

PRINCIPLES OF CORPORATE FINANCE

PLR4

Valuation (Part I)



Turun yliopisto
University of Turku

Basic Issues of Corporate Finance

- Corporations need a large number of real assets in order to carry on businesses
- <http://dstevenwhite.com/2012/08/11/the-top-175-global-economic-entities-2011/>
- Corporations must pay for the real assets.
- Corporation sells claims on the assets and on the cash flow that they will generate. These claims when issued become financial assets/liabilities or financial securities.



Basic Issues of Corporate Finance

- A bank loan provides corporation with cash in exchange for a financial asset. Corporation promises to repay the loan with interest.
- Bank loan is not a security because it is not marketable or traded in financial markets.
- A corporate bond is sold by corporation to investors in exchange for the promise to pay interest on the bond and to pay off the bond at its maturity. The bond is a financial asset, and also a security, because it is marketable in financial markets.
- Securities include bonds, shares of stock, and a variety of specialized instruments.



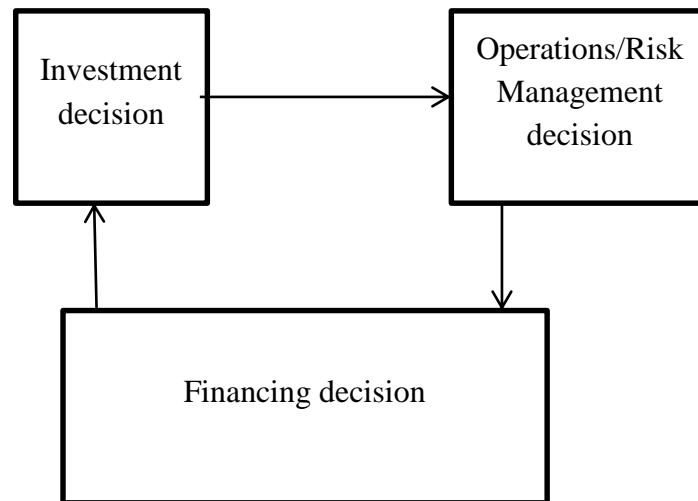
Basic Issues of Corporate Finance

- Investment decision = Purchase of **real assets**
- Financing decision = Sale of **financial assets**



Basic Issues of Corporate Finance

Financing decision = Sale of financial assets



Investment Decisions

- The investment decision also involves managing assets already in place and deciding when to shut down and dispose of assets if profits decline.
- Corporations operations significant to generate cash flows so that financial claims held by financiers can be met.
- Also firms need to manage and control the risks of their investments. The financing decision includes not just raising cash today but also meeting obligations to banks, bondholders, and stockholders that contributed financing in the past.



Investment Decisions

- For example, the corporation has to repay its debts when they become due. If it cannot do so, it ends up insolvency and bankruptcy. Sooner or later the corporation will also want to pay out cash to its shareholders.

Therefore, firms' operations and risk management play crucial role.



Investment Decisions

- Investment decisions are also referred to as capital budgeting or capital expenditure (CAPEX) decisions, because most large corporations prepare an annual capital budget listing the major projects approved for investment.
- Today's capital investments generate future returns. Investment returns come in the distant or near future.
- Financial managers make major investment decisions in consultation with board of directors, engineers and managers from manufacturing, marketing etc., outside directors, consultants etc.
- *Billion-dollar investments are not made on a daily basis.*
- Most investment decisions are of smaller amount and routine natured, such as the purchase of information software, machine tool.
- Corporations make numerous smaller investment decisions every year.



Financing Decisions

- Firms can raise money (cash) from lenders or from shareholders.
- If firms borrows, the lenders contribute the cash, and the corporation promises to pay back the debt plus a fixed rate of interest.
- If the shareholders put up the cash, they get no fixed return, but they hold shares of stock and therefore get a fraction of future profits and cash flow.
- The shareholders are equity investors, who contribute equity financing.
- The choice between debt and equity financing is called the capital structure decision.



Financing Decisions

- The financing choices available to large corporations seem almost endless.
- *If firm decides to borrow, should it borrow from a bank or borrow by issuing bonds that can be traded by investors? Should it borrow for 1 year or 20 years? If it borrows for 20 years, should it reserve the right to pay off the debt early if interest rates fall? Should it borrow in Paris, receiving and promising to repay euros, or should it borrow dollars in New York?.....endless questions*



Financing Decisions

- Corporations raise equity financing in two ways.
- First, they can issue new shares of stock. The investors who buy the new shares put up cash in exchange for a fraction of the corporation's future cash flow and profits.
- Second, the corporation can take the cash flow generated by its existing assets and reinvest the cash in new assets. In this case the corporation is reinvesting on behalf of existing stockholders. No new shares are issued.



Financing Decisions

- A firm does not reinvest all of the cash flow generated by its existing assets. It may hold the cash in reserve for future investment, or it may pay the cash back to its shareholders.
- In 2008, Toyota paid cash dividends of ¥431 billion, equivalent to about \$4.3 billion and Shell paid back \$13.1 billion to its stockholders by repurchasing shares. This was in addition to \$9.8 billion paid out as cash dividends.
- The decision to pay dividends or repurchase shares is called the payout decision.



Financing Decisions

- See buyback fact sheet file
- <http://www.forbes.com/sites/steveschaefer/2015/04/10/ges-50-billion-buyback-continues-corporate-americas-binge-on-its-own-stock/>



Financing Decisions

- Arguably, financing decisions are less important than investment decisions (Modigliani-Miller).
- Financial managers say that “value comes mainly from the asset side of the balance sheet.” For example, at the end of 2008, Microsoft shares traded for \$19.44 each. There were about 8.9 billion shares outstanding. Therefore Microsoft’s overall market value—its market capitalization or market cap was $\$19.44 * 8.9 = \173 billion.
- <https://uk.finance.yahoo.com/>
- Arguably, market value comes from Microsoft’s product development, operations, brand name, worldwide customer base, research and development, ability to make profitable future investments etc., and not from sophisticated financing. However, alternative arguments are strong too as financing decisions can also influence firm value.
- Microsoft used to have no debt (why??)



Financing Decisions

- Business is inherently risky. The financial manager needs to identify the risks and make sure they are managed properly.
- Debt has its advantages, but more/less than optimum level can destroy firm value.
- Firms face a large number of market and firm specific risks. Some of these risks can be hedged or insured.
- Firms can be private, closely held and public.
- Separation of ownership and control provides perpetual succession to firms.
- The separation of ownership and control can also have downside risks.



Financing Decisions

- In large firms chief financial officer (CFO) is responsible for financial policy and financial planning.
- Lower in the hierarchy are usually a treasurer and a controller. The treasurer is responsible for short-term cash management, currency trading, financing transactions, and bank relationships. The controller manages the company's internal accounting systems and oversees preparation of its financial statements and tax returns.
- Large firms may have a team of specialized financial managers, including tax lawyers and accountants, experts in planning and forecasting, and managers responsible for investing money for employee retirement plans.



Financing Decisions

- Financial decisions are not restricted to financial specialists. Top management team, including engineers, production managers, marketing managers etc. must consent on major investment projects.
- What do firm stockholders want the financial managers to do?
- Stockholders compare the rate of return on investment project and on the minimum rate of return that can be earned by investing in comparable financial markets.
- Stockholders' realized expectation affect their decision to buy/hold/sell which further affects firm's stock market performance.



Financing Decisions

- This minimum rate of return is called a hurdle rate or opportunity cost of capital. Whenever a corporation invests cash in a new project, its shareholders lose the opportunity to invest the cash on their own.
- Corporations increase value by accepting all investment projects that earn more than the opportunity cost of capital.
- The opportunity cost of capital depends on the risk of the proposed investment project.
- Investors risk profile is a very vital factor.



Financing Decisions

- The safest investments, such as government debt (e.g. T-bills), offer low rates of return.
- Investments with higher expected rates of return—the stock market, for example—are riskier and sometimes deliver painful losses. (The U.S. stock market was down 38% in 2008, for example.)
- Other investments are riskier too, e.g. high-tech growth stocks offer the prospect of higher rates of return, but are even more volatile.



Valuation of Real Assets: Net Present Value (NPV)

- Shareholders wealth maximization is an important firm objective. Firm managements must invest in projects whose worth are more than their costs.
- Firms must strive to invest in positive NPV projects only as negative NPV projects are value destructive.
- Present value (PV) of cash flows = cash flow \times discount factor (based on number of years in the future and the cost of capital)
- **Net present value (NPV) = present value of future cash flows – initial capital investment**



Valuation of Real Assets: Net Present Value (NPV)

- Chief financial officer (CFO) of a firm is wondering how to analyze a proposed \$1 million investment in a new venture called project X. His reasoning should be as follows: “First, forecast the cash flows generated by project X over its economic life. Second, determine the appropriate opportunity cost of capital (r). This should reflect both the time value of money and the risk involved in project X. Third, use this opportunity cost of capital to discount the project’s future cash flows. The sum of the discounted cash flows is called present value (PV). Fourth, calculate net present value (NPV) by subtracting the \$1 million investment from PV. If we call the cash flows C_0 , C_1 , and so on, then



Valuation of Real Assets: Net Present Value (NPV)

$$NPV = \sum_{t=1}^T \frac{C_t}{(1+r)^t} - C_0$$

- C_t = net cash inflow during the period
- C_0 = initial investment
- r = discount rate, and
- t = number of time periods
- We should invest in project X if its NPV is greater than zero.”



Why is NPV so important?

- The CFO replies: “Let us look at what is best for firm’s stockholders. They want you to make their shares as valuable as possible. Right now firm’s total market value (price per share times the number of shares outstanding) is \$10 million. That includes \$1 million cash we can invest in project X. The value of firm’s other assets and opportunities must therefore be \$9 million. We have to decide whether it is better to keep the \$1 million cash and reject project X or to spend the cash and accept the project.



Why is NPV so important?

- Let us call the value of the new project PV. Then the choice is as follows:

	Market Value (\$ millions)	
Asset	Reject Project X	Accept Project X
Cash	1	0
Other assets	9	9
Project X	0	PV
Total	10	9 + PV

Clearly project X is worthwhile if its present value, PV, is greater than \$1 million, that is, if net present value is positive.



How do I know that the PV of project X will actually show up in firm's market value?

- Suppose a new independent firm X is set up, whose only asset is project X. What would be the market value of firm X?
- Investors would forecast the dividends that firm X would pay and discount those dividends by the expected rate of return of securities having similar risks. Stock prices are equal to the present value of forecasted dividends.
- Since project X is the only asset, the dividend payments expected from firm X to pay are equal to forecasted cash flows for project X.



How do I know that the PV of project X will actually show up in firm's market value?

- If project X is accepted, investors holding firm's stock will really hold a portfolio of project X and the firm's other assets. Other assets are worth \$9 million considered as a separate venture. Since asset values add up, we can easily figure out the portfolio value once we calculate the value of project X as a separate venture.
- By calculating the present value of project X, we are replicating the process by which the common stock of firm X would be valued in capital markets.



Where does the discount rate come from?

- The discount rate is the opportunity cost of investing in the project rather than in the capital market. Instead of accepting a project, firm can always return cash to the shareholders (dividends or share repurchase/buyback) and let them invest it in financial assets. If cash is reinvested, the opportunity cost is the expected rate of return that shareholders could have obtained by investing in financial assets.
- The opportunity cost of taking the project is the return shareholders could have earned had they invested the funds on their own. When we discount the project's cash flows by the expected rate of return on financial assets, we are measuring how much investors would be prepared to pay for your project.



Which financial assets?

- The fact that investors expect only 12% on IBM stock does not mean that we should purchase “Fly-by-Night Electronics” if it offers 13%. The opportunity-cost concept makes sense only if assets of equivalent risk are compared.
- In general, identify financial assets that have the same risk as your project, estimate the expected rate of return on these assets, and use this rate as the opportunity cost.



Three Points to Remember about NPV

- First, the NPV rule recognizes that a dollar today is worth more than a dollar tomorrow, because the dollar today can be invested to start earning interest immediately.
- Any investment rule that does not recognize the time value of money cannot be sensible.



Three Points to Remember about NPV

Year (Column 1)	Project 1 cash flows (Column 2)	Project 1 cash flows (Column 3)	Present value of cash flows (Column 4) Col. 2 multiply 3
1	25,000	.909	22,725
2	25,000	.826	20,650
3	25,000	.751	18,775
4	25,000	.683	17,075
5	25,000	.621	15,525
Total			94,750
Less: Initial investment			100,000
Net present value			-5,250



Three Points to Remember about NPV

- Second, net present value depends solely on the forecasted cash flows from the project and the opportunity cost of capital. Any investment rule that is affected by the manager's tastes, the company's choice of accounting method, the profitability of the company's existing business, or the profitability of other independent projects may lead to inferior decisions.
- Third, because present values are all measured in today's dollars, you can add them up.
- Therefore, if you have two projects A and B, the net present value of the combined investment is
- $NPV (A+B) = NPV (A) + NPV (B)$



Three Points to Remember about NPV

- This adding-up property has important implications.
- Suppose project B has a negative NPV. If you tack it onto project A, the joint project (A+B) must have a lower NPV than A on its own. Therefore, you are unlikely to be misled into accepting a poor project (B) just because it is packaged with a good one (A).
- Managerial discretions may trick investors to accept that a package of a good and a bad project is better than the good project on its own.
- Dynamics of managerial discretions?



NPV Depends on Cash Flow, Not on Book Returns??

- Net present value depends only on the project's cash flows and the opportunity cost of capital. But when companies report to shareholders, they do not simply show the cash flows. They also report book—that is, accounting—income and book assets.
- Financial managers sometimes use these numbers to calculate a book (or accounting) rate of return on a proposed investment. In other words, they look at the prospective book income as a proportion of the book value of the assets that the firm is proposing to acquire:
- **Book rate of return = Book income / Book assets**



NPV Depends on Cash Flow, Not on Book Returns??

- Cash flows and book income are often different, e.g. accountant labels some cash outflows as capital investments and others as operating expenses. The operating expenses are deducted immediately from each year's income. The capital expenditures are put on the firm's balance sheet and then depreciated. The annual depreciation charge is deducted from each year's income. Thus the book rate of return depends on which items the accountant treats as capital investments and how rapidly they are depreciated.



NPV Depends on Cash Flow, Not on Book Returns??

- Now the merits of an investment project do not depend on how accountants classify the cash flows and few companies these days make investment decisions just on the basis of the book rate of return.
- But managers know that the company's shareholders pay considerable attention to book measures of profitability and naturally they think (and worry) about how major projects would affect the company's book return. Those projects that would reduce the company's book return may be scrutinized more carefully by management/board members.



NPV Depends on Cash Flow, Not on Book Returns??

- The company's book rate of return may not be a good measure of true profitability. It is also an average across all of the firm's activities.
- The average profitability of past investments is not usually the right hurdle for new investments. Think of a firm that has been exceptionally lucky and successful. Say its average book return is 24%, double shareholders' 12% opportunity cost of capital.
- Should it claim that all new investments offer 24% or better?
- **Clearly not:** That would mean passing up many positive-NPV opportunities with rates of return between 12 and 24%.



Payback Period

- Related to the NPV concept is project's payback period, which is found by counting the number of years it takes before the cumulative cash flow equals the initial investment.
- The payback rule states that a project should be accepted if its payback period is less than some specified cutoff period.
- For example, if the cutoff period is four years, the high NPV investment project becomes feasible; if the cutoff is two years, it doesn't.



Payback Period

- Cash Flows

Project	C_0	C_1	C_2	C_3	Payback Period (Years)	NPV at 10%
A	-2000	500	500	5000	3	+2624
B	-2000	500	1800	0	2	-58
C	-2000	1800	500	0	2	+50



Payback Period

- Project A involves an initial investment of \$2,000 ($C_0 = -2,000$) followed by cash inflows during the next three years. Suppose the opportunity cost of capital is 10%. Then project A has an NPV of +\$2,624:
- $NPV(A) = -2000 + 500/1.10 + 500/(1.10)^2 + 500/(1.10)^3 = +\2624
- $NPV(B) = -2000 + 500/1.10 + 1800/(1.10)^2 = -\58
- $NPV(C) = -2000 + 1800/1.10 + 500/(1.10)^2 = +\50
- The NPV rule implies that projects A and C should be accepted and B should be rejected. The project pays back signals how rapidly each project pays back its initial investment. With project A it takes three years to recover the \$2,000 investment; with projects B and C it takes only two years.



Payback Period

- If the firm used the payback rule with a cutoff period of two years, then project A does not even qualify to be considered for investment.
- If by using the payback rule a cutoff period of three or more years is taken then A is also shortlisted.
- An important lesson of above example is that short-term managerial behavior can be corporate value eroding.



Why do many companies continue to use the payback rule?

- -First, the senior managers do not truly believe that all cash flows after the payback period are irrelevant.
- -Second, managers of larger corporations may opt for projects with short paybacks because they believe that quicker profits mean quicker promotion.
- -Third, owners of family firms with limited access to capital may worry about their future ability to raise capital. These worries may lead them to favor rapid payback projects even though a longer-term venture may have a higher NPV.



Internal (or Discounted-Cash-Flow) Rate of Return (IRR)

- “Accept investment opportunities offering rates of return in excess of their opportunity costs of capital.”
- -That statement, properly interpreted, is absolutely correct. However, interpretation is not always easy for long-lived investment projects.
- There is no ambiguity in defining the true rate of return of an investment that generates a single payoff after one period:
- **Rate of return = (Payoff/Investment) – 1**
- **= $(C_1/C_0) - 1$**



Internal (or Discounted-Cash-Flow) Rate of Return (IRR)

- Alternatively, we could write down the NPV of the investment and find the discount rate that makes $NPV = 0$.
- **$NPV = C_0 + C_1 / (1 + \text{Discount Rate}) = 0$**
- Which also implies $(C_1/C_0) - 1$
- **IRR is the rate of discount rate that makes $NPV = 0$**
-
- **$NPV = C_0 + C_1/(1+IRR) + C_2/(1+IRR)^2 + C_3/(1+IRR)^3 + C_4/(1+IRR)^4 + \dots + C_T/(1+IRR)^T = 0$**



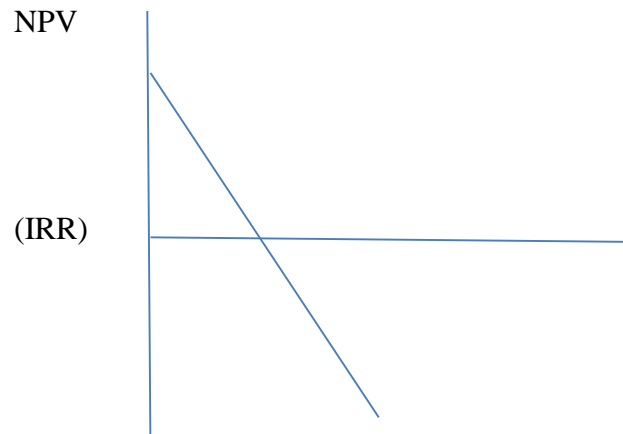
Internal (or Discounted-Cash-Flow) Rate of Return (IRR)

- Imagine a project has two year life
- $NPV = -4000 + 2000/(1+IRR) + 4000/(1+IRR)^2 = 0$
- Assume IRR is zero
- Then NPV is 2000
- Assume IRR is 50%
- $NPV = -4000 + 2000/(1+0.5) + 4000/(1+0.5)^2 = -889$
- Therefore, IRR must be below 50%.



Internal (or Discounted-Cash-Flow) Rate of Return (IRR)

Fig.1



$$\text{NPV} = -4000 + 2000 / (1+0.28) + 4000 / (1+0.28)^2 \approx 0$$

-The easiest way to calculate IRR is using spreadsheet function



Internal (or Discounted-Cash-Flow) Rate of Return (IRR)

- -Some may confuse the internal rate of return and the opportunity cost of capital because both appear as discount rates in the NPV formula.
- The internal rate of return is a profitability measure that depends solely on the amount and timing of the project cash flows.
- The opportunity cost of capital is a standard of profitability that we use to calculate how much the project is worth. The opportunity cost of capital is established in capital markets (e.g. CAPM). It is the expected rate of return offered by other assets with the same risk as the project being evaluated.

