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1 Stocks and the Business Cycle

The first thing in the course is to cover a few essential concepts:
The **stock market** is the venue where investors buy and sell individual company shares, bonds, or other financial products. It aims to bring together both buyers and sellers effectively, especially through **price discovery**, a mechanism where prices adjust based on supply and demand. Investors rely on fundamental analysis of the business' health as well as technical analysis on price patterns and volume; as prices rise and fall, investors decide whether to buy or sell depending on their view of the company's future, market conditions, and other factors. Thus, the stock market acts as both a funding mechanism for companies and a wealth-building platform for investors.
From that idea, **stock exchanges** appeared. These are organised venues, often privately-owned, that receive buy/sell orders from broker-dealers, match such orders following their internal rules and systems, and confirm completed trades back to brokers. Exchanges set rules for who can trade and how and supports trading during their specific opening hours. All exchanges together form the broader stock market ecosystem.
Capital is anything that holds value and can be used to generate more value, such as cash, real estate, stocks & bonds, commodities, intellectual properties, and collectibles. It is essential to launch a business, invest in new assets, or funding growth and innovation. A major way in which companies raise capital is by selling shares to the public, essentially exchanging ownership in the company for money.
An **investor** is then an individual who puts capital into an asset expecting either profit (buy low, sell high), or income (e.g. dividends). For practicality purposes, they are often categorised in several groups:

- Active traders: those who make frequent trades to earn a living.
- Long-term investors: those who hold positions for years.
- Retirement savers: those who contribute to plans like MPF, 401(k), or IRAs.
- Institutional investors: institutions who often invest on behalf of others who don't have time, expertise, or in general prefer the expertise of professionals to manage risk. Some examples of these institutions are pension funds, asset managers, hedge funds, and investment advisors.

Onto **equilibrium**. It is the moment in which buyers and sellers agree on price and supply and demand are balanced. If there are more buyers than sellers, prices rise until new sellers enter. If the opposite conditions are true, more sellers than buyers, then the price will fall until new buyers appear. Individual stock prices often move with the overall market, because market-wide sentiment affects prices.
Risk is the probability that the value of capital increases or decreases; it is present in every investment. Usually, higher-risk investments may offer both a higher reward and a higher chance of loss. Risk is usually influenced by how established the company is, the quality of management, access to funding, the strength of its products, and in general how adaptable a company is to changes in the market. Understanding risk is essential for investors to make better decisions, set realistic expectations, and build suitable portfolios. A direct way in which one

can build such portfolios is by applying **diversification**: spreading investments across different assets to reduce risk. If you put all your eggs in one basket, you lose everything if that basket falls—if you distribute the eggs, a single failure won't leave you without a breakfast. One can diversify by spreading investment across companies, sectors, geographies, asset classes (stocks, bonds, property), risk levels, and yields. Diversification does not guarantee profit, but it does dramatically reduce exposure to any single failure.
An **index** is a benchmark that tracks the performance of a segment of the market. For instance, the **S&P 500** tracks 500 large U.S. companies and is commonly used as an indicator of the performance of the overall market. Investors usually compare their performance against an index to see whether they outperformed or underperformed the market.
Lastly, a portfolio is the total collection of everything an investor owns, such as stocks, bonds, cash, funds, property, and any other asset. A well-structured portfolio must spread investment across many types of assets and match the investor's goals (e.g. growth, income, safety).

1.1 The Business Cycle

The goal of most investors is to grow their portfolios at a rate that either matches or, even better, exceeds the returns of major stock market benchmark indexes. There are different approaches taken to realise this goal:

- Market Timers: they try to participate in the upside of the market and avoid as much downside as possible. Market timing is difficult in practice because predicting short-term movements is challenging.
- Stock Pickers: they try to outperform the market through superior stock selection, such as buying stocks that rise faster than the market during upswings and avoiding the ones that fall harder during downswings.

Both of these strategies depend on analysing companies and understanding our current position within the **economic cycle**.
The economic cycle, also known as business cycle, is the natural rise and fall of economic activity that an economy experiences over time. It represents the repeating pattern of expansion and contraction in indicators like outputm employment, income, spending, and production. This cycle typically includes six stages:

1. Early Recovery:
    - Triggers: Economic stimuli such as lower taxes or increased government spending; central bank rate cuts.
    - Effects: Businesses hire more workers, consumer confidence rises, housing activity increases, and growth turns positive.
2. Expansion:
    - Triggers: Central banks lower interest rates, which makes borrowing cheaper. Government also promotes stimuli for the economy like tax cuts and increased spending. Businesses keep on hiring more people due to rising demand, higher investment in housing, factories, and technology and consumer confidence improves.

- Effects: Rising GDP growth, falling unemployment, increased consumer spending and borrowing, upwards-trending stock market, business expand production, corporate profits improve, and inflation starts to rise gradually.

3. Peak: Often only recognised in hindsight

   - Triggers: Economy reaches full capacity and the labor market becomes very tight (low unemployment). Strong demand leads to rising inflation and central banks raise interest rates to slow overheating. At this moment, production capacity limits begin to appear.
   - Effects: Growth slows but remains high, inventories build up (indicating slowing demand), confidence slips, higher interest rates weight on borrowing. At this point, inflation peaks or accelerates, which also leads businesses to experience higher costs.

4. Contraction:

   - Triggers: High interest rates reduce borrowing and spending, demand weakens, businesses cut production due to rising inventories, consumer confidence keeps on declining.
   - Effects: Even slower GDP growth, hiring slows and some layoffs begin, consumer spending pulls back, corporate profits shrink, the stock market becomes volatile or declines, and early signs of recession may appear.

5. Recession:

   - Triggers: Two consecutive quarters of negative GDP. Tight financial conditions (e.g. high borrowing costs and strict lending), major drops in customer demand, and widespread corporate cost-cutting are worsened by a negative feedback loop of pessimism in which both customers and businesses retreat.
   - Effects: Significant increase in unemployment, sharp decline in customer spending, housing and investment activity both drop, stock market downturns may deepen, lower corporate profits and some may even fail. Central bank typically cuts rates to stimulate recovery and government may again introduce fiscal stimuli such as public spending and tax support.

6. Trough (Bottoming Out):

   - Triggers: Economic activity bottoms out, businesses stop cutting jobs, inventories are depleted, financial conditions become easier due to lower interest rates, and customer confidence stabilises.
   - Effects: Economy transitions from decline to early recovery. Hiring gradually resumes and customer spending starts to improve. Businesses also start investing again. At this point, the stock market typically starts recovering—which often happens before the economy as a whole visibly improves.

These stages are much easier to describe on paper than to identify real-time—economists usually even disagree on where the economy stands at any given moment. The timing and duration of

each stage of the cycle are unpredictable; however, understanding the business cycle can help investors choose sectors likely to outperform at different times.

A classic example is that, when the economy expands quickly, central banks raise interest rates to control inflation. These higher interest rates widen the yield curve (long-term rates rise relative to short-term ones) and thus banks benefit because they earn more from lending. Thus, in early-to-mid expansion phases, a savvy investor would invest in banks, insurance companies, and other financial-sector stocks. These sectors see profit grows as borrowing becomes more expensive and economic activity remains strong.
During periods of slowing growth or even recession, investors shifts towards defensive sectors like utilities and consumer staples like food or household goods. This is because utilities pay steady dividends, consumer staples remain in demand regardless of the times, and these industries generate relatively stable cash flows.

Economic cycles as described above occur as a result of millions of decisions by every stakeholder involved in the economy as a whole, such as households, firms, investors, and governments. These are influenced by larger factors like interest rates, consumer confidence, supply/demand conditions, global events, technological changes, government policy, or others. All of these macro and micro changes lead the economy to naturally move through alternating periods of strength and weakness.

1.2 Intro to Sector Investing

State Street's Select Sector SPDR (Standard & Poor's Depositary Receipts) ETFs divide the U.S. stock market into major economic sectors such as tech (XLK), financials (XLF), utilities (XLU), healthcare (XLV), consumer discretionary (XLY), amongst others. These ETFs allow investors to easily study the economy by sector, breakdown where market strength and weakness are happening, and tools to invest according to the business cycle. In general, ETFs can become building blocks to analyse sector rotation, economic cycle positioning, and portfolio diversification.

Remark 1.1. An Exchange-Traded Fund (ETF) is an investment fund that holds a basket of assets (e.g. stocks, bonds, commodities, etc), trades on an exchange like a stock, and allows investors to buy/sell shares throughout the day at market prices.
A single ETF may hold dozens or hundreds of companies, have generally lower fees than mutual funds, and have high liquidity due to them being traded on an exchange.

A resource that was introduced in this lecture was (*of course*) Interactive Brokers' *Trader Workstation*, which offers sector ETF information for free. When clicking on a given Sector SPDR fund symbol, TWS offers quote details, including price, market data, earnings, and valuation metrics as well as fund details, which include things like basic fund information, historical and projected sales, earning and dividend trends, performance data, valuation ratios, charted key metrics, top 10 holdings, among others. This snapshot can help one understand what drives each sector and how the sector behaves over time.
An important indicator, especially in the context of analysing business cycle, is that of **beta**. Beta is the measure of how sensitive an asset is relative to a benchmark, such as S&P 500 which has a beta of 1.0.

If a consumer goods ETF has $\beta = 1.4$, that means that when S&P 500 rises 10%, consumer goods tend to rise around 14%. Similarly, when S&P 500 falls 10%, this ETF tends to fall around 14%.

Beta is calculated over historical periods and is a dynamic value. It is a long-term relationship, so it is not exact on a day-to-day basis. Different sectors have different sensitivity to the business cycle; for example, sectors like tech, consumer discretionary, and semiconductors tend to be high-beta. This means that they tend to outperform when economic recovery begins and investor optimisim rises. On the other hand, sectors like utilities, staples, and healthcare are low-beta and thus known as *defensive*: when the economy slows and investors seek stability, these sectors tend to outperform.
A powerful tool for TWS mentioned in the vid was **virtual securities**, which are basically a non-tradable formula or expression that help investors visualise relationships between assets; they are not real financial instruments and thus are non-tradable. One could create for example XLF/SPY, financials divided by S&P 500 to understand whether the sector is outperforming the S&P 500 (increasing ratio) or otherwise. Virtual securities could also analyse stuff like $RealEstate/Utilities$, $Staples/Discretionary$, or $Technology/Industrials$ to easily identify where investors are rotating capital, which sectors are gaining/losing strength, or where we might be in the business cycle.

1.2.1 Select Sector SPDR ETFs

As mentioned before, the Select Sector SPDR ETFs divide the S&P 500 into 11 major economic sectors. Each sector ETF includes companies whose primary business fits that specific part of the economy. For instance:

- **Consumer Staples (XLP)**: These are companies producing essential everyday consumer goods, such as beverages, household products, food products, personal products, and even tobacco. XLP contains 33 companies and its demand tends to stay stable in all economic conditions.
- **Healthcare (XLV)**: These are companies that focus on medical products, services and biotechnology—including industries like pharmaceuticals, healthcare equipment, healthcare providers, and biotechnology. It is a defensive sector that tends to have a stable demand during recession. XLV contains 62 companies.
- **Real Estate (XLRE)**: Companies owning or managing real property, including real estate investment trusts. XLRE contains 32 companies with a heavy emphasis on property-owning REITs.
- **Communication Services (XLC)**: Companies that deliver media, entertainment, telecom, and internet services. It consists of 26 companies which are a mixture of traditional telecom and modern digital media.
- **Energy (XLE)**: Companies involved in oil, gas, and energy equipment. XLE is highly sensitive to global commodity prices and contains 29 companies.

- **Industrials (XLI)**: Companies that provide industrial goods, manufacturing, and services. It includes industries like aerospace, defence, industrial conglomerates, building products, construction, electrical equipment, and commercial supplies. It is the broadest sector, with 69 different companies, so it has heavy exposure to economic cycles.
- **Technology (XLK)**: Companies that produce software, electronic devices, and digital services. XLK has 68 companies and also includes semiconductors and storage & peripherals. It is a growth-oriented ETF, often having a high beta.
- **Consumer Discretionary (XLY)**: Companies that sell non-essential goods and services such as internet and direct marketing retail, specialty retail, hotels, restaurants, leisure, apparel, cars, and consumer durables. It has 63 companies and performs well when consumers have strong confidence and income.
- **Financials (XLF)**: Firms offering banking, insurance, and investment services. It has 67 companies and is strongly influenced by interest rates.
- **Materials (XLB)**: Companies that produce raw materials used in manufacturing and construction. It contains 28 companies belonging to industries like chemicals, containers, packaging, metals, mining, construction materials, and paper. It is sensitive to global demand and commodity cycles.
- **Utilities (XLU)**: Companies that generate or distribute electricity, gas, and water. It has 28 companies in industries like gas, water, and electricity. XLU is stable, defensive, and very dividend-oriented.

2 Fundamental Analysis

Fundamentals are the economic and financial characteristics of a company that describe how it makes money, how it operates, how much it grows, and how risky it is. They are the main things determining the price of the asset and normally come from the company's financial statements (e.g. income statements, balance sheet, cash flow statement) and from market data (e.g. price, exchange, market cap). They are kind of like a health check: a balance sheet, for example, can tell us what the company owns vs what it owes.
A fundamentalist analyses supply and demand by looking for three specific conditions within markets. The first one is deficit, whenever demand exceeds supply. Deficit is considered bullish and leads to higher prices. Surplus, the opposite of deficit, is when supply exceeds demand. Lastly, equilibrium, is when demand equals supply. Equilibrium is considered to be a neutral state with stable prices. Whenever you use a fundamental metric, ask yourself:

- Is the metric improving or deteriorating over time? (Trend)
- How does it stack up vs. similar companies in the same sector/industry?
- Is performance driven by real demand, durable advantages, or one-off factors?
- Is the balance sheet strong enough to handle downturns?

Let us go through some of most commonly-used fundamentals:

- **Intraday Price**: Today's real-time move up or down. Big moves on high volume can signal important events like earnigns or regulatory updates. Avoid overreacting to noise and check why it moved and whether it changes long-term fundamentals before acting on it.

- **52-Week High/Low**: The highest and lowest prices over the past 12 months. If the current price is near the 52-week high, it means the market is optimistic and the trend is strong—but you need to be careful of overvaluation. If it is near the 52-week low, it means the market is pessimistic.

- **Market Cap**: It is the company's size by equity value = Price $\times$ Shares Outstanding. Size tends to correlate with growth potential and risk; large caps usually indicate a more stable company with slower growth and lower volatility. The opposite is also true, with small/mid caps meaning a faster growth potential with a higher risk. Market cap is useful for picking appropriate peers for comparison of different companies.

- **Earnings per Share**: The portion of net income attributed to each share. One should check EPS growth over 3-5 years; steady growth means healthy business.

- **P/E (Price-to-Earnings Ratio)**: It is Price per Share$\div$Earnings per Share It says how many dollars investors pay for $1 of earnings. It is a core fundamental, since it basically says how expensive earnings are. A lower P/E can mean undervaluation or weak growth alongside quality concerns. A higher P/E can mean strong growth prospects or hype. In general, make sure to always compare to the company's own history, industry average, and growth rate.

  > A company growing EPS 20% per yr with a P/E of 22 might be reasonable; a company growing 2% per yr at P/E 30 is likely expensive.

  The **trailing P/E** uses the data from the past 12 months whereas the **forward P/E** uses analyst estimates for the next 12 months.

- **Gross Margin**: It measures how much of each sales dollar is left after direct production costs, calculated as Revenue - Cost of goods sold/ Revenue. Higher and stable gross margins indicate the company has stronger product economics; falling ones can signal rising costs or competitive pressure. They are different on an industry basis. For example, software has high margins whereas grocery retail tends to have low ones.

- **Operating Income (EBIT)**: The profit from core operations before interest and taxes. It shows the profitability of the actual business. If revenue rises but operating income does not, that may imply that costs are growing too fast.

- **Return on Equity (ROE)**: It is the net income divided by shareholders' equity. It measures how effectively management uses the capital of the owners, since it tells the profit generated per dollar of equity. A higher ROE tends to be good but one needs to make sure it is not inflated by high debt.

- **Return on Assets (ROA)**: It is the net income divided by total assets; basically it is the profit per dollar of assets. It matters because it shows the efficiency of all assets. The higher it is, the better the asset efficiency. In capital-intensive sectors, such as airlines and utilities, ROA tends to be lower than in asset-light sectors like software.
- **Debt-to-Equity (D/E)**: It is the total debt divided by shareholders' equity. The higher the D/E, the more leverage—which amplifies returns and risk.
- **Debt-to-Assets (D/A)**: The total debt divided by the total assets. It shows what portion of assets is financed by debt.
- **Free Cash Flow (FCF)**: It is the cash generated by operations after capital expenditures. Consistent positive FCF means there are high-quality earnings. For fast growers, temporarily low FCF can be okay if CapEx is building future earnings (e.g. data centres).

In general, when using fundamentals to evaluate a possible investment, avoid comparing across unrelated industries. Furthermore, do not ignore the cash flow; EPS can be *managed*, while FCF is harder to fake. Do not guide your decisions based on a single number like P/E; instead, combine metrics like quality, growth, valuation, and risk.

Balance sheets represent a company's assets, liabilities, and owners' equity. As the name implies, the values must balance; that is to say, the value of a firm's assets must equal the value of its liabilities plus the equity attributable to shareholders. Assets are those things the company owns that have value while liabilities and equity are claims against the value of such assets.

The method of reporting balance sheets has some standard characteristics. For example, more liquid and short term assets are listed first while less liquid and longer term claims are listed lower down. Cash is the most liquid of all assets and is used to pay bills and other obligations the company may have. Companies may put excess cash balances to work in interest bearing accounts or in marketable securities—as long as there is sufficient available cash to pay near term needs, most analysts feel alright about the company.

Accounts receivable represents what is owed to the company at the end of the period by customers for goods or services that have been sold but whose payment is yet to be collected. Investors want to be confident in the company's dominion over its own accounts receivable—a high level could mean the company has extended too much credit or that it's inefficient in collecting its debts. A low level, on the other hand, may indicate that sales are suffering due to tight credit standards and negative economic conditions.

Property is the only fixed asset that does not depreciate, while machinery and equipment do. Companies allow for depreciation over each period and report a net property and equipment value to reflect such erosion. Such losses appear in the accumulated depreciation account.

Items like goodwill or patents are intangible, but companies still need to measure them according to their reported value and, if necessary, record an impairment loss over time. Losses in intangible assets do not directly affect cash flow but create non-cash changes that impact earnings directly.

Liabilities, the debts the company holds towards its suppliers, creditors, and employees, are usually divided into current liabilities and long-term liabilities. The former are the ones whose maturity is of less than a year, while the latter includes those whose maturity is of more than a year. Current liabilities usually fall into the section of the balance sheet known as accounts

payable.
Accrued expenses are costs incurred but not yet paid, such as rent on property, interest on machinery, and employees' salaries. Income taxes payable is the amount set aside to pay for taxes at appropriate known rates on sales.
The **income statement** allows one to distill the operations of a company during a particular period in time into a single number of earnings per share. The income statement is standardised and meant to read from top to bottom in five steps:

1. Gross income
2. Operating income
3. Income before taxes
4. Income after taxes
5. Net income

3 Funds

A **mutual fund** is an investment product where the money of investors is pooled and invested in different assets, such as stocks, bonds, money market instruments, or others. The assets are then managed by a portfolio manager, who needs to choose which investments the fund buys or sells, manage risk, and try to meet the fund's overall objective (e.g. growth, income, stability). Each shareholder of a mutual fund owns a proportional piece of the entire portfolio, not individual assets directly. Profits and losses are then shared equally based on share ownership. There are several categories of funds based on the investors' goals and risk levels:

- **Equity Funds (Stock Funds)**: These are funds that mainly invest in stocks and thus have both higher volatility and higher potential for return. They are good for goals like retirement and wealth building.
- **Fixed Income Funds (Bond Funds)**: They invest in bonds like municipal bonds, corporate bunds, and mortgage-backed securities. They provide steady income and have a lower risk than stocks.
- **Money Market Funds**: They invest in low-risk, short-term debt instruments like treasury bills, certificates of deposit, and commercial paper. Their main purpose is that of capital preservation and general stability. Money market funds are typically used to parked cash and for short-term savings.
- **Balanced Funds**: A mixture of bonds and stocks to provide different levels of stability and room for growth.
- **Index Funds**: They track (i.e. mirrors the index composition to match its performance) a market index (e.g. S&P 500) and are usually passively managed.
- **Specialty Funds**: They focus on specific sectors or themes, like tech or healthcare. They have higher risk due to having a narrower focus.

- **Fund of Funds**

When a fund is **actively managed**, it means that the manager tries to beat the market's return by buying and selling frequently. This type of fund relies on research team and analysis, and thus has higher fees. **Passively managed** funds, on the other hand, simply track an index and change only when the index itself is adjusted. If a fund is **open-ended**, it means that there is an unlimited number of shares. Open-ended funds set their price once a day at market close. **Closed-ended** funds basically operate like stocks; they only issue a limited number of shares, prices fluctuate through the day based on supply and demand, and shares are usually purchased from other investors, not the fund.
Funds are popular investment options because they allow for easy diversification—a single fund can hold hundreds of stocks or bonds—provide professional management, and are convenient in that they handle issues like rebalancing, dividends, bond interest, trading, and reporting.

3.1 Funds in Practice

There are many channels for investors to purchase mutual funds: employer retirement plans, brokerage accounts, banks that offer investment products, and even directly from the fund company. Note that although one can place buy/sell orders anytime the New York Stock Exchange is open, mutual funds don't trade through the day like stocks or ETFs. Mutual funds are only priced once per day and use the price calculated after the markets close, usually at 4 p.m. ET. The price you get is called the **NAV** (Net Asset Value). Generally, NAV $=$ (Total Assets $-$ Total Liabilities) $\div$ Shares Outstanding.

> If in a fund, the assets are of \$50 million, liabilities of \$10 million, , and shares outstanding of \$4 million, the NAV is then $(50000000 - 40000000) \div 4000000 = 10$, so the daily price for buying or redeeming shares would be set at %10.

Mutual funds charge feeds that ultimately reduce the amount of money being invested or the money received upon selling. The first type of fee is **front-end loads**. Front-end loads are sales charges paid when you buy the fund. They are charged as a percentage of oyur purchase and reduce the initial investment amount. **Back-end loads**, also known as **CDSC** (Contingent Deferred Sales Charges), are the fees you pay when you sell shares within a certain time period. The fee percentage declines the longer you hold and disappear after holding for the required period. When you bought shares at different times, funds tend to use FIFO to determine which shares to sell first. **Short-term redemption fees** apply if shares are sold within a short period, typically 7 days to 6 months. These fees are directly charged by the fund, not the broker, and they discourage short-term or frequent trading to protect long-term investors. **12b-1 fees** are marketing and distribution fees, often used to compensate advisors. They are included in the fund's annual expenses and thus reduce the fund's annual returns. Similar to these, there are **management fees**, which pay for portfolio management, research, operations, and administration. Management fees are also included in the expense ratio of the fund and thus reduce the fund's return every year.