

# Financial Markets

## Module 5

MSc Financial Engineering



# Table of Contents

<b>1. Brief</b>	<b>2</b>
<b>2. Course Context</b>	<b>2</b>
2.1 Course-level Learning Outcomes	3
2.2 Module Breakdown	3
<b>3. Module 5: Stock and Equity Markets</b>	<b>4</b>
3.1 Module-level Learning Outcomes	4
3.2 Transcripts and Notes	5
3.2.1 Transcript: Understanding Equity	5
3.2.2 Notes: Public Equity versus Private Equity	7
3.2.3 Transcript: Equity Market Influencers	10
3.2.4 Notes: Key Concepts in Equity Markets	13
3.2.5 Transcript: Trading and Investing	16
3.2.6 Notes: Equity Valuation Techniques	18
3.2.7 Transcript: Types of Equity Risk Exposure	22
3.2.8 Notes: Managing Risk	24



## 1. Brief

This document contains the core content for Module 5 of Financial Markets, entitled Stock and Equity Markets. It consists of four video lecture scripts, four sets of supplementary notes, and a peer review question.



## 2. Course Context

Financial Markets is the first course presented in the WorldQuant University (WQU) Master of Science in Financial Engineering (MScFE) program. The course sets the tone for the wider program, providing the context for the field of financial engineering, while introducing you to the financial markets, analysis of market events and valuations of financial instruments.



## 2.1 Course-level Learning Outcomes

Upon completion of the Financial Markets course, you will be able to:

- 1** Describe the types and components of financial markets.
- 2** Identify and define the key characteristics of financial instruments.
- 3** Evaluate the different ways in which financial instruments can address risk.
- 4** Perform valuations of simple financial instruments (especially bonds and options).
- 5** Understand the impact of credit risk within financial markets.



## 2.2 Module Breakdown

The Financial Markets course consists of the following one-week modules:

- 1** Introduction to Financial Markets
- 2** Market Regulation
- 3** Interest and Money Markets
- 4** Fixed Income and Bond Markets
- 5** Stock and Equity Markets
- 6** Futures, Options and Derivatives
- 7** Market Making and Trading

### **3. Module 5**

## **Interest and Money Markets**

Beginning with a brief introduction to the function of equity markets, the fifth module exposes you to key components of equity markets, including different types of markets, role players within them, and the functions these markets serve. Later in the module the focus shifts to different ways of approaching equity investment, valuation, and risk mitigation.

### **3.1 Module-level Learning Outcomes**

Upon completion of the Stock and Equity Markets module, you will be able to:

- 1** Understand what equity is and how it applies to financial markets.
- 2** Identify and describe various types of equity instruments.
- 3** Display basic share valuation capabilities.
- 4** Identify and apply risk mitigation techniques according to the investment strategy.



## 3.2 Transcripts and Notes



### 3.2.1 Transcript: Understanding Equity

Imagine this scenario: you've graduated from your Financial Engineering course and are now ready to take on the business world. You have an idea that you believe has huge potential for success, and this drives you to start your own business venture. As you begin to detail your business plan you realize the development of your product is going to cost quite bit of money and you start assessing different financing options.

One option is to ask a bank for the money. You approach them for a business loan, but because this is your first business and you don't have anything in the way of a working product yet, the bank is only willing to offer your business a loan at a very high interest rate, as a cover for their potential investment loss. You assess the offer and conclude that the interest repayment – the cost of debt – is just too high, and you decline the offer.

Next, you assess your own savings as a means to fund the product development but find that if you were to use all your savings you'd still only be able to fund 60% of the start-up costs. You then approach a like-minded friend who has shown some interest in the idea before and ask them if they would be willing to lend your business the rest of the money. Your friend responds with a counter-offer where instead of lending your business the other 40% with interest repayment terms, they offer up the full 40% for an ownership stake in your business.

You contemplate the proposal against some of its benefits and drawbacks. Some drawbacks are that you would no longer have full control of your company, and that all future profits would now be distributed between two members instead of one. However, you appreciate that your partner has certain skills that could prove helpful in the business. Eventually, after the previous considerations you decide that this is the best option for raising the required capital; because this offer avoids immediate financial strain in the form of frequent interest repayments, but still meets the initial investment amount needed to develop the product. You inform your friend of your decision and welcome them on board as your new business partner.

Now that the required funds have been raised, you and your new business partner agree that the most equitable way to distribute any future profits from business operations (when they aren't being reinvested) would be a 60/40 split according to the proportion of funds each partner invested in the business. You also decide that all decision-making authority will be aligned according to this split.

This example illustrates the concept of equity and relays the usefulness of equity as a source for raising business capital.

Equity refers to the right of ownership a party has in relation to a particular business entity. This ownership places certain obligations on both the issuing party (the business seeking to raise capital) and the equity holder (the investor). In general terms, the equity issuer has a right to use the capital provided for pursuing business objectives, while the equity holder has ownership rights which may translate into profit distributions, voting rights, priority of repayment in the case of sequestration or liquidation, and others. In the international financial markets, equity can be a useful method for raising much needed business capital without putting immediate financial strain on a business's balance sheet in the form of debt.

Not only will we explore private forms of equity, as with the example above, but we'll also explore equity as a public means of fund raising. We'll assess important role players within equity markets and learn about key concepts in the industry. Finally, we'll put our knowledge to the test by learning to value a share and assess the best risk management approach to take to protect profits.

While we engage in these various topics, bear in mind that the equity market is comprised of integrated, high-speed networks of stock/securities exchanges and OTC (over-the-counter) markets which total nearly \$100 trillion globally. This means that all the concepts we're unpacking can have significant impact in the overall capital markets when applied in the real world.



### 3.2.2 Notes: Public Equity versus Private Equity

In our previous example we saw the importance that equity has when used as a vehicle for raising capital. An investor can own a share of a company that is either listed on the stock exchange – called public equity – or they can own a piece of a non-listed business – called private equity. We will now expand on the concepts of public and private equity and how they relate to the financial markets.

When a business is first founded it commonly requires start-up funding. This funding is required for the purchasing of assets – the machinery, property and equipment necessary to operate and produce goods or services, as well as the paying of expenses such as staff salaries and transport costs. The initial start-up funding is the pool from which these purchases and payments are made before revenues are able to cover them. This funding can come from either public sources, or private sources.

#### **Private equity**

When one thinks of equity markets, you may be forgiven for conjuring thoughts of Wall Street or the Hong Kong Stock Exchange, but this is not where companies start out. Stringent rules for financial reporting, corporate disclosure, market capitalization (the size of a company according to its share price) and the like, mean that smaller businesses cannot meet these criteria. As such they are prohibited from participating in public funding through listing on the stock exchange. This is where private equity investing, and the private equity market comes in to play.

Private equity is a broad term used to describe investment in non-listed companies, or companies that are about to be delisted. The private equity market primarily consists of, but not solely, firms called private equity firms. These firms, for the most part, seek to invest in non-listed businesses with the aim of applying their expertise to boost profits. The private equity firm will sell their stake for a profit (assuming they were successful) after buying the business or part thereof for a discount. Although these firms invest mainly in non-listed companies, they themselves may be listed on the stock exchange.

There are many investment strategies private equity firms can implement in their hunt for return on investment, but these strategies can be consolidated into three main categories:

- 1 Venture capital (VC)** – According to this strategy equity firms identify potentially profitable start-up enterprises. They provide the start-up business with the funding they require and once it has grown significantly, seek to sell their stake for profit, either publicly or privately. The stage of the business may range from Seed (infant stage) to pre-IPO (right before listing on the stock market).
- 2 Growth capital** – Here the private equity firm is called in by a well-established company with a proven business model to spur growth and profits through deploying financial and organizational expertise. They may do this for a fee as well as a stake in the business.
- 3 Leveraged/controlled buyout (LBO)** – In this strategy the private equity firm will seek to gain control of a company. They use this control to restructure the business, which they then sell-off for a profit. Sometimes the private equity firm will purchase a listed company with the aim of delisting them, making them more profitable, and then reselling them to the market.

## Public equity

When a company is more established it may seek to raise further capital by issuing shares on an exchange. The initial process of making shares available to the public is called an IPO, or initial public offering. The IPO is a process which encompasses:

- **Underwriting** – Selecting an investment bank that is willing and able to take on the risk of the share offering.
- **Regulatory filings** – Documenting and reporting all appropriate accounting, legal and financial data required by the overseeing regulatory body of the relevant exchange.
- **Pricing** – The issuing company and the underwriter determine an appropriate trade price.
- **Analyst recommendations** – Writing up of financial reports disclosing the company's potential for future profits.
- **Price stabilizing** – The underwriter seeks to influence the share price for a set period of time after the share is issued so as to stabilize the share price.

The above phases happen as part of the primary market. This market is where shares are purchased for the first time (from the issuing company) and sold to the primary investor. Once shares are sold on from the primary investor to other investors, these shares then form part of the secondary market.

Stockexchanges are the most visible examples of this secondary market.

The secondary public equity markets are connected via stock exchanges which allow investors from around the world to buy and sell parts of companies at will. Companies who seek to raise capital offshore can do so by listing their company shares on the stock exchange of the country they wish to raise capital in.

Sellers offer an ask price which the price is they are willing to part with their share for. Where these prices match for a certain share, a sale is made. In theory, buyers and sellers will adjust their price upward or downward to accommodate what the market is willing to pay for that share. Where the ask price (sell) exceeds the bid price (buy) this is known as a bid/ask spread. This relationship is an indication of the supply and demand forces at play for a share – the ask price indicates supply, and the bid price indicates demand.

There are different types of public shares available to investors, and the different types of shares hold different rights and obligations. Two main types are:

- 1 Preference shares** – These shares typically offer the holder first rights to dividend pay-outs, meaning holders of these shares are likely to receive dividends before common shareholders when they are issued. Preference shareholders will also have a senior claim over common shareholders should the company in question go bankrupt.
- 2 Common shares** – These shares are riskier because they are last in line to receive payment should the issuing company go bankrupt. However, common shareholders are allocated voting rights through their shareholding, meaning they are able to vote proportionally (according to the number of common shares they hold) on corporate policy, and elect the company's board of directors.

Today the stock markets trade with a daily traded value of just below \$200 billion. In the next module we'll take a look at the parties that influence these trades, as well as some important concepts that help us understand the industry.



### 3.2.3 Transcript: Equity Market Influencers

Now that we understand that the global equity market – forming part of the capital markets – has two primary components, namely private equity and public equity, we can start to look at the role-players within each. Both sub-markets ultimately have the same objectives. The first is to allow sellers to raise business capital in exchange for a portion of their company, and second is to allow buyers to obtain ownership rights in the company with the prospect of investment returns.

Let's take a closer look then at who the major players are in these markets, and how they influence global market activities.

#### **Institutional investors**

These are large corporations, asset managers, pension funds, insurance companies, commercial banks, and the like. These investors are large capital investors who pool funds either in cash or through mutual funds (entities who manage pooled investor funds on behalf of others, often in diversified investments instruments), who then buy up large, diversified investment positions on behalf of their members. The nature and mandate of the institutional investor determines the risk they are willing (and permitted) to take on. For example, a pension fund which invests other people's retirement savings is bound by certain investment criteria that restricts it from investing in high risk instruments.

#### **Investment banks**

Investment banks are the middle men of the financial world. Although they do not operate exclusively within equity markets their role is extremely influential. Investment banks are responsible for performing underwriting services, financial analysis, facilitating mergers and acquisitions, and brokering services. In an equity market context, investment banks are an integral part of initial public offerings (IPO), which is the transition of a company's equity offering from private to public.

#### **Institutions of oversight**

There are many overseeing bodies and regulatory authorities that are tasked with regulating how equity markets are run, how the instruments are created and traded, and how buyers and sellers participate in the market. These bodies may differ from country to country or they may form an international body. An example of the one such international body is the International Organization of Securities Commissions (IOSCO) whose members are made up of regional regulators.

Another form of oversight is carried out by public accounting firms who are tasked with some of the following:

- Auditing of company financial statements
- Tax accounting and consultancy
- Financial reporting
- Advisory services

These tasks all ensure accurate and transparent financial disclosure of a company's position, preventing a company from misrepresenting itself to potential investors.

## **Stock exchanges**

Stock exchanges (also known as bourses in non-English-speaking countries) are the conduit that connect global equity markets – and financial markets in general - to each other. They are the physical and digital market place for trading shares. A company must first meet a significant amount of financial, legal and administrative requirements before it can market its stock on a stock exchange. However, once a company has met the necessary requirements to have the share on an exchange, we say that their share is 'listed' with that particular exchange.

There are many exchanges worldwide, some large, some smaller. Not all exchanges list the same stock and some only list industry or region-specific stocks. If a multinational corporation (MNC) wishes to raise capital for offshore operations without wanting to send localized cash out of the country, it can choose to list its share on the offshore exchange in the region it operates in. For larger companies, this means that their shares are always being traded, as somewhere in the world at least one stock exchange will be open for trade.

Many modern-day exchanges offer share indexes which are views of specific sectors of stock allowing investors to analyze share prices according to a particular grouping, such as industry or size. The S&P 500 is a popular example – this index displays the market-value weighted average of the top 500 companies in the US. The S&P 500 groups share price by company market value (size), whereas an index like the Dow Jones Industrial Average measures share prices for the top 30 companies in the goods and services market (according to their size and industry).

---

These influencers help create, shape, manage, and guide the dynamic to-and-fro of stock trading, bringing together willing buyers and willing sellers and facilitating prices both are willing to pay. These role players are the cornerstone of the global equity markets and neither can function without the other.



## 3.2.4 Notes: Key Concepts in Equity Markets

Before we progress any further it's important to address some key concepts, terms and jargon often heard when speaking about the stock market. Once we have an understanding of these terms we'll move on to how to value a share.

### Bull market

A bull market (or bull run) is a market concept not solely applied to the stock market but has its origins in it. Bull markets refer to a period of time in equity markets characterized by market optimism, during which stock prices increase, trade volumes improve, and general market sentiment is positive. Informally speaking, a bull market is a 20% upturn in stock or market prices over a period. As of the first quarter of 2018, we are currently in the second longest bull market of the last 100 years, eclipsed only by the bull run which started in October 1987 and ended in 2000 with the dotcom bubble bursting. Generally speaking, a bull market ends when prices plummet more than 20% against their peak.

### Bear market

A bear market is essentially the opposite of a bull market. Here stock markets experience downward trending prices. Markets are more depressed and economic activity becomes stunted. Bear markets can be lengthy, but historically are shorter than bull markets.

### Earnings per share (EPS)

This is a method of assessing a share's worth in relation to the company's earnings. This concept is extrapolated to all shares outstanding (all common shares in circulation), which gives investors an indication of the company's value. EPS is calculated as follows: (Net income – preferred stock dividends)/shares outstanding.

### Price-to-earnings ratio (P/E)

The price-to-earnings ratio is a widely used calculation used to determine what investors are willing to pay for a share in relation to the earnings accrued to that share. The P/E ratio is calculated by dividing the current share price by the company's EPS. To illustrate this, imagine a company's shares are currently trading at \$100 per share, this company has 1 million shares outstanding (shares in circulation), and recently posted a profit of \$10 million.

EPS can be calculated by diving the profit by the number of shares outstanding (\$10 million/1 million shares) which means EPS equals \$10 per share. Now, the P/E ratio can be calculated as \$100/\$10 which equals 10. This means investors are willing to pay ten times earnings for a share in the company. A higher P/E ratio against those of similar companies indicates that investors are expecting higher future earnings, and the opposite for a low P/E.

## **Moving average**

A moving average is a technical way of analyzing the price of a share over a given period of time by comparing its current price to its trailing average share price. A 50-day moving average aggregates the share price over a timeline of 50 trading days and compares that price to the current price of the share. If the moving average is lower than the current share price, then an investor may decide to sell the share as it is higher than the trend. If the moving average is higher than the current price then an investor may want to buy the share, as it is currently trading at a discount against the trend. Moving averages are a type of technical analysis method often used by traders.

## **Volatility**

Volatility is a statistical measure that investors use to measure a stock's risk. They do this by analyzing the standard deviation, or variance in relation to the share's mean price and then plot that deviation. Simply put, volatility is a measure of the rate of price movements a share experiences. Higher volatility means the price of a share is more prone to price fluctuation. The primary market index which plots this is called the VIX (volatility index).

## **Alpha and beta**

Alpha and beta are risk measures which seek to gauge a share's risk according to benchmarked values.

Alpha refers to a portfolio managers ability (or inability) to outperform a similar share or benchmarked return. For example, if an investor expects a share to return 5% per annum based on various market risk and stock market factors, and the share returns 8%, then the alpha is considered to be the 3% difference between expected and actual returns. This is often a measure of a portfolio manager's value add.

Beta (or beta coefficient) is a risk measure which uses a 'baseline' of 1 as an indicator of its price in relation to a benchmark (usually the market).

For example, if a share's beta is 1.2 it means the share has moved 120% in relation to the market's 100% move, thus it is more volatile than the market average. A beta of 0.7 means the share price moved 70% in relation to the market price movement, and it is therefore less volatile.

## **Fundamental analysis versus Technical analysis**

When it comes to styles of investment analysis, there are two general approaches investors can choose between.

The first is known as fundamental analysis whereby the investor takes a 'bottom-up' approach to assigning value to a company's stock. Here the investor analyses company financial statements, management teams, corporate structure, and business model amongst others, in order to determine the company's intrinsic value. The analyst or investor will forecast future cash flows and discount that value into a current value. This value is then converted into a share price.

The investor will therefore determine if a stock is selling at below, above or at fair value. If the reflected share price is lower than the investor's fair value estimate, then the share is deemed to be trading at below fair value and would be an attractive investment option. Where a share is trading above fair value the investor may see this as over-priced.

Technical analysis is known as a 'top-down' approach to investing. This is because analysts and investors are more interested with share price trends than the true underlying value of the company and share. Here, investors will use charts, indexes, and statistical metrics to forecast potential changes in share price, which they seek to capitalize on by selling, buying or holding their investment position.

Understanding these concepts now lays the foundation for us to explore various techniques for valuing a stock and some of the more prominent models used in the industry.



## 3.2.5 Transcript: Trading and Investing

Since we're interested in the equity markets, it stands to reason that activities that have a material effect on the movement of these markets deserve some attention. For this reason, we'll be using this section to assess the differences between technical trading and value investing.

### Trading and technical investing

Trading – in the equity market context - refers to the activity of buying and selling shares primarily based on statistical share price analysis or the analysis of volumes traded. Traders seek profit by analyzing share price and volume trends, and buying or selling according those metrics.

Some key concepts in this approach, also called technical analysis, are:

#### Support and resistance levels

Traders believe that share prices fluctuate within a minimum to maximum price range; and that prices which breach either end requires significant change, related to the market or market psychology. The minimum level is called the support, and the maximum is called the resistance.

#### Trends and swings

Traders take advantage of the likelihood for prices to remain more or less in the same trend pattern unless some significant external factor acts against it. For example, where a company is experiencing an upward trend in its share price, that trend should remain upward facing unless and until another external factor, such as poor financial results cause it to buck the trend.

#### Market psychology

Technical analysts understand that markets do not operate in a vacuum, and that share prices can move significantly based on nothing more than the perception of negativity or positivity. It's this concept that often leads to panic sell-offs in the stock markets. Negative sentiment will grow to a point of critical mass until a sell-off occurs that significantly undervalues the shares. The same is true about stock market bubbles. The dotcom bubble (and cryptocurrency bubble more recently) were clear indicators that participants feed on the optimism of others in the market, which can override the reality of the situation and therefore lead to inflated share prices that have very little to do with the true value of the share.

## **Value investing**

An investor (by which we mean a value investor) seeks to maximize returns by understanding the underlying value of a share or company. Their share buying or selling is less frequent and longer-term in scope. For the fundamental investor, share price movement is only significant where it is material enough to move the share above or below its determined fair value price.

## **Differences between the technical and value investing**

**Time horizons:** traders usually hold for much shorter periods of time, because their profits are derived from quick reactions to market movements, whereas value investors seek to hold their stock for longer periods of time to capitalize on dividend payouts and capital gains (increasing share price over time).

**Focus:** traders use past trends to analyze current price movements. This means their focus is primarily backward looking. Value investors are primarily forward looking as their valuations concern future cash flows, and future price growth.

**Data sources:** Traders and technical investors will source their data for decision making from numerous technical charts. Value investors, however, analyze financial statements as their primary data source.

**Risk:** due to the nature of trading, participants are usually exposed to higher risk and higher reward. Since traders are frequently buying in and selling out of their investment position, and because they need to be very quick with their decision-making, they are more prone to higher fluctuations in gains and losses. Value investors, although they are more exposed to high-risk events due to their longer-term investment horizon, also have the benefit of recovery time. They do not frequently sell-out or buy in to positions which minimizes their potential for capitalizing on share price spikes, but also reduces their risk on the downside.

Each participant must choose their preference. Evaluating one's risk appetite, investment timeline and desired return on investment are fundamental in choosing the best approach.



### 3.2.6 Notes: Equity Valuation Techniques

We now know the answers to the 'why', 'who' and 'what' questions - why buyers and sellers partake in the equity markets – the 'why'; who the main influencers in equity markets are – the 'who'; and some important terminology – the 'what'. Now let's look at the 'how'. The 'how' question we'll be exploring relates to how investors decide what a share is worth, and therefore what they should buy or sell it for.

Valuation is foundational in any market as it explains the extent to which participants are willing to pay (or not pay) for potential profit, and what stock issuers are willing to accept in order to raise capital for business concerns. This is the financial market in its essence.

Below we will unpack some of the more foundational valuation techniques. It is important at this point to understand that there are numerous valuation techniques – most of which we cannot cover in this course.

#### **WACC and the cost of equity**

Like most things in business, equity has a cost. If you're an investor, the cost of equity is the rate of return the issuing entity pays on your equity investment for the risk that you take by owning that share. As you may remember the riskier an investment is seen to be, the higher the required return is for investors to compensate them for that risk. If you're an issuer then the cost of equity is the return markets require on your share, and therefore the return required for the company to raise capital. Where this cost is higher than the cost of raising capital through debt channels, a company may opt not to pursue equity capital, and instead raise funds through debt.

Firms can calculate their average cost of raising capital by multiplying their cost of debt and their cost of equity by the weighted proportions of each and summing them. This is known as the weighted average cost of capital (or WACC, pronounced 'whack'). WACC is useful because it shows the minimum value (rate of return) a company is required to earn in order to create value for investors. For investors, WACC indicates the rate of return their investment needs to beat in order to continue creating value in the company.

#### **Net present value (NPV)**

Net present value is a model for calculating the value of a project, asset or investment based on the forecasted future cash flows, minus any outflows, the project or investment will earn; and discounting those amounts back to a

present-day value. This method uses a time-value-of-money approach which assumes that money is either worth less (in an inflationary environment) or more (in a deflationary environment) over time.

For example, if we were to assume that an investment would generate \$1000 per year for 3 years starting at the end of year one, with a \$500 initial capital outlay, in an inflationary environment where inflation is 5% per annum, then the NPV would be calculated as follows:

$$NPV = -C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3}$$

Where:

$C_0$ = Initial investment

$r$  = Annual effective rate for discounting /Rate of return

$C$ = Cash flow

We can now calculate the NPV as:

$$NPV = -\$500 + \frac{\$1000}{1.05} + \frac{\$1000}{0.5^2} + \frac{\$1000}{0.5^3} = \$2223.27$$

Note that we are only taking inflation into account in this example, whereas we could also include the current interest rate term structure in the rate we are using for discounting.

From this we see that even if it looks like we should earn \$3000 from operations, when we take the initial capital outlay (\$500) and the effects of inflation on our profit into account, we are left with a Net Present Value of \$2223. If we were offered the investment opportunity at \$3000 we'd likely turn it down, however if we were offered the investment for \$1500 we'd likely accept the terms based on returns from forecasted future earnings.

The NPV method is foundational to fundamental analysis, as it forms the basis of many other more comprehensive valuation techniques, such as discounted cash flow modelling. This is because when valuing a company, the fundamental investor considers the projected net cash flows of the company, and discounts them to a present-day value that they then use to derive an intrinsic company value from. This intrinsic value is then compared to the company's share price, which the investor then uses to make a buy/sell decision.

## **Dividend discount model (Gordon Growth Model)**

The dividend discount model is a method for valuing a share (assessing the attractiveness of its market price) by discounting its forecasted dividend payments to a present-day value – it is essentially the NPV method in relation to dividend payouts. The DDM is calculated as follows:

$$\text{Price per share} = \frac{D_1}{(r-g)}$$

Where:

$D_1$  = the estimated value of the next period's dividend

$r$  = the cost of equity

$g$  = the expected constant dividend growth rate

This formula is known as the Gordon growth model and is one of a few variations of dividend modelling. It has some weaknesses, as does any valuation model that uses forecasting. The first being that it assumes a perpetual dividend – which in reality will not be the case. The second is that it is very sensitive to changes in relation to its inputs. Meaning, any changes in one of the three variables could see a significant change in the forecasted value.

## **Discounted cash flow (DCF)**

The discounted cash flow technique is a popular technique among qualitative, fundamental analyst investors. It's one of the most reliable valuation techniques used in deriving the intrinsic value of a business. This is primarily because this model relies on free cash flows of the business as an indicator for future growth, which is considered more reliable than balance sheets or a statement of financial position, which may be subject to accounting manipulations.

Simply put, the DCF approach seeks to value a company by forecasting its future cash flow, then using net present value to discount them to a present-day value. However, it's not quite as simple as that, as it factors in many other variables, including but not limited to: the cost of debt (combined with the cost of equity to derive the weighted average cost of capital or WACC), the risk-free rate of return (what the 'riskless' investment rate of return is – i.e. the rate of return on a US Treasury bill), the corporate tax rate, and the equity beta coefficient, terminal value.

---

## **Conclusion**

These are only a few of numerous valuation techniques investors use to assess whether a share, and therefore a company, is worth investing in. The valuation technique chosen is determined by the inputs and outputs the investor/analyst places a large emphasis on, as well as the information available to them. It is therefore critical to understand your investment objectives and priorities before choosing a technique. The intelligent investor should assess the context of the asset they wish to value, then assess the valuation technique that best fits this context. In simple terms, use the valuation technique(s) that assesses what you as investor place the most value in.



## 3.2.7 Transcript: Types of Equity Risk Exposure

The risk of loss is all encompassing in the financial markets. It always exists and affects all markets, industries, instruments and market participants – equity markets are no exception.

Equity markets are exposed to many different types of risk, the most influential of which we'll explore here.

### Valuation risk

Valuation of an asset or investment is the investor's best estimate of its worth based on the information available to them. In many valuation models, assumptions need to be made due to imperfect information. These assumptions – as we've seen in the previous module – can concern company cash flows, risk, dividend payouts, financial stability and so on. Where this information is inaccurate or incomplete (which it always is in reality) investors expose themselves to risk of loss.

Some argue that private equity investors have a greater exposure to valuation risk to public equity investors because of the relative lack of information available to them. This is because public equity investors have the benefit of regulations which force listed companies to disclose important financial information, allowing for more readily available data when making investment decisions. Private equity investors do not have this luxury, and according to this case, it is expected that private equity investors should be compensated for the greater risk involved.

### Reputational risk

Companies have an obligation to the communities they operate in, and the market they serve. Where firms are not seen as acting in the best interest of these stakeholders, their reputation, and therefore value may take a hit as a result of distrust, or clients looking to 'punish' them by abstaining from their goods and services. If the action or inaction from the company in question is severe, it may also suffer penalties from regulators, which will have an impact on bottom-line profits.

### Liquidity risk

Liquidity is a concept we've mentioned before which you may remember refers to the ability of an investment to be converted to cash quickly. In private equity, liquidity risk is a very real threat, as it is much harder for private equity investors to offload their investment in relation to changes in a company's fortune.

Liquidity risk also exists in public equity, particularly during times of high volatility where investors and traders may seek to make quick buy or sell calls based on price movements. When stocks' values crash investors flock to sell out of their stock positions, but traders aren't always able to match sell-side instructions with the buy-side. Most stock exchanges also have breakers built into them which halts trade if daily sell-offs exceed a certain percentage. This causes investor's money to be locked in for longer, rendering it temporarily illiquid.

## Risk-free rate and market risk premium

As I hope everyone remembers - risk is everywhere and it is inescapable, however the total absence of risk exists, albeit in theory. There is a theoretical concept called a risk-free rate, which is the rate of return an investor should expect to earn if there is no risk associated with holding an asset/investment for a given period. This risk-free rate is useful as a basis for determining the risk, and therefore rate of return in a given market. A government bond is considered a risk-free instrument and therefore the risk-free rate is often equal to the interest rate of these bonds – although this may not be the case where the country is unstable. For example, if the interest rate on a US Treasury bill is 1.65%, then the risk-free rate of return is considered 1.65%.

If we know an investor's expected return, we can then use the risk-free rate to determine a market's risk-premium – which is the rate of return investors demand for the risk they accept when investing in the market. We do this by using the following calculation:

$$\text{Market Risk Premium} = R_m - R_f$$

Where:

$R_m$  = Market/investor rate of return

$R_f$  = Risk-free rate of return

Therefore, if the market or investor expects to earn an 8% ROI and knows that a US T-bill offers an interest rate of 1.8%, the market risk premium will equal 6.2% (since  $8 - 1.8 = 6.2$ ) This means the market and investors expect a return of at least 6.2% in order to compensate them for the risk they are exposed to in a particular market or equity.



### 3.2.8 Notes: Managing Risk

The intelligent investor understands that risk of loss is unavoidable in equity markets and therefore seeks to manage this ever-present risk instead of fleeing it (and seeking potential profits). In this final section we will take a look at some prominent risk management approaches as they relate to equity. In this case, when we speak about managing equity risk we mean from the investor point of view, not the not issuer's. An equity issuer will manage risk from a cost of capital and revenue perspective to ensure that their equity issuances extract the required funding at an affordable rate. This is out of scope for this module.

The risk mitigation strategies below incorporate both technical and non-technical approaches, both of which can go a long way to protecting one's investment from losses.

#### Sound valuation processes

Establishing a firm's fair value – their intrinsic worth valued at a present-day price – is critical for managing risk. It has the added benefit of being a pre-investment activity, meaning the investment is not yet locked-in. This gives us time to evaluate important company and market data, at a micro and macro level, which is one of the best ways to mitigate the risk of investment loss for a few reasons. These include:

- Understanding the true value of a firm gives an investor confidence to ride out share price volatility, and share price downturns,
- Understanding the micro and macro business environment helps the investor understand which market changes pose serious threats and which do not,
- A well-established valuation process allows investors to sift through a myriad of companies to find the best, often overlooked opportunities, and
- Where investors find below-fair-value shares, they can reduce their risk even further by only investing in those shares that are well below fair value. The more discounted a stock price is compared to fair-value, the less likely the risk of loss.

#### Dollar-cost averaging

Once an investor has their pick of share(s) they can choose an all-in approach or a phased approach to buying them. If the investor expects price volatility in the coming period, or a price downturn, they may choose a phased approach.

Dollar-cost averaging is once such way an investor can increase their holding position. In this approach investors buy more shares when stock prices are downward trending, and fewer shares when prices are trending upward.

Let's use an example: Imagine that you're an investor who fancies a particular share. You want to invest \$1000 per month and a total of \$6000 all-in in this share, but currently this particular share price has been in an upward trend and you're worried about eroding your future profits.

So instead you apply the dollar-cost averaging approach. Using this approach, you decide to invest the following way, using \$1000 per month:

#### Rising market

Month	Share price	Number of shares bought
April	\$20	50
May	\$25	40
June	\$28	35.71

#### Declining market

Month	Share price	Number of shares bought
July	\$18	55.56
August	\$12	83.33
September	\$10	100

This way, you're still increasing your holdings by \$1000 each month, but you maximize the number of shares bought when prices are lower, thereby creating greater value in your portfolio than if you bought all \$6000 worth of shares in April.

This is a good approach for investors with a longer-term investment time horizon.

## Diversification

Diversification is a powerful tool in spreading portfolio risk. In diversification, the old adage of "don't put all your eggs in one basket" rings true. Here the investor seeks to minimize risk by buying up different types of stock or other instruments. Let's look at a few different ways to diversify a portfolio of stock:

- 1 Company diversification** – This is where an investor seeks to minimize risk by buying shares from multiple companies within the same industry, or even with the same beta. For example, buying stock in the tech industry is less risky when you own multiple tech stocks instead of just one.
- 2 Industry diversification** – Buying stock across different industries reduces risk of loss in case an industry is hit with negative disruption (adverse policy, strikes, cyclical downturns etc.). If this happens performance from other industries may help prop-up portfolio returns. It may also be beneficial to buy up stock in counter-cyclical industries. For example, banking sector stocks may perform well in higher interest rate environments, whereas retail stocks may perform poorly. On the other hand, when interest rates are lower, retailers may perform well, and banks may perform poorly. To mitigate risk and smooth out portfolio returns the equity investor may seek to invest in both sectors accordingly.
- 3 Geographic diversification** – Stock markets and exchanges differ from country to country as they offer listings of companies that operate within that country. Geographic diversification seeks to minimize risk by spreading investment across stock exchanges so that assets aren't tied up in one country's stock market.

## Hedging

Hedging is the practice of buying stock (or other asset classes and instruments) that have a highly negative correlation to the current portfolio in order to offset losses. In simple terms, the investor buys stock that performs well when their other stock performs poorly. Having said this, one can also hedge by purchasing uncorrelated stock/assets classes which will reduce the portfolio risk, but not offset it altogether.

A common hedging strategy is using protective 'put options' to mitigate losses in unrealized profits. A put option is a contract that gives the buyer the right, but not the obligation, to sell the underlying asset at a specified price at a future time. In this strategy, the investor buys the put option with a strike price (the price at which the put option can be exercised) near the current stock price.

If the stock price declines below the strike price, the investor can exercise the option at its strike price, which means the loss is mitigated at the put option strike price level.

Here's an example to illustrate this. Imagine you bought a share worth \$100 a year ago, and that share has performed well, and now trades at a value of \$200. You now have an unrealized gain of \$100 – it's unrealized because you have not sold the share yet, so the profit is not cash in your pocket and can still be lost. However, things seem to be more volatile in the stock market at the moment, but you don't want to sell the share yet, because you think it will still appreciate further in the future. To manage the current market risk, you decide to buy a protective put option, for \$20. This put option has a strike price of \$150. In a scenario where your stock price declines from \$200 to \$80 you are able to exercise your put option at a price of \$150, meaning you paid \$20 to protect yourself from a \$120 share price decline (\$200 - \$80). In a scenario where your share price continues to appreciate the cost of the hedge is only \$20 (the cost of the put option).

There are numerous other hedging techniques which use all manner of instruments, but in principle the concept of hedging is the same – the investor seeks to pay a relatively small cost for the purpose of insuring their investment against a larger loss. In fact, this is true of all risk management strategies.