Summary

-Corporate Finance-

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Chapter 1 – Introduction in Corporate Finance

Managers represent the owners' interests and make decisions on their behalf. The *accounting function* takes all the financial information and data that arises as a result of ongoing business activities and presents this in ways that allow management to assess the performance and risk of their firm (financial accounting) and make informed decisions on future corporate activity (management accounting).

There are three kinds of financial management decisions:

1. **Capital budgeting**: planning and managing a firm's long-term investments. The essence is to evaluate size, timing and risk of future cash flows.
2. **Capital structure**: the specific mixture of *long-term debt* and *equity*.
3. **Working capital management**: managing short-term assets and liabilities, which ensure that the firm has sufficient resources to continue its operations. (Amount of inventory, sell on credit or not).

The goal of financial management is to maximize the current value per share (or market value) of the existing equity. There are a lot of possible goals, like surviving and maximizing profits, but most of them are in conflict with each other. The total value of the equity in a corporation is simply equal to the value of the owner's equity. Therefore, a more general way of stating our goal is as follows: maximizing the market value of the existing owners' equity.
Corporate finance is the study of the relationship between business decisions and the value of the equity in the business.

Financial markets bring buyers and sellers of money together. *(Figure 1-2, p.7; Smartbook, p.10)*
Different kinds of markets:

- **Primary market**: the original sale of securities by governments and corporations. the corporation is the seller, and the transaction raises money for the corporation. Corporations engage in two types of primary market transaction: public offerings and private placements. A public offering, as the name suggests, involves selling securities to the general public, whereas a private placement is a negotiated sale involving a specific buyer. The first share issue is called an initial *public offering*. The second share issue is called a *seasoned offering*.
- **Secondary market**: markets in which securities are bought and sold after the original sale. It involves a transaction from one owner or creditor selling to another. Transferring ownership of financial assets. The owner of a financial asset sells it to another owner. Secondary markets are most import. Investors want to buy on primary markets, because they know they can sell later on secondary markets.
  There are two kinds of secondary markets:
- **Dealer market (OTC)**: the dealer buys assets and sells them later to make profit (for themselves and at their own risk). (In contrast, **brokers** and agents match buyers and sellers, but they do not actually own the commodity that is bought or sold).
- **Auction market (OTC)**: an agent matches the people who want to sell and who want to buy. Charges commission. Most large European firms trade their shares on auction markets.

Over the counter (OTC) means that securities are traded directly between counterparties without being listed on an exchange (securities that trade on an organized exchange are said to be listed on that exchange).

Chapter 2 – Corporate Governance

There are different ways of businesses:

- Sole proprietorship: a business owned by one person. There is *unlimited liability* for business debts, this means that creditors can look beyond business assets to the proprietor's personal assets for payment. All business income is taxed as personal income, the life is limited because of the owner's lifespan and the amount of equity that can be raised is limited to the amount of proprietor's personal wealth.
- Partnership: a business formed by two or more individuals or entities. It is similar to a proprietorship except that there are two or more owners. In a general partnership, all the partners share in gains or losses, and all have unlimited liability for all partnership debts, not just some particular share. How gains and losses will be divided is described in the partnership agreement.
  In a limited partnership one or more general partners will run the business and have unlimited liability, but there will be one or more limited partners who will not actively participate in the business.

Main disadvantages of sole proprietorships and partnerships: unlimited liability for business debts on the part of the owners, limited life of the business and difficulty of transferring ownership.

- A corporation is a separate entity, distinct from its owners so they have limited liability. Starting a corporation is less easy than a proprietorship or partnership. Ownership is traded easily because it's divided in shares. Profits are taxed at corporate rate, but shareholders also have to pay a dividend tax. In most corporations shareholders and managers are separate groups.
  1-tier board: shareholders and managers are in the same board and the shareholders are closer to the managers. The shareholders elect the board of directors, who then select the managers.
  2-tier board: supervisory board with only shareholders. Daily board with CEO, CFO, etc. More independence of managers and more risk on agency problems. The supervisory board chooses the executive board of directors.

Disadvantage of a corporation: because a corporation is a legal person, it must pay taxes. Moreover, money paid out to shareholders in the form of dividends is taxed again as income to those shareholders. This is *double taxation*, meaning that corporate profits are taxed twice

There are different ways of voting systems:

- **Straight voting**: directors are elected one at a time. Each time that you have to choose, you have your total amount of votes. The only way to make sure that the director that you want is chosen, you should have 50% of the shares. This freezes out the minority shareholders.
- **Cumulative voting:** the directors are elected all at once. Total votes = number of shares x number of directors. You need 1/(N+1) percent + 1 share to choose the director you want.
- **Proxy voting**: a grant of authority by a shareholder to someone else to vote his or her shares.

Classes of shares: Some firms have more than one class of ordinary equity. Often the classes are created with unequal voting rights. You could do this to have more control over the firm

Staggering has two effects:

- It is more difficult for a minority to elect a director when there is cumulative voting, because there are fewer directors to be elected at one time.
- It makes takeover attempts less likely to be successful, because it makes it more difficult to vote in a majority of new directors.

Agency theory

Type I problems: managers (agents) and shareholders (principals) have other incentives. Shareholders only want an increase in the share price (maximize the value of the company) while managers have other personal goals (maximize their own wealth and power). Direct agency costs are costs to monitor management actions like hiring auditors. Indirect agency costs are lost opportunities. This problem can be solved with giving managers the opportunity to buy equity of the firm. The goal of the shareholders and managers is than the same.

Mechanism to align managers to shareholders' interests: **managerial compensation** (performance-based pay) or a shareholders facility to call managers to account (because they have shareholder rights: the conceptual structure of the corporation assumes that shareholders elect directors, who in turn hire managers to carry out their directives. Shareholders therefore control the corporation through the right to elect the directors).

Type II problems: majority shareholders and minority investors can also have different goals. A major shareholder has more voting power and can benefit if the firm trades with another company of the shareholder (they want to take advantage of their power to control). Minority shareholders want to maximize value per ordinary share. Bondholders, however, want to maximize bond value. shareholders might be interested in risky investments, but bondholders will be more risk averse.

Rights of a shareholder

- Share proportionally in dividends paid
- Share proportionally in assets remaining after liabilities have been paid in a liquidation
- Voting on shareholder matters.
- Share proportionally in any new equity sold (*pre-emptive right*)

Dividends

- It's not a liability of the corporation
- It's not an expense and are paid out of the after-tax profits
- Dividends received by individual shareholders are taxable

Common law is law developed through court rulings; it is flexible and can adjust quickly to events. Civil law is law developed through regulation and code of laws (those court rulings do not change the legal text); it is based on code of principle and it does not or only slowly change.

Differences in economic, social and religious culture can lead to differences in the way companies run. E.g., common law (US, UK) can quickly change a law while civil law (EU) can't. But also, other factors like corruption and government intervention are from importance to the way companies run.

Bank based financial system: banks have the major role in facilitating the flow of money between investors with a surplus and organizations that require funding. Banks are often involved in long-term strategic decisions and actively monitor corporations. Ownership is often more clustered.
Market based systems: financial markets are the main financial intermediaries. For corporations it's easier to raise money on financial markets. There is external market discipline and ownership is often rather fragmented.

Chapter 3 – Financial Analysis and Planning

The **annual report** gives information relating to the performance and activities of the firm over the previous year; it presents three financial statements: the balance sheet, the income statement and the statement of cash flows.

The **statement of financial position** or **balance sheet** is a snapshot of the firm at a particular point in time. It's summarizing what a firm owns, what the firm owes and the difference between the two.
Assets = liabilities + shareholders' equity.
Assets are classified as either *current* or *non-current*. A non-current asset is one that has a relatively long life (greater than 12 months). Non-current assets can be either *tangible*, such as a truck or a computer, or *intangible*, such as a trademark or patent. A current asset has a life of less than 1 year.
Liabilities are classified as either *current* or *non-current*. Current liabilities, like current assets, have a life of less than one year (meaning they must be paid within the year), and are usually listed before non-current liabilities.
Net working capital = current assets – current liabilities (NWC = CA – CL)
The values shown in the statement of financial position for the firm's assets are **book values**. The **market value** is based on prices or market valuations. *International accounting standards (IAS)* is a common set of standards and procedures by which audited financial statements are prepared in Europe and many other countries.

The **income statement** measures performance over some period of time.
Income = revenues – expenses
EBITD = earnings before interest, taxes and depreciation (or appreciation)
Matching principle: the idea is to first determine revenues as described previously and then match those revenues with the costs associated with producing them.

Non-cash items are expenses charged against revenues that do not directly affect cash flow, such as depreciation.
Your *average tax rate* is the percentage of income that is paid in taxes (tax bill divided by your taxable income). The *marginal tax rate* is the tax you would pay if you earned one more unit of currency.
With a flat-rate tax there is only one tax rate, so the rate is the same for all income levels. With such a tax the marginal tax rate is always the same as the average tax rate.

Cash flow: the difference between the cash that came in and the cash that went out.
Cash flow identity: cash flow from assets = cash flow to creditors + cash flow to shareholders

Total cash flow = cash flow from operating activities + cash flow from investing activities + cash flow from financing activities

Cash flows from operating activities: the cash flow that results from the firm's activities of producing and selling (the normal business activities).

Cash flows from investing activities: the cash flow that results from a firm's long-term investments.

Cash flows from financing activities: the cash flow that results from a firm's choices in equity and debts.

Some ratios are missing, but those will be on the formula sheet for the exam of 2021.

Return on Equity (ROE)= $\frac{Net\ income}{Total\ equity}$

Return of Assets (ROA) = $\frac{Net\ income}{Total\ assets}$

Always: ROE > ROA (because the equity multiplier is > 1)

Du Pont identity: ROE = ROA × equity multiplier ⇔ ROE = profit margin × total asset turnover × equity multiplier

The Du Pont identity tells us that ROE is affected by

- Operating efficiency: how efficient is our operation
- Asset use efficiency: how much sales do you make out of your assets
- Financial leverage: how much do you rely on your equity

$$Tobin's\ Q = \frac{market\ value\ of\ firm's\ debt\ and\ equity}{replacement\ cost\ of\ firm's\ assets}$$

Uses of financial information:

- Performance evaluation
- Planning for the future and checking the realism of assumptions made in those projects
- External uses: for parties outside the firm
- Evaluating your main competitors

How to choose a benchmark for evaluation?

- *Time trend analysis*: history
- *Peer group analysis*: identify firms similar in the sense that they compete in the same markets, have similar assets and operate in similar ways
- *Aspirant group*: a group of the top firms in an industry, not with the average firm.

Chapter 4 – Introducing to Valuation: The Time Value of Money

Future value is the amount an investment is worth after one or more periods.

$Future\ value\ interest\ factor = (1 + r)^t$

An amount invested now, times the future value interest factor, is the amount you will have in the future.

Investing for more than one period:

- **Compounding**: the process of accumulating interest on an investment over time to earn more interest.
- **Interest on interest**: interest earned on the reinvestment of previous interest payments.
- **Compound interest:** interest earned on both the principal and the interest reinvested from prior periods.
- **Simple interest**: interest earned only on the original principal amount invested.

Present value is the current value of future cash flows discounted at the appropriate discount rate.
Discounted cash flow valuation: calculating the PV of future cash flows to determine its value today
$Present\ value\ interest\ factor/discount\ rate = (1+r)^{-t}$
The amount that you want in the future, times the present value interest factor is the amount you have to invest now.

$$PV = FV_t \times (1+r)^{-t} \Leftrightarrow PV = \frac{FV_t}{(1+r)^t}$$

$$FV = PV_t \times (1+r)^t$$

If you want to solve for r, rearrange the last equation: $r = \left(\frac{FV}{PV}\right)^{\frac{1}{n}} - 1$

Rule of 72 $= \frac{72}{r\%}$

For reasonable rates of returns, the time to double your money is given approximately by 72/r%
This rule is fairly accurate for discount rates in the range 5 to 20 percent, but you can always rearrange the FV formula to calculate the exact number of years to earn an investment back.

Chapter 5 – Discounted Cash Flow Valuation

C = cash flow, r = interest rate, g = growth rate, t = number of periods and q = quoted rate.
Future value for annuities:

$$= C \times \frac{(1+r)^t - 1}{r}$$

Present value for annuities:

$$C \times \frac{1-(1+r)^{-t}}{r}$$

Annuity due is an annuity for which the cash flows occur at the beginning of each period. If you have x payments than you calculate the x-1 year annuity + single annuity → just multiply the outcome with (1+r).

A **perpetuity** is an annuity in which the cash flows continue forever, they are also called consols.
PV for a perpetuity:

$$= \frac{C}{r}$$

Growing annuities present value:

$$= C \times \left[\frac{1 - \left(\frac{1+g}{1+r}\right)^t}{r-g}\right]$$

Only if r > g

Growing perpetuity present value:

$$= \frac{C}{r-g}$$

Delayed perpetuity:

$$= \frac{C}{r} \times \frac{1}{(1+r)^T}$$

The future value of a perpetuity would be infinity.

Nominal/stated/quoted interest rate: 15% per year, 16% per day, etc…
Effective annual percentage rate (EAR): the interest rate expressed as if it was compounded once per year.

$$EAR = \left[1 + \frac{q}{m}\right]^m - 1$$

Annual percentage rate (APR): the harmonized interest rate that expresses the total cost of borrowing or investing as a percentage interest rate (including all kinds of other fees and costs).

$$\text{PV} = C_0 + \sum_{i=1}^{T} \frac{\text{C}_\text{i}}{(1+\text{APR})^\text{i}}$$

Pure discount loan: receive money today and repay a single lump sum, pay interest over the amount borrowed. Short loan term, less than a year (T-bills)
Interest only loan: pay interest each period and repay the original loan amount at some point in the future. It is possible to pay interest every year forever and never repay the principal; in that case it is a perpetuity (corporate bonds)
Amortized loan: repay parts of the loan amount over time. Each period, you pay the interest and a fixed amount of the principal. The total payment of each period differs.
Partially amortized: regular repay – same amount plus balloon/bullet (=after a certain point you have to repay the remaining amount and the loan stops)

Chapter 6 – Bond Valuation

A bond is normally an interest-only loan, meaning that the borrower will pay the interest every period, but none of the principal will be repaid until maturity date. A bond is a tradable loan, you could also trade smaller pieces of the loan.

- *Coupon*: the stated interest payment made on a bond; constant and paid every year
- *Face value* (or par value): the principal amount of a bond that is repaid at the end of the term

- *Coupon rate*: the annual coupon divided by the face value of a bond
- *Maturity*: the specified date on which the principal amount of a bond is paid

The interest on a bond stays the same until the maturity date, while the market interest rate changes. So, the value of the bond fluctuates depending on the market interest rate.
When interest rates rise, the PV of a bond's remaining cash flows declines, and the bond is worth less. When interest rates fall, the bond is worth more. The interest rate required in the market on a bond is called the bond's **yield to maturity** (YTM). It's called a **discount bond** when the bond is sold for a price lower than the face value (coupon rate < market discount rate). A bond is a **premium bond** when the bond is sold for a higher price than the face value (coupon rate > market discount rate). A **par bond** is a bond that sells at its face value (coupon rate = market discount rate).

Calculate the PV of the face value (F) and the PV of the annuity component. Both answers together will give the YTM. The C in the formula is the coupon paid per year and r the interest rate.

$$\text{Level coupon (straight bond)} = C \times \frac{\left(1 - \frac{1}{1+r^t}\right)}{r} + \frac{F}{(1+r)^t}$$

Where r is the unknown discount rate, or yield to maturity, C is the coupon and F is the face value. You can only find the yield to maturity by trial and error. When you have a discount bond you know the interest rate is higher than the coupon rate.
This formula comes from the fact that if you have a level coupon bond, you receive the constant payments as long as the bond exists. This is basically an annuity. On top of that, at the end of maturity, you receive the face value too. Therefore, you need to calculate the PV of both the face value and the annuity.

The risk arises for bond owners from fluctuating interest rates is called interest rate risk. How much it changes depends on the time to maturity and the coupon rate. The longer the time to maturity, the greater the risk. The lower the coupon rate, the greater the interest rate. A higher coupon rate means bigger cash flows at the beginning.

Current yield is a bond's annual coupon divided by its price. It's not the same as yield to maturity. Current yield of a discount bond is lower than YTM, it considers only the coupon portion of your return; it ignores the built-in gain from the price discount. The current yield of a premium bond is higher than YTM; it ignores the built-in loss from the premium. With this information, you could already eliminate some answers when they ask for the price or the YTM in a multiple-choice question.

Securities may be classified as *equity securities* or *debt securities*.
Difference debt and equity:

- Debt is not an ownership in the firm. The creditors have no voting power.
- Interest payments on debts are costs and are fully tax deductible. Dividends aren't.
- Unpaid debt is a liability, so one of the costs is the possibility of financial failure.

Debt securities are typically called *notes*, *debentures* or *bonds*. The main difference between public-issue and privately placed debt is that the latter is placed directly with a lender and not offered to the public.
The **indenture** (*deed of trust*) is the written agreement between the corporation (the borrower) and its creditors.
Firms frequently pay to have their debt rated. The *debt ratings* are an assessment of the creditworthiness of the corporate issuer. Bond rating are only concerned with the possibility of default. A bond's credit rating can change as the issuer's financial strength improves or deteriorates. Determinants of the bond's credit rating are political risk, economic strength and growth prospects, government debt, and monetary and fiscal flexibility.

- **Government bonds**: Treasury notes and bonds. No default risk, because government can always come up with the money to make the payments (except in EU because ECB controls the money supply) Many treasury issues are exempt from income taxes. In some countries, state and local governments also borrow money by selling notes and bonds. Such issues are called municipal notes and bonds, or just "munis".
- **Zero coupon bonds/pure discount bonds/zeros**: a bond that makes no coupon payments and is thus initially priced at a deep discount.
- **Floating rate bonds (floaters)**: coupon payments are adjustable. The adjustments are tied to an interest rate index. The holder has the right to redeem the note at par on the coupon payment date after some specified amount of time. This is called a *put provision*, and is discussed in the following section. The coupon rate has a floor and a ceiling, meaning that the coupon is subject to a minimum and a maximum. In this case the coupon rate is said to be "*capped*", and the upper and lower rates are sometimes called the *collar*.
  A particularly interesting type of floating-rate bond is an *inflation-linked bond*. Such bonds have coupons that are adjusted according to the rate of inflation (the principal amount may be adjusted as well).
- *Catastrophe/cat bonds* are issued at a large discount to par value (are rated below investment grade) and lose all their value if there is a major specific catastrophe (such as a hurricane, flooding or earthquake) in a stated region.
- A *warrant* gives the buyer of a bond the right to purchase shares of equity in the company at a fixed price
- *Income bonds*: the coupon payments depend on company income
- *Convertible bond*: can be swapped for a fixed number of shares of equity any time before maturity at the holder's option.

The trading volume in bonds on a typical day is many, many times larger than the trading volume in equities (by trading volume we simply mean the amount of money that changes hands).

Clean price: the price of a bond net of accrued interest; this is the price that is typically quoted.
Dirty price: the price of a bond including accrued interest, also known as the *full* or *invoice* price. This is the price the buyer actually pays.

Nominal rates are not adjusted for inflation. On an investment, it's the percentage change in the amount of cash that you have.

Real rates are adjusted for inflation. On an investment, it's the percentage change in how much you can buy with your cash. So, the percentage change in your buying power.

The **Fisher equation** is the relationship between nominal returns, real returns and inflation.
Approximation formula (only exact if interest rates are continuously compounded):
$R \approx n + I$

But, if you are asked to calculate the real interest rate, you have to use this formula, because it is more accurate (you can always use this one, also when interest rate are not continuously compounded):
$(1 + R) \times (1 + I) = (1 + N)$

R= real interest rate
N = nominal interest rate
I = inflation rate

$R = r + I + r \times I$

Effect of inflation on present value calculations:
Discount nominal cash flows at a nominal rate or discount real cash flows at a real rate. You will get the same answer as long as you are consistent.

The term structure of interest rates is the relationship between short- and long-term interest rates. It tells us what nominal interest rates are on default free, pure discount bonds of all maturities.
The common shape of the term structure is upward sloping, long term rates are higher than short term rates.

What determines the shape of the term structure: (Figure 6.3; Smartbook, p.148)

- Real rate of interest
- Rate of inflation
- Interest rate risk premium

Inflation premium: the portion of a nominal interest rate that represents compensation for expected future inflation
If investors believe that the rate of inflation will be higher in the future, then long term nominal interest rates will tend to be higher than short term interest rates. So upward sloping.
If they think that inflation will fall in the future, the curve is downward sloping.
Interest rate risk premium: the compensation investors demand for bearing interest rate risk. The longer the term to maturity, the greater the interest rate risk. So, interest rate risk premium increases with maturity, but at a decreasing rate.

The **Treasury yield curve** is a plot of the yields on Treasury notes and bonds relative to maturity.
Treasury yields depend on the real rate, expected future inflation, and the interest rate risk premium
Default risk premium: the portion of a nominal interest rate or bond yield that represents compensation for the possibility of default.

Taxability premium: the portion of nominal interest rate or bond yield that represents compensation for unfavourable tax status. Government bonds are free of taxes, so investors demand extra yield on a taxable bond.
Liquidity premium: the portion of a nominal interest rate or bond yield that represents compensation for lack of liquidity. If you want to sell an illiquid bond quickly you won't get a good price, so that's why they have a higher yield.

Chapter 7 – Equity Valuation

Share prices are more difficult to value than a bond.

- Equity's promised cash flows are not known in advance
- Life of investment is forever
- There's no way to easily observe the rate of return that the market requires

Current price of equity is the present value of all the future dividends.

$$P_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \frac{D_4}{(1+R)^4} + \dots$$

There are some special circumstances when it is possible to come up with a value for the equity:

- Dividend has a zero-growth rate
- Dividend grows at a constant rate
- Dividend grows at a constant rate after some length of time

Value of equity with zero growth of dividend: constant dividend like a preference share. Share price can be viewed as an ordinary perpetuity with a cash flow equal to D every period, and where R is the required return.

$$P_0 = \frac{D}{(1+R)^1} + \frac{D}{(1+R)^2} + \frac{D}{(1+R)^3} + \frac{D}{(1+R)^4} + \dots \Leftrightarrow P_0 = D/R$$

Value of equity with constant growth of dividend: dividend that grows at a steady rate, g. It's like a growing perpetuity.

$$D_t = D_0 \times (1+g)^t$$

$$P_0 = \frac{D_0 \times (1+g)}{R-g} = \frac{D_1}{R-g} \quad \rightarrow \quad P_t = \frac{D_t \times (1+g)}{R-g} = \frac{D_{t+1}}{R-g}$$

Dividend growth model: a model that determines the current share price as its dividend next period divided by the discount rate less the dividend growth rate.
The share price will grow at the same constant rate as the dividend because if the cash flow on an investment grow at a constant rate through time, so does the value of that investment.

In the dividend growth model, it is not possible that the growth rate exceeds the required return.

Value of equity with non-constant growth of dividend
We can use the dividend growth model, but the difficulty is to correctly identify the start of the constant growth.

$$P_t = \frac{D_t \times (1+g)}{R-g}$$

Value of equity with two-stage growth of dividend
Dividend will grow at a rate of g_1 for t years and then grow at a rate of g_2 thereafter forever. Growth rate can change due to competition.

$$P_0 = \frac{D_1}{(R-g_1)} \times \left[1 - \left(\frac{1+g_1}{1+R}\right)^t\right] + \frac{P_t}{(1+R)^t}$$

With $P_t = \frac{D_{t+1}}{R-g_2} = \frac{D_0 \times (1+g_1)^t \times (1+g_2)}{R-g_2}$

Required return

$$R = \frac{D_1}{P_0} + g$$

The first part is the **dividend yield**; an equity's expected cash dividend divided by its current price. The second part is the **capital gains yield**; the dividend growth rate, also the rate at which the share price grows.

Ordinary equity: equity without priority for dividends or in bankruptcy.
Preference shares: equity with preference over ordinary shares in the payment of dividends, normally with a fixed dividend rate, and in the distribution of corporation assets in the event of liquidation. Sometimes without voting rights. **Stated value**: preference shares have a stated liquidating value.

Dividends payable on preference shares are either **cumulative** or **non-cumulative**; most are cumulative. If preferred dividends are cumulative and are not paid in a particular year, they will be carried forward as an *arrearage* and they have to be paid the next year with the current preferred dividends before ordinary shareholders receive anything.
Unpaid preferred dividends are not debts.

Chapter 8 – Net Present Value and Other Investment Criteria

The **net present value** is the difference between an investment's market value and its cost. It's based on estimates. First you have the estimate the future cash flows. → **discounted cash flow valuation**: the process of valuing an investment by discounting its future cash flows. An investment should be accepted if the net present value is positive and rejected if it is negative.

$$NPV = -investment + C \times \frac{1 - \frac{1}{(1+r)^t}}{r}$$

Annuities → PV=annuity *annuity PV factor
Unequal amounts → PV of every cash flow

NPV with residual value
NPV = PV + PV of residual value (single lump sum, t=last year) – investment
An investment should be accepted if the net present value is positive and rejected if it is negative.

Payback period is the amount of the time required for an investment to generate cash flows sufficient to recover its initial cost. Based on the payback rule, an investment is acceptable if its calculated payback period is less than some pre-specified number of years.
Equal yearly cash inflows: amount invested / expected annual net cash inflow.
Non-equal yearly cash inflows: years + (amount needed to complete recovery / net cash inflow)

Advantages	**Disadvantages**
Easy to understand	Ignores the time value of money
Adjusts for uncertainty of later cash flows	Requires an arbitrary cut-off point
Biased towards liquidity	Ignores cash flows beyond cut-off date
	Biased against long term projects, such as research and development, and new projects

Discounted payback period is the length of time required for an investment's discounted cash flows to equal its initial cost. Based on the discounted payback rule, an investment is acceptable if its discounted payback is less than some pre-specified number of years.

Advantages	**Disadvantages**
Includes time value of money	May reject positive NPV investments
Easy to understand	Requires an arbitrary cut-off point
Doesn't accept negative estimated NPV investments	Biased against long term projects, such as research and development, and new projects
Biased towards liquidity	Ignores cash flows beyond cut-off date

Average accounting return is an investment's average net income divided by its average book value.

$$AAR = \frac{Average\ net\ income}{Average\ book\ value}$$

If the AAR ≥ target return → accept investment and if the AAR < target return → reject investment.

$$Average\ annual\ operating\ income\ from\ asset = \frac{Total\ operating\ income\ during\ life}{Asset's\ operating\ life\ in\ years}$$

$$Total\ operating\ income\ = Total\ net\ cash\ inflows\ during\ life - depreciation\ during\ life$$

$$Average\ amount\ invested = \frac{Asset's\ cost + residual\ value}{2}$$

Advantages	Disadvantages
Easy to calculate	Not a true rate of return, time value of money is ignored
Needed information will usually be available	Uses an arbitrary benchmark cut-off rate
	Based on accounting book values, not cash flows and market values.

Internal Rate of Return is the discount rate that makes the NPV of an investment zero. The IRR on an investment is the required return that results in a zero NPV when it is used as the discount rate.
If IRR ≥ required return → accept investment and if IRR < required return → reject investment.
You also should accept the investment if you earn a higher rate (pay a lower rate) in the project than in the market.

IRR annuities → investment's costs = PV of investment's net cash flows
= amount of each equal net cash inflow * annuity factor
IRR unequal amounts → trial and error
Multiple rates of return problem: the possibility that more than one discount rate will make the NPV of an investment zero.

Advantages	Disadvantages
Closely related to NPV, often leading to identical decisions	May result in multiple answers, or not deal with non-conventional cash flows
Easy to understand and communicate	May lead to incorrect decisions in comparisons of mutually exclusive investments.

A mutually exclusive investment is an investment that once taken prevents another one from being taken.

Modified internal rate of return: you first have to modify the cash flows and then calculate an IRR using the modified cash flows.

- Method 1: the discounting approach. Discount all the cash flows back to the present value at required return, add to initial cost and calculate the IRR.
- Method 2: the reinvestment approach. You compound all the cash flows, except the first out to the end of projects life and then calculate the IRR.
- Method 3: the combination approach. Negative cash flows are compounded back to the present, and positive cash flows are compounded to the end of the project.

The MIRRs don't suffer from the multiple rates of return problem. But the MIRR stands for meaningless internal rate of return, because there are different ways of calculating them. Not truly internal, because depends on externally supplied rates.

Profitability index (benefit-cost ratio) is the present value of an investment's future cash flows divided by its initial cost. It measures the value created per cash unit invested.

$$PI = \frac{PV\ of\ an\ investment's\ future\ cash\ flows}{Initial\ costs\ of\ the\ investment}$$

If PI is ≥ 1 → accept investment and if PI < 1 → reject investment.

Advantages	Disadvantages
Closely related to NPV, often leading to identical decisions Easy to understand and communicate May be useful when available investments funds are limited	May lead to incorrect decisions in comparisons of mutually exclusive investments (different measures give us different preferable outcomes).

Usually, the NPV is the one you base your final decision on, because it is a better measure.

Chapter 9 – Making Capital Investment Decisions

The paragraph 9.6 will not be tested in the exam of 2021!

Incremental cash flows: the difference between a firm's future cash flows with a project and those without the project. Incremental cash flows are all changes in the firm's future cash flows that are a direct consequence of taking the project.
You have to apply the **stand-alone principle**: the assumption that evaluation of a project may be based on the project's incremental cash flows.

Sunk costs are costs that has already been incurred and cannot be removed, and which therefore should never be considered in an investment decision.
Opportunity costs are the most valuable alternative that is given up if a particular investment is undertaken. The rule is to incorporate opportunity costs.
Side effects are classified as either erosion or synergy. **Erosion** is a negative impact on the cash flows of an existing product from the introduction of a new product, so that the cash flows of a new project that come at the expense of a firm's existing projects. Erosion is only relevant when the sales would otherwise not be lost. **Synergy** occurs when a new project increases the cash flows of existing projects. The rule is to incorporate side effects.

Pro forma financial statements are financial statements projecting future years' operations. They are a convenient and easily understood means of summarizing much of the relevant information of a project.

Project's total cash flow = project operating cash flow – project capital expenditure – change in net working capital
⇔ Project's total operating cash flow: net income + depreciation – increase (+ decrease) in net working capital.

Net cash flow comes from operating activities, financing activities and investing activities.

Depreciation can be calculated with the **reducing-balance method**. This is a depreciation method allowing for the accelerated write-off of assets under various classifications.

Depreciation is a non-cash deduction. It has only cash flow consequences because it only influences the tax bill.
Financing expenses, such as interest, are ignored in the calculation of a project's OCF.
EBITDA = earnings before interest, taxes and depreciation and amortization
Standard approach:
EBIT = sales – costs – depreciation.
Taxes = EBIT x T
OCF = EBIT + depreciation – taxes.

Bottom-up approach:
Project net income = EBIT – taxes.
OCF = net income + depreciation (when there is no interest given)

Top-Down approach:
OCF = sales – costs – taxes.

Tax shield approach:
OCF = (sales – costs) x (1-T) + depreciation x T
The depreciation tax shield is the tax saving that result from the depreciation deduction, calculated as depreciation multiplied by the corporate tax rate.

You come to the same result, no matter which approach you take. They could ask for one specific approach in the exam or they only give some data with which you have to decide which approach you have to use.

Chapter 10 – Project Analysis and Evaluation

The paragraphs 10.1-10.2 and 10.6 are not tested in the exam of 2021!

Forecasting risk, scenario analysis and simulation analysis will not be tested in the exam of 2021!
Forecasting risk is the possibility that errors in projected cash flows will lead to incorrect decisions. Also called estimation risk.

Scenario analysis is the determination of what happens to NPV estimates when we ask what-if questions, by changing all the variables. This way, a firm is better in estimating risk. The firm makes different scenario's, like the worst case and the best case.
The **sensitivity analysis** is the investigation of what happens to NPV when one variable is changed, others remain frozen.
The **simulation analysis** is a combination of scenario and sensitivity analysis. But for all the analysis: once we have the results, no simple decision rule tells us what to do.

Break-even analysis
Variable costs are the costs that change when the quantity of output changes $V = Q \times v$. Where v is the variable cost per unit.
Fixed costs are the costs that do not change when the quantity of output changes during a particular time period.
Contribution $(P - v)$: contribution of a sale to cover fixed costs.
Quantity (Q): the goal is to determine the number of units that is needed to earn the fixed costs back

$V = Q \times v$.
$TC = V + F \Leftrightarrow v \times Q + F$

$V = Q \times v$
$TC = V + F = v \times Q + F$
Average total costs = $ATC = TC / Q$
$MTC = TC'$

- The **accounting break-even** is the sales level that results in zero project net income.
  Accounting break-even point: $q = (F + D) / (P - v)$, where D = depreciation.
- The **cash break-even** is the sales level that results in a zero operating cash flow.
  Cash break-even point: $Q = F / (P - v)$
- The **financial break-even** is the sales level that results in a zero NPV.
  Financial break-even point: $Q = F + OCF / (P - v)$

OCF = operating cash flow
P = selling price per unit
v = variable cost per unit
Q = total units sold
S = total units sold = P*Q
V = total variable costs = v*Q
F = fixed costs
D = depreciation
T = tax rate (taxes are ignored because net income is zero)

Net income = $(S - V - F - D) * (1 - T)$

$(S - V - F - D) * (1 - T) = 0$

$$
\begin{aligned}
(S - V - F - D) &= 0 \\
S - V &= F + D \\
P * Q - v * Q &= F + D \\
(P - v) * Q &= F + D \\
Q &= (F + D) / (P - v)
\end{aligned}
$$

OCF = EBIT + depreciation
OCF = [(P – v) * Q – F – D] + D
OCF = (P – v) * Q – F

Q = (F + OCF) / (P – v)

Q	= (F + D) / (P – v)	OCF = D if net income =0	**accounting break-even**
Q	= F / (P – v)		**cash break-even**
Q	= (F + OCF) / (P – v)	OCF for which NPV =0	**financial break-even**

Operating leverage is the degree to which a project or firm is committed to fixed production costs. A firm with low operating leverage will have low fixed costs compared with a firm with high operating leverage. A high degree means *capital intensive* projects and thus a greater potential danger for forecasting risk. The reason is that relatively small errors in forecasting sales volume can get magnified, or "levered up", into large errors in cash flow projections.

The **degree of operating leverage** (DOL) is the percentage change in operating cash flow relative to the percentage change in quantity sold.
→ DOL = 1 + F / OCF
Zero fixed costs would result in a DOL of 1, implying that percentage changes in quantity sold would show up one for one in operating cash flow so no leverage effect would exist. In general:
High fixed costs and low variable costs → high DOL
Low fixed costs and high variable costs → low DOL

Capital rationing will not be tested in the exam of 2021.
Capital rationing is said to exist when we have profitable (positive NPV) investments available, but we can't get the funds needed to undertake them.

1. **Soft rationing**: the situation that occurs when units in a business are allocated a certain amount of financing for capital budgeting.
2. **Hard rationing**: the situation that occurs when a business cannot raise financing for a project under any circumstances.

Chapter 11 – Some Lessons From Recent Capital Market History

Required *return on an investment* depends on the risk of the investment. The greater the risk, the greater the required return.

If you buy an asset of any sort, your gain (or loss) from that investment is called the return on your investment. The *income component* is the cash you receive for owning. The *capital gain/loss* exists because values change.

Total cash return: dividend income + capital gain (loss)

Capital gain yield: $P_{t+1} - P_t / P_t$

Dividend yield: D_{t+1} / P_t *Together they're the percentage returns.*

For summarizing you need percentages returns, because these doesn't depend on investment size.

The easiest way to calculate the *average returns* is to simply add up the yearly returns and divide by N. The outcome is nominal, so when you divide it by inflation, you get the real return.

The government borrows money by T-bills. Because the government can always raise taxes to pay its bills, there is no risk and thus has a T-bill a risk-free return. The **risk premium** is the difference of the return on a risky asset and the return on a risk-free asset. The higher the risk premium, the riskier the investment (compensation for risk).

To know how much the actual return deviates from the average, we use a **variance**, which is the average squared difference between the actual return and the average return.

$$Var(R) = \sigma^2 = 1/(T-1)\left[(R_1 - \overline{R})^2 + \cdots + (R_T - \overline{R}^2)\right]$$

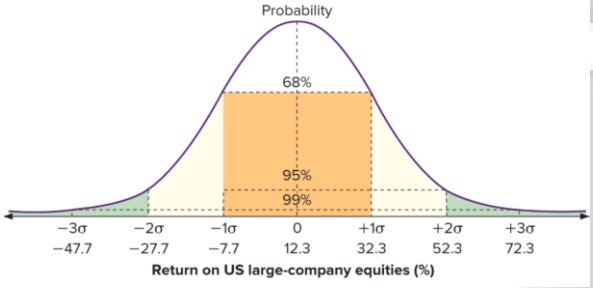
Take each of the T individual returns (R_1, R_2,..) and subtract the average return($\overline{R}$), square the results, and add them all up. Finally, divide this total by the number of returns less 1 (T-1).

Standard deviation: the positive square root of the variance.

$$SD(R) = \sigma = \sqrt{Var(R)}$$

The larger the variance or the standard deviation is, the more spread out the returns will be.

Normal distribution (*bell curve*): a symmetric, bell-shaped frequency distribution that is completely defined by its mean and standard deviation. Example figure 11.7, Smartbook, p.299:



Arithmetic average return: the return earned in an average year over a multi-year period.

$$= (R_1 + R_2 + \ldots)/T$$

Geometric average return: the average compound return earned per year over a multi-year period.

$$= [(1+R_1) \times (1+R_2) \times \ldots \times (1+R_T)]^{1/T} - 1$$

The geometric average tells you what you actually earned per year on average, compounded annually. The arithmetic average tells you what you earned in a typical year. There is a simple way of combining the two averages, using **Blume's formula:**

$$R(T) = \frac{T-1}{N-1} \times geometric\ average + \frac{N-T}{N-1} \times arithmetic\ average$$

- Averages calculated over a long period up to a decade → arithmetic average
- Averages calculated a few decades into the future → Blume's formula
- Averages calculated over a very long period covering many decades → geometric average

In the rest of the summary, 'average return' refers to the arithmetic average unless said otherwise.

A market in which security prices reflect available information is an **efficient capital market**. Thus, based on information, there is no reason to believe that the current price is too low or too high. Because information is reflected in prices immediately, investors should only expect to obtain an "average" rate of return. Awareness of information when it is released does an investor no good, because the price adjusts before the investor has time to trade on it.
The efficient markets hypothesis states that well organized capital markets are efficient markets, at least as a practical matter. If a market is efficient, then all investments in that market are zero-NPV investments. If prices are neither too low nor too high, then the difference between the market value of an investment and its cost is zero.

There are three forms of efficient markets:

- *Weak form*: financial asset (stock) prices incorporate all historical information into current prices. Future stock prices cannot be predicted on an analysis of past stock prices.
- *Semi-strong form*: stock prices incorporate all publicly available information (historical and current). There will not be a delayed response to information disclosures.
- *Strong form*: stock prices incorporate all information, private as well as public. Prices will react as soon as new information is generated, rather than as soon as it is publicly disclosed.

Three economic forces that can lead to market efficiency:

- Investors use their information in a rational manner
- There are independent deviations from rationality
- Arbitrageurs exist

Can we systematically beat the market? You cannot; the no-free-lunch principle says that market prices are impossible to predict and so it is hard for any investor to beat the market after taking risk into account.". The price is always right: "The price-is-right principle says asset prices will fully reflect available information, and thus provide accurate signals for resource allocation".

Chapter 12 – Return, Risk and the Security Market Line

The expected return is the return on a risky asset expected in the future. You can expect different states of economy, thus you need to take the average. E(Ru) = 0.5 x R(L) + 0.5 x rate R(U).
Risk premium = expected return – risk-free rate = E(Ru) – R_f.

To calculate the variances of the returns on two equities, you first determine the squared deviations from the expected return. You then multiply each possible squared deviation by its probability. We

add these up, and the result is the variance. The standard deviation is the square root of the variance.

Portfolio: a group of assets such as equities and bond held by an investor. Combining assets into portfolios can substantially alter the risks faced by the investor.
Portfolio weight: the percentage of a portfolio's total value that is in a particular asset. Your weights always have to add up to 1, because all of our money is invested somewhere. If a portfolio is said to be *equally weighted*, all portfolio weights are the same.

Calculating the expected return on a portfolio with number of assets (n), x_i is the percentage of our money in asset i.
$E(R_p) = x_i \times E(R_1) + x_2 \times E(R_2) + \cdots + x_n \times E(R_n)$

$Total\ return\ (R) =\ expected\ return\ E(R) +\ unexpected\ return\ (U) \Leftrightarrow R = E(R) + U$

The true risk of an investment is the portion resulting from surprises or unanticipated events. It is the part that comes from unexpected information revealed within a year.

There is systematic and unsystematic risk. **Systematic risk** is one that influences a large number of assets (or *market risk*, because of market-wide effects). **Unsystematic risk** is one that affects a single asset or a small group of assets (sometimes called *unique* or *asset-specific risks*).
Total risk = systematic risk + unsystematic risk

$Unexpected\ return\ (U) =\ systematic\ portion\ (m) +\ unsystematic\ portion\ (\varepsilon) \Leftrightarrow$
$R = E(R) + m + \varepsilon$

The process of spreading an investment across assets (or forming a portfolio) is called *diversification*. The **principle of diversification** tells us that spreading will eliminate some of the risk. Unsystematic risk is eliminated by diversification, so a portfolio with many assets has almost no unsystematic risk. Systematic risk is *non-diversifiable*, the part that cannot be eliminated simply by diversifying. The **systematic risk principle** states that the expected return on a risky asset depends only on that asset's systematic risk, because unsystematic risk can be reduced at no cost, by diversification.

The **beta coefficient** (β)is the amount of systematic risk present in a particular risky asset relative to that in an average risky asset. Because assets with larger betas have greater systematic risks, they will have greater expected returns. A **portfolio beta** can be calculated just like a portfolio expected return. The reward-to-risk ratio is equal to the slope of the curve (where the portfolio's expected return is plotted against the portfolio's beta).
$= \frac{E(R_A) - R_f}{\beta_A}$
The **reward-to-risk ratio** must be the same for all assets in the market. If that's not the case, investors will choose the asset with the highest ratio, the price of that asset rises and the price of the other asset falls until they offer the same reward. Buying and selling would lead to an equilibrium, and thus the reward-to-risk ratio must be the same for all the assets in the market.

The **Security Market Line** (SML) is a positively sloped straight line displaying the relationship between expected return and beta. A **market portfolio** is a portfolio made up of all of the assets in the market. The **market risk premium** is the slope of the SML. It is the difference between the expected return on a market portfolio and the risk-free rate:

$= E(R_M) - R_f$

Capital Asset Pricing Model (CAPM): the equation of the SML showing the relationship between expected return and beta is included in this calculation.

$E(R_i) = R_f + [E(R_M) - R_f] \times \beta_i$

The CAPM shows that the expected return for a particular asset depends on three things:

- The pure time value of money: as measured by the risk-free rate, Rf, this is the reward for merely waiting for your money, without taking any risk.
- The reward for bearing systematic risk: as measured by the market risk premium, E(RM) – Rf, this component is the reward the market offers for bearing an average amount of systematic risk in addition to waiting.
- The amount of systematic risk: as measured by βi , this is the amount of systematic risk present in a particular asset or portfolio, relative to that in an average asset.

Chapter 13 – Cost of Capital

If the required return is 10%, we can also say that the cost of capital is 10%. The cost of capital associated with an investment depends on the risk of that investment. The cost of capital depends primarily on the use of the funds, not the source. A firm's cost of capital will reflect both its cost of debt capital and its cost of equity capital.

The cost of equity: the return that equity investors require on their investment in the firm.
The cost of equity capital can be estimated by using the dividend growth model:

$$P_0 = \frac{D_0 \times (1+g)}{R_E - g} = \frac{D_1}{R_E - g}$$

If you rewrite the second part, you can calculate the cost of/required return on equity: $R_E = \frac{D_1}{P_0} + g$

g has to be estimated. It's easy, but you can only use it when the company uses dividend. Also, they take g as a constant and they don't imply risk.

Disadvantages of the dividend growth model:

- Only applicable to companies that pay dividends. Even for companies that do pay dividends, the key underlying assumption is that dividend grows at a constant rate, but this will never exactly be the case.
- Estimated cost of equity is very sensitive to the estimated growth rate.
- There is no direct adjustment for the riskiness of the investment, unlike the SML approach.

The cost of equity capital can also be estimated by using the SML approach:

$$R_E = R_f + \beta_\varepsilon \times (R_M - R_f)$$

Advantages

- Explicitly adjusts for risk.
- Applicable to companies other than just those with steady dividend growth.

Disadvantages

- Resulting cost of equity will be inaccurate when market risk premium and beta are bad estimates.
- Rely on the past while predict the future, but economic conditions can change.

The **cost of debt**: the return that lenders require on the firm's debt.
The cost of preference shares: $R_P = D/P_0$
They have a fixed dividend paid (D), which essentially is a perpetuity.

E (equity) = market value of the firm's equity = number of share outstanding × share price
D (debt) = market value of the firm's debt = number of bonds outstanding × market price
V (value) = combined market value of the debt and equity:
V = E + D

If we divide both sides by V, we can calculate the percentages of the total capital represented by the debt and equity = **capital structure weights** (can be interpreted just like portfolio weights):
100% = E/V + D/V

Interest paid by a corporation is deductible for tax purposes. Payments to shareholders, like dividends are not tax deductible.
$After\ tax\ rate = R_D \times (1 - T_c)$
R_D = return on debt and T_c = corporate tax rate

The **weighted average cost of capital** is the weighted average of the cost of equity and the after-tax cost of debt:
$WACC = (E/V) \times R_E + (D/V) \times R_D \times (1 - T_C)$
It is the overall return the firm must earn on its existing assets to maintain the value of its equity. It is also the required return on any investments by the firm that have essentially the same risks as existing operations. So, if we were evaluating the cash flows from a proposed expansion of our existing operations, this is the discount rate we would use.

If you also define the preference shares as a percentage of the firm's financing, than it's:
$WACC = (E/V) \times R_E + (P/V) \times R_P + (D/V) \times R_D \times (1 - T_C)$
Where R_P is the cost of preferences shares.
You can use the WACC as the appropriate discount interest rate for calculating the NPV, but only if the proposed investment is a replica of the firm's existing operating activities.

Combining the WACC and the SML: you should accept the investment if rate lies above the WACC, but you should accept the investment with the rate above the SML.
Required return = $R_f + \beta_A \times (R_M - R_f)$ → expected return higher, than accept.
A firm that uses its WACC as a cut-off will tend to reject profitable projects with risks less than those of the overall firm.

The **pure play approach** is the use of a WACC that is unique to a particular project, based on companies in similar lines of business → use that when own WACC is useless (by differences in businesses and thus differences in risk).

Flotation (issue) costs: to accept a new project, it may be required to issue new bonds and shares. The costs are referred as flotation costs.

Weighted average flotation cost:
$f_A = (E/V) \times f_E + (D/V) \times f_D$
Notice that whether equity is generated internally or externally makes a big difference, because external equity has a relatively high flotation cost.

Chapter 14 – Raising Capital

Private equity is used for the rapidly growing area of equity financing for nonpublic (small companies for which the stocks are currently not traded) companies.
New companies might not get a loan at a bank. Instead of that, they can raise money by venture capital (VC). **Venture capital** means financing for new, often high potential and high-risk ventures. The venture capital fund makes money by owning equity in the companies it invests in. Private equity has been important for both traditional start-up companies and established public firms. A large part of the non-venture market is made up of firms in financial distress. The market can be divided into venture equity and non-venture equity. The most common form of private equity financing in recent years is through buyouts.

4 suppliers: old-line wealthy families, private partnerships and corporations, large industrial or financial corporations and individuals (investors who participate in the informal venture capital market).

Stages of financing:

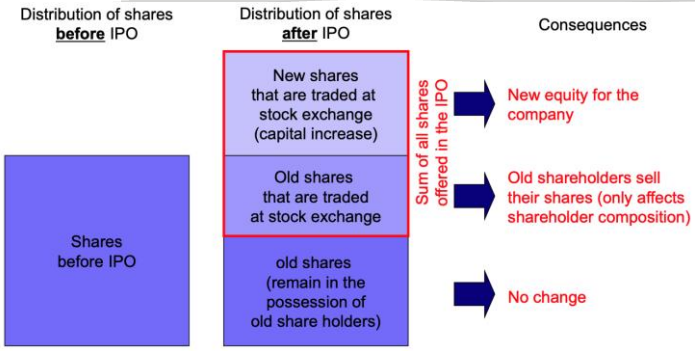
1. *Seed money*: a small amount of financing needed to prove a concept or develop a product. Marketing is not included in this stage.
2. *Start up*: financing for firms that started within the past year. Funds are likely to pay for marketing and product development expenditures.
3. *Later stage capital*: additional money to begin sales and manufacturing after a firm has spent its start-up funds.
4. *Growth capital*: funds earmarked for a firm to enable it to reach its potential and achieve successful growth.
5. *Replacement capital*: financing for a company to buy out other investors in the firm.

6. *Buy-out financing*: money provided for managers and outside investors to acquire a fully functioning firm.

Access to venture capital is very limited. Venture capitalists rely heavily on informal networks to help identify potential investments. It is also very expensive. The venture capitalist will typically demand several seats on the company's board of directors and may even appoint one or more members of senior management.

For equity sales, there are two kinds of public issue:
General cash offer: an issue of securities offered for sale to the general public on a cash basis
Rights issue (or *rights offering*)**:** a public issue of securities in which securities are first offered to existing shareholders. The first public issue is the **initial public offering** (IPO) (or the *unseasoned new issue*). A **seasoned equity offering** (SEO) is a new issue for a company with securities that have been previously issued securities to the public.

An IPO is often associated with a capital increase:



Underwriters are investment firms that act as intermediaries between a company selling securities and the investing public. They buy securities for less than the offering price and accept the risk of being unable to sell them. **Syndicates** are groups of underwriters formed to share the share risk and to help sell an issue. The difference between the underwriter's buying price and the offering price is called the **gross spread** (compensation to the underwriter). Underwriters perform services such as the following for corporate issuers: formulating the method used to issue the securities, pricing the new securities or selling the new securities.
A firm can offer its securities to the highest bidding underwriter on a competitive offer basis, or it can negotiate directly with an underwriter. Except for a few large firms, companies usually do new issues of debt and equity on a negotiated offer basis.

3 types of underwriting:

- **First commitment**: the type in which the underwriter buys the entire issue, assuming full financial responsibility for any unsold shares.
- **Best efforts**: the type in which the underwriter sells as much of the issue as possible but can return any unsold shares to the issuer without financial responsibility. the underwriter is legally bound to use 'best efforts' to sell the securities at the agreed-upon offering price.

- **Dutch auction** (*uniform price auction*): the type in which the offer price is set based on competitive bidding by investors. Investors can bid. The price, by which all bonds can be sold, will be the price.

The aftermarket is the period after a new issue is initially sold to the public. During this time the members of the underwriting syndicate generally do not sell securities for less than the offering price.
The green shoe provision (*overallotment option*)**:** a contract provision giving the underwriter the option to purchase additional shares from the issuer at the offering price.
Lock-up agreements: the part of the underwriting contract that specifies how long insiders must wait after an IPO before they can sell some or all of their equity. This ensures that they maintain a significant economic interest in the company going public.
The quiet period: all communications with the public must be limited to ordinary announcements and other purely factual matters until the period ends. The logic is that all relevant information should be contained in the prospectus, and an important result of this requirement is that the underwriter's analysts are prohibited from making recommendations to investors.

If the issue is priced too high, it may be unsuccessful and have to be withdrawn. If the issue is priced below the true market value, the issuer's existing shareholders will experience an opportunity loss when the issuer sells shares for less than they are worth.
Underpricing is fairly common. It helps new shareholders earn a higher return on the shares they buy, but the company loses money. Underpricing tends to be higher for firms with few to no sales in the previous year, they can be very risky investments. Another reason for underpricing is that it is a kind of insurance for the underwriters.

Share prices tend to decline following the announcement of a new equity issue because of:

- **Managerial information**: if a firm is overvalued, it will attempt to issue new shares of equity when the market value exceeds the correct value. This will benefit existing shareholders and new ones know that. they will anticipate this superior information and discount it in lower market prices at the new-issue date.
- **Debt usage**: it could be that the company has too much debt or too little liquidity, therefore equity issue is a bad signal to the market.
- **Issue costs:** there are substantial costs associated with selling securities

The costs of selling stock to the public (main message: it is very costly):

- **Gross spread**: The gross spread consists of direct fees paid by the issuer to the underwriting syndicate; difference between the price the issuer receives and the offer price.
- **Other direct expenses**: these are direct costs, incurred by the issuer, that are not part of the compensation to underwriters such as filing fees, legal fees and taxes.
- **Indirect expenses**: costs of management time spent working on the new issue.
- **Abnormal returns**: in a seasoned issue of equity, the price of existing shares drops on the announcement of the issue.
- **Underpricing**: for initial public offerings, losses arise from selling the equity below true value.
- **Green shoe option**: gives the underwriters the right to buy additional shares at the offer price to cover overallotments.

IPO's are more expensive for larger companies. But not it it's measured in percentages (from the total direct costs).

Rights: an issue of equity offered to existing shareholders is called a r**ight issue**. In a right issue each shareholder is issued rights to buy a specified number of new shares at a specified price within a specified time, after which the rights are said to *expire*. The terms of the rights offering are evidenced by certificates known as *share warrants* or *rights*. Such rights are often traded on securities exchanges or over the counter.
Subscription price: the price in a rights issue that existing shareholders are allowed to pay for a share of equity.

Number of new shares = funds to be raised / subscription price
Shareholders get one right for each share of equity they own.
Number of rights needed to buy a share of equity/value of the right = "old" shares / "new" shares
Value of the right: (new price – subscription price)/number of rights for a share

Effects on shareholders: shareholders can exercise their rights or sell them. In either case the shareholder will neither win nor lose by the rights offering.
It is obvious that the new market price of the firm's equity will be lower after the rights offering than it was before the rights issue. The lower the subscription price, the greater the price decline of a rights issue. However, our analysis shows that the shareholders have suffered no loss because of the rights issue.

The underwriting arrangements, terms:

- **Standby underwriting**: the type of underwriting in which the underwriter agrees to purchase the unsubscribed portion of the issue.
- The underwriter usually gets a **standby fee**, which is the amount paid to an underwriter participating in a standby underwriting agreement.
- **Oversubscription privilege**: a privilege that allows shareholders to purchase unsubscribed shares in a rights offering at the subscription price. This privilege makes it unlikely that the corporate issuer would have to turn to its underwriter for help.

Dilution: the loss in existing shareholders value in terms of:

- Proportionate ownership (dilution of the ownership of existing shareholders can be avoided by using a rights issue)
- Market value
- Book value and EPS

Term loans: direct business loans of typically one to five years. Private placements are similar to tern loans, except that the maturity is longer. They are loans provided directly by a limited number of investors.

Differences between direct private long-term financing and public issues of debt:

- A direct long-term loan avoids the cost of stock exchange registration.
- Direct placement is likely to have more restrictive covenants.
- It's easier to renegotiate a term loan or private placement in the event of a default. In is harder to renegotiate a public issue because a lot of holder are usually involved.
- Life insurance companies and pension funds dominate the private placement segment of the bond market. Banks are significant participants in the term loan market.
- The costs of distributing bonds are lower in the private market.
- Interest rates on term loans and private placements are higher than those on an equivalent public issue.

A **line of credit** is an arrangement between a bank and a firm, typically for a short-term loan, whereby the bank authorizes the maximum loan amount, but not the interest rate, when setting up the line of credit.
A **loan commitment** on the other hand, is an arrangement that requires a bank to lend up to a maximum pre-specified loan amount at a pre-specified interest rate.
A revolver is a loan commitment in which funds flow back and forth between the bank and the firm without any predetermined schedule. Funds are drawn from the revolver whenever the company needs them, up to the maximum amount specified.
A **non-revolving loan commitment** is one in which the firm cannot pay down the loan and then subsequently increases the amount of borrowing.

Chapter 15 – Financial Leverage and Capital Structure Policy

This chapter will not be tested in the exam of 2021!

The **capital structure** that maximizes the value of the firm is the one that financial managers should choose for the shareholders. Then the WACC is minimized. Thus, the lowest possible WACC is the optimal capital structure.

Financial leverage refers to the extent to which a firm relies on debt. The more debt financing a firm uses in its capital structure, the more financial leverage it employs.

EPS = net income / shares outstanding.
ROE = net income / equity.

Graph relationship between EBIT and EPS: the point where they cross is the break-even point. If the EBIT is above that point, the leverage is beneficial.

Homemade leverage is the use of personal borrowing to change the overall amount of financial leverage to which the individual is exposed. That's why capital structure is irrelevant; shareholders can change the leverage by themselves.

M&M proposition 1: it's completely irrelevant how a firm chooses to arrange its finances. No matter how much debt or equity is recruited, the assets will always have the same value.

M&M proposition 2: the cost of equity depends on required rate of return on assets, the firm's cost of debt and the firm's debt-equity ratio.

$R_E = R_A + (R_A - R_D) \times (D/E)$

The WACC is the required return on the firm's overall assets. *Figure 15.3 p.452*: if the firm raises its debt-equity ratio, the increase in leverage raises the risk of the equity and therefore the required return or cost of equity.

A firm faces two kinds of risk.

- **The business risk** is the equity risk that comes from the nature of the firm's operating activities.
- **The financial risk** is the equity risk that comes from the financial policy (the capital structure) of the firm. Both are systematic risks.

The interest tax shield = interest x tax rate.
If a firm has a lot of debt, the WACC is lower.
Present value of the interest tax shield: $T_C \times D \times R_D / R_D = T_c \times D$. Thus if a firm adds taxes, proposition 1 changes into $V_L = V_U + T_C \times D$. the unlevered cost of capital is the cost for a firm that has no debt.

Proposition 1 with taxes contain that the value of leverage firm is higher than that of an unlevered value. The difference is the present value of the interest tax shield. When a firm attracts more debt, the WACC will decline.

Proposition 2 with taxes implies that the cost of equity of a firm grows when there is more debt. Thus a firm is better with 100% debt.

When the value of a firm's assets equals the value of its debt, then the firm is economically bankrupt in the sense that the equity has no value. Because of the expenses associated with bankruptcy, bondholders won't get all that they are owed. The direct bankruptcy costs are the costs such as legal and administrative expenses. Because it is expensive to go bankrupt, a firm will spend resources to avoid doing so. These costs are called indirect bankruptcy costs. Financial distress costs are the direct and indirect costs associated with going bankrupt or avoiding a bankruptcy filing.

When a firm has debt, conflicts of interest arise between shareholders and bondholders.

- Selfish investment strategy 1: incentive to take large risks. Firms near bankruptcy often take great chances, because they believe that they are playing with someone else's money.
- Selfish investment strategy 2: incentive towards underinvestment. Shareholders of a firm with a significant probability of bankruptcy often find that new investment helps the bondholders at the shareholder's expense.
- Selfish investment strategy 3: another strategy is to pay out extra dividends or other distributions in times of financial distress, leaving less in the firm for the bondholders.

The static theory of capital structure says that firms borrow up to the point where the tax benefit from an extra pound or euro in debt is exactly equal to the cost that comes from the increased probability of financial distress. *Figures 15.6, 15.7 and 15.8 p.464-466*.

Because taxes are reduced as leverage is increased, the value of the government's claim on the firm's cash flows decreases with leverage.

CF = payments to shareholders + payments to creditors + payments to the government + payments to bankruptcy courts and lawyers + payments to any and all other claimants to the cash flows of the firm.

Proposition one without a tax is useless because in the real world that's not possible. The value of a firm is based on the total cash flows. It doesn't matter how these cash flows are divided, because these change when debt increases.

Rational firms raise debt levels when profits are expected to increase. Investors view debt as a signal of firm value. Thus, a manager can fool the public by increasing debt.

The pecking-order theory:
Many large, financially sophisticated and highly profitable firms use little debt, this is the opposite as what we would expect. A firm prefers to use internal financing whenever possible, because selling securities can be expensive. There is no optimal debt-equity ratio. Profitable firms attract less debt.

Financial distress:
Business failure, legal bankruptcy, technical insolvency (unable to meet its financial obligations), accounting insolvency (negative net worth).

Liquidation is the termination of the firm as a going concern.
Reorganization is the financial restructuring of a failing firm to attempt to continue operations as a going concern.
Absolute priority rule: the order of creditor claims distribution in the event of liquidation.

1. Administration expenses associated with liquidating the bankrupt's assets.
2. Unsecured claims arising after the filing of an involuntary bankruptcy petition.
3. Wages, salaries and commissions.
4. Contributions to employee benefit plans arising within a set before the filing date.
5. Consumer claims.
6. Tax claims.
7. Secured and unsecured creditors' claims.
8. Preference shareholder claims.
9. Ordinary shareholder claims.

Chapter 20 – Financial Risk Management

Hedging: Reducing a firm's exposure to price or rate fluctuations.

Corporate risk management often involves the buying and selling of derivative securities. A **derivative security** is a financial asset that represents a claim to another financial asset (equity option).

The financial world has become riskier. Inflation is still a big concern. Also, the interest rate has become very volatile. The **exchange rate volatility** has become increasingly important.

The **risk profile** is a plot showing how the value of the firm is affected by changes in prices or rates. Increasing in prices will increase the value of the firm. For a buyer it's the opposite, an increasing price will lead to a lower value of the firm. A firm that hedges financial risk usually won't be able to create a completely flat risk profile.

Short-run, temporary changes in prices result from unforeseen events or shocks. Short-run financial risk is often called **transactions exposure**. This name stems from the fact that short-term financial exposure typically arises because a firm must make transactions in the near future at uncertain prices or rates.

Price fluctuations can also be *long-term*, more permanent changes. A firm's exposure to long-term financial risks is often called its **economic exposure**. Because long-term exposure is rooted in fundamental economic forces, it is much more difficult, if not impossible, to hedge on a permanent basis.

Hedging

- **Forward contracts**: a legally binding agreement between two parties calling for the sale of an asset or product in the future at a price agreed on today. The buyer of a forward contract benefits if prices increase, the seller wins if prices fall. Now there is no risk about changing prices.
- **Pay-off profile** is a plot showing the gains and losses that will occur on a contract as the result of unexpected price changes.
- **Future contracts:** a forward contract with the feature that gains and losses are realized each day rather than only on the settlement date. If we buy a futures contract on oil, then if oil prices rise today, we have a profit and the seller of the contract has a loss. The seller pays up, and we start again tomorrow with neither party owing the other.
  The types of contract available are traditionally divided into two groups: commodity futures and financial futures. With a *financial future*, the underlying goods are financial assets such as equities, bonds or currencies. With a *commodity future*, the underlying goods can be just about anything other than a financial asset.
- **Cross-hedging**: hedging an asset with a contract on a related, but not identical, asset. When a firm cross-hedge, it does not actually want to buy or sell the underlying asset and the firm can reverse its futures position at some point before the maturity date. Actual physical delivery rarely takes place.
- **Swap contracts**: an agreement by two parties to exchange, or swap, specified cash flows at specified intervals in the future. The only difference is that there are multiple exchanges instead of just one.
  - Currency swaps: two parties agree to exchange a specific amount of one currency for a specific amount of another at specific dates in the future.
  - Interest rate swaps: it is the exchange of a fixed rate loan to a floating rate. The reason for this exchange rate is to take benefit from comparative advantages. Some companies may

have a comparative advantage in floating rate markets, while others have in fixed rate markets.

- Commodity swaps: it is an agreement to exchange a fixed quantity of a commodity at fixed times in the future.

Swap contracts are not traded on organized exchanges. The *swap dealer* takes the other side of the agreement from the firm and will try to find an offsetting transaction with some other party. Failing this, a swap dealer will hedge its exposure using future contracts.

- **Option contracts**: an agreement that gives the owner the right, but not the obligation, to buy or sell a specific asset at a specific price for a set period of time.
  - **Call option**: an option that gives the owner the right to buy an asset.
  - **Put option**: an option that gives the owner the right to sell an asset.

The buyer of the option contract gains a valuable right and must pay the seller, therefore.
Some options (American) can be exercised at any time up to and including the expiration date.
Some options (European) can be exercised only on the expiration date.
Options that are typically traded on commodities are actually options on futures contracts, that is why they are called futures options.

Chapter 21 – Options and Corporate Finance

This chapter will not be tested in the exam of 2021!

Protective put: The purchase of equity and also a put option on the equity to limit the downside risk associated with the equity.
This is the same as a combination of a call option, with the same strike price as the put option, and a riskless investment.

Put-call parity (PCP) condition
Price of underlying equity + Price of put = Price of call + Present value of strike price
S + P = PV(E) +C

S = share price
P = put value
PV(E) = PV of the exercise price → strike price/(1+risk free rate)^t
C = call value

S_1 = share price at expiration
S_0 = share price today
C_1 = Value of call option on the expiration date
C_0 = Value of call option today
E = exercise price on the option

$C_1 = 0$ if $S_1 - E \leq 0$ (Figure 21.2, p.631)
$C_1 = S_1 - E$ if $S_1 - E > 0$

Lower bound for the value of a call option: Share price – exercise price
Upper bound for the value of a call option: Price of underlying share.

Factors determining option values:

	Calls	Puts
Current value of the underlying asset	+	–
Exercise price on the option	–	+
Time to expiration on the option	+	+
Risk-free rate	+	–
Variance of return on the underlying asset	+	+

Option pricing model

$$S_0 = C_0 + \frac{E}{1 + R_f}$$

$$C_0 = S_0 - \frac{E}{1 + R_f}$$

Employee share options

- Providing incentives for employees to focus on corporate goals.
- Substitute for ordinary wages, especially in smaller, cash-strapped companies.

Disclaimer

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