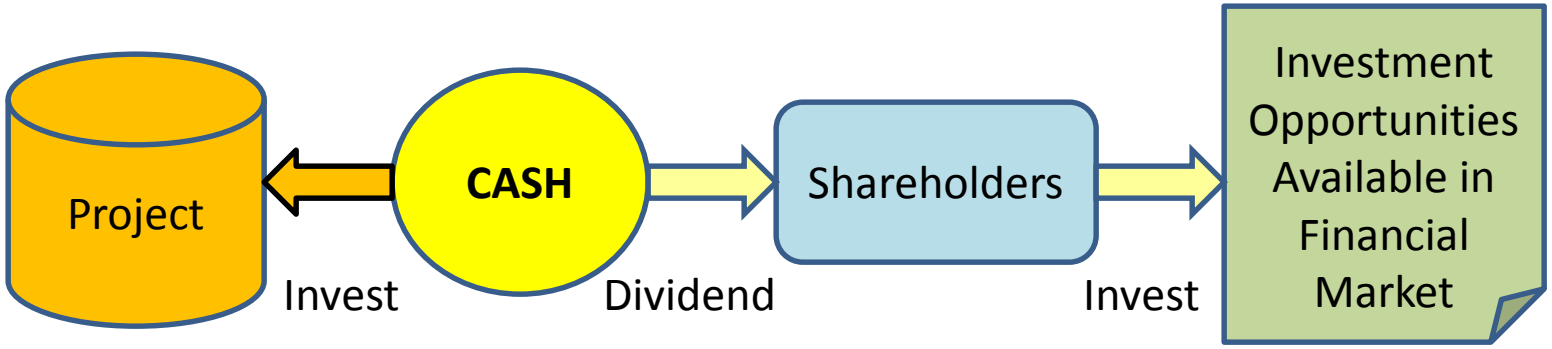
Valuation of a project

- A firm can always give cash back to shareholders,
- A shareholder can invest in the financial market.



Opportunity cost of capital is the expected rate of return offered by **equivalent** (in time and risk) investments in financial markets.

Market valuation of the project (i.e., its CF):

- Good if it offers higher return than its cost of capital,
- Bad if it yields lower return than its cost of capital.

Consider a project with the following cash flows:

- Initial investment I
- Future cash flow CF_1
- Opportunity cost of capital (COC).

Whether to take the project depends on the value of CF_1.

What is the value net present value created by the project?

$$NPV = -I + \frac{E[CF_1]}{1+r}$$

Take the project only if its NPV is positive!

We assume COC is given for now and return to its determination later.

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Potential considerations in financial decision making:

- Timing
- Risk
- Accounting performance
- "Long-run" value …

Objective: Maximize current market value of the firm!

- Current market value is the only plausible financial objective.
- Current market value incorporates present value of all current and future cash flows, adjusted for timing and risk.
- Current market value rule is independent of shareholders' differences.

Justification for value maximization:

1. Shareholders' financial objectives:
   a) Increase wealth
   b) Optimal time pattern for consumption
   c) Optimal risk profile for future consumption.

2. Shareholders can do b) and c) on their own through the financial market.

3. Financial manager can help only with a), by increasing the firm's market value (i.e., shareholder wealth).

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Example. Mass Biz, a NASDAQ listed company, is choosing between two business plans, A and B:

- Both have positive NPV: NPV(A) = $50 million, NPV(B) = $80 million;
- A pays off in 3 years and B pays off in 10 years;
- A expands current business with relatively low risk, B ventures into a new business with high risk.

The board consists of three controlling shareholders from the founding family. Here are their views:

a) Grandma: "B is no good. Already 80, I probably won't see it paying off even if it eventually does."

b) Dad: "B is way too risky. I am about to retire and have no stomach for this kind of risk."

c) Son: "B is overvalued due to the market hype for this new line of business."

As the CEO, how would you respond?

Example. Tang Associates is reopening King Solomon's mine:

- Total capacity 0.11 million oz of gold
- Time for production 1 year
- Initial investment $86 million
- Current gold price $800/oz
- Cost of capital 10%.

Shares owned by optimists (50%) and pessimists (50%):

- Optimists are bullish in gold price, forecasting 20% growth next year,
- Pessimists are bearish in gold price, forecasting only 5% growth.

For optimists (in millions):

$$NPV = -86 + \frac{(0.11)(800)(1+0.2)}{1+0.1} = -86 + \frac{(0.11)(960)}{1.1} = 10$$

For pessimists:

$$NPV = -86 + \frac{(0.11)(800)(1+0.05)}{1+0.1} = -86 + \frac{(0.11)(840)}{1.1} = -2$$

What should the CFO do?

- The key is how to value 1oz of gold next year -- different shareholders have different views.
- What we need to know is its current market value, that is:

PV (1oz of gold next year) = ?

- Gold is mostly held as a long-term investment with no interim payoffs. Thus, 1oz of gold is the same as 1oz of gold today.
  - Gold has no interim payoffs and no storage costs (almost)
- Since 1oz gold today is $800, we then have:

PV (1oz of gold next year) = $800

- Thus, the NPV of the mine is:

$$NPV = -86 + (0.11)(800) = +2$$

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Conclusions:

1. Financial manager should maximize firm's current market value.
2. Shareholder differences can be settled in financial markets by trading on their own account.
3. Perfect financial markets allow potential separation of ownership and management.

Practical issues:

- ❑ Other stakeholders
- ❑ Agency problems – Management may put its own interest first
- ❑ Imperfections in financial markets ...

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