

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economic Theories



Master's Thesis

Approaches to common stock valuation

Rakhimjan Jarylgapov

© 2022 CZU Prague

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Rakhimjan Jarylgapov

Economics and Management

Economics and Management

Thesis title

Approaches to common stock valuation

Objectives of thesis

The main objectives of this master thesis are to examine the existing methods of valuation of common stocks, to compare the changes in the indicators of selected companies in several industries over time, especially including crisis periods. If it is successful, choose the best or develop a new approach to the valuation of shares that is optimal for potential investor.

The value of the price quotes per share of a particular company or fund is influenced by both the "numbers" of the balance sheet and financial statements, as well as the news background, market sentiment and the human factor. Thus, it is necessary to approach the solution of this issue, including with the soft systems methods.

During the analysis of historical data and indicators, it is planned to apply econometric models, to establish correlations of key parameters. Apply a systematic approach in assessing the structure and functioning of the market, establishing relationships between market participants and stakeholders.

Methodology

Methodology

1. Study the published literature on the topic of the work. To summarize the authoritative opinions on the valuation of stocks. Compare their results.
2. Analyze the historical data of a sample of company shares(including econometric analysis), compare the indicators of prices and parameters with the average for the sector. Identify non-convergence of the results with the theories of an efficient and competitive market, find exceptions.
3. Study the existing approaches used, including: Discounted Cash Flow Method, Constant Growth Dividend Discount Model, Free Cash Flow Model. Identify existing strengths and weaknesses. Combine the results.
4. To establish the relationship between events and the causes of irrational behavior of market participants at critical moments, using historical data. Try to derive a rough model of human behavior in the market. After reviewing the existing works on this topic.
5. Summarize the results of the work carried out.

The proposed extent of the thesis

60-80

Keywords

Stock valuation, stock market, trading behaviour, market indicators, corporate finance, investment, volatility

Recommended information sources

Brealey, Richard A., Stewart C. Myers, and Franklin Allen. Principles of Corporate Finance. New York, NY: McGraw-Hill/Irwin, 2006. ISBN 978-1259144387
Damodaran, Aswath. Investment Valuation: Tools and Techniques for Determining the Value of Any Asset. Investment Valuation. Hoboken, N.J.: Wiley, 2012. ISBN 978-1118011522
Damodaran A., Valuation approaches and metrics : a survey of the theory and evidence. Boston : Now Pub, Foundations and trends in finance, v. 1, issue 8., 2005. ISBN: 9781601980144 1601980140
Russell J. Fuller & Chi-Cheng Hsia (1984) A Simplified Common Stock Valuation Model, Financial Analysts Journal. Vol. 40, No. 5, pp. 49-56 ISSN: 0015-198X
Williams, J.B. The Theory of Investment Value. Harvard University Press, Cambridge, MA, 1983. ISBN 9781607964704

Expected date of thesis defence

2021/22 SS – FEM

The Diploma Thesis Supervisor

Ing. Pavel Srbek, Ph.D.

Supervising department

Department of Economic Theories

Electronic approval: 31. 12. 2021

doc. PhDr. Ing. Lucie Severová, Ph.D.

Head of department

Electronic approval: 8. 2. 2022

doc. Ing. Tomáš Šubr, Ph.D.

Dean

Prague on 09. 02. 2022

Declaration

I declare that I have worked on my master's thesis titled "Approaches to common stock valuation" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 30 March 2022

Acknowledgement

I would like to thank my supervisor, Ing. Paver Srbek, Ph.D., for his help, useful advices, patience and support. I appreciate his feedback that I received while working on the thesis.

Approaches to common stock valuation

Abstract

In this thesis, a study of absolute and relative valuation methods of ordinary shares is conducted on the practical valuation of shares of six companies representing the technology sector and the consumer goods sector. Three companies from the technology sector represent Intel, Qualcomm and Oracle, while Coca-Cola, Procter & Gamble and Estee Lauder companies, represents the consumer goods sector. The main purpose of this approach is to establish the fair value of the shares of each of the companies.

The thesis consists of two parts: a literary review of the existing literature on the research topic, and a practical part with the application of selected fundamental approaches to the valuation of common shares. The practical part consists of a three-stage approach to valuation, including a macroeconomic overview of the current state of the economy, an overview of the sectors to which the selected companies belong, as well as an absolute and relative valuation of stocks. Absolute valuation includes three discount models, namely: Discounted Dividend Model, Free Cash Flow to Equity Model and Free Cash Flow to Firm model. The results of the study obtained during the calculations are described and analysed in the Results and discussion section.

Keywords: stock market, common stocks, intrinsic value, stock valuation, Discounted Cash Flow, fundamental analysis, investment.

Přístupy k oceňování kmenových akcií

Abstrakt

V této práci je provedena studie absolutních a relativních metod oceňování kmenových akcií na praktickém oceňování akcií šesti společností zastupujících technologický sektor a sektor spotřebního zboží. Tři společnosti z technologického sektoru zastupují Intel, Qualcomm a Oracle, zatímco společnosti Coca-Cola, Procter & Gamble a Estee Lauder zastupují sektor spotřebního zboží. Hlavním účelem tohoto přístupu je stanovit reálnou hodnotu akcií každé ze společností.

Práce se skládá ze dvou částí: literárního přehledu dosavadní literatury k výzkumnému tématu a praktické části s aplikací vybraných základních přístupů k oceňování kmenových akcií. Praktickou část tvoří třístupňový přístup k oceňování, včetně makroekonomického přehledu současného stavu ekonomiky, přehledu odvětví, do kterých vybrané společnosti patří, a také absolutního a relativního ocenění akcií. Absolutní ocenění zahrnuje tři diskontní modely, a to: model diskontované dividendy, model volného peněžního toku do vlastního kapitálu a model volného peněžního toku do firmy. Výsledky studie získané během výpočtů jsou popsány a analyzovány v části Výsledky a diskuse.

Klíčová slova: akciový trh, kmenové akcie, vnitřní hodnota, oceňování akcií, diskontované peněžní toky, fundamentální analýza, investice.

Table of content

1 Introduction	13
2 Objectives and Methodology	14
2.1 Objectives.....	14
2.2 Methodology	15
Inputs determinants of valuation	15
3 Literature Review	18
3.1 Theory of investment	18
3.1.1 Investment and speculations	18
3.1.2 Efficient market theory and market psychology.....	19
3.2 Stock market.....	21
3.2.1 Common stocks.....	22
3.3 Valuation methods.	24
3.3.1 Fundamental approach.	25
3.3.2 Discounted Cash Flow method	26
3.3.3 Relative valuation	40
3.3.4 Technical approach	42
3.4 Sustainability.....	45
4 Practical Part	46
4.1 Selected sample of companies.	46
4.2 Fundamental analysis	47
4.2.1 Macroeconomic analysis.....	48
4.2.2 Industry analysis	54
4.3 Common stock valuation.....	61
4.3.1 Profitability analysis	61
4.3.2 Absolute valuation	65
4.3.3 Relative valuation	70
5 Results and Discussion	75
Conclusion	77
References	79
5 Appendix	Ошибка! Закладка не определена.

List of figures

Figure 1 Firm valuation structure	25
Figure 2 Enterprise valuation structure.	28
Figure 3: Equity valuation structure.	29
Figure 4: US Real GDP growth 2019-2021	50
Figure 5: US PCE and PCI Indexes (2019-2022)	52
Figure 6: Eurozone CPI index (2019-2022)	53
Figure 7: US unemployment rate	54
Figure 8: NASDAQ 100 Technology Sector 2012-2022	56
Figure 9: Six largest US Technological sectors' companies by Market cap.	57
Figure 10: Top US Technological companies by revenue.	57
Figure 11: S&P 500 Consumer staples historical data chart	59
Figure 12: US Consumer staples sector's largest companies by Marketcap	60
Figure 13: Gross profit margin	61
Figure 14: Return on assets	62
Figure 15: Return on equity	63
Figure 16: Payout ratio	63
Figure 17: Debt to equity ratio	64

List of tables

Table 1: Comparison of Common and Preferred stocks.	23
Table 2: Sample of selected companies.	46
Table 3: Projections of main US macroeconomic indicators.	49
Table 4: Growth rates estimation.	66
Table 5: Cost of equity using CAPM model.	66
Table 6: Weighted Average Cost of Capital	67
Table 7: Gordon growth DDM	67
Table 8: Multi-stage DDM	68
Table 9: FCFE estimation.	68
Table 10: Multi-stage FCFE DCF model	69
Table 11: FCFF Estimation	69
Table 12: Multi-stage FCFF DCF Model	70
Table 13: Price to Earnings ratio	71
Table 14: Price to book ratio	71
Table 15: Price to sales ratio	72
Table 16: Price to Free Cash Flow ratio	72
Table 17: ESG risk rating.	74

List of abbreviations

APT	Arbitrage Pricing Theory
APV	Adjusted Present Value
CAPM	Capital Asset Pricing Model
CapEx	Capital Expenditures
CEO	Chief Executive Officer
CF	Cash Flow
CFO	Cash Flow from Operations
CFS	Cash Flow Statement
COVID-19	Corona Virus Disease 2019
DCF	Discounted Cash Flow
DDM	Dividend Discount Model
D/E	Debt/Equity
EBIT	Earnings before Interest and Taxes
EBITDA	Earnings before Interest, Taxes, Depreciation and Amortization
EMT	Efficient Market Theory
EPS	Earnings per Share
ESG	Environmental, Social and Governance
FCF	Free Cash Flow
FCFE	Free Cash Flow to Equity
FCFF	Free Cash Flow to Firm
FOMC	Federal Open Market Committee
GDP	Gross Domestic Product
IS	Income Statement
IT	Information Technology
MPT	Modern portfolio theory
MV	Market value
NB	Net borrowings
NOPAT	Net Operating Profit after Tax
NOPLAT	Net Operating Profit Less Adjusted Taxes
NOWS	Net Operating Working Capital
OPM	Option pricing models
P/B	Price/Book
P/CF	Price/Cash Flow
P/E	Price/Earnings
PM	Profit Margin
P/S	Price/Sales
PV	Present value
RI	Rate of Investment
ROE	Return on Equity

SEC	Securities and Exchange Commission
S&P	Standard and Poor's
TAT	Total Asset Turnover
TV	Terminal Value
WACC	Weighted Average Cost of Capital

1 Introduction

The valuation of common shares is one of the main instruments on the stock market. Both financial analysts and experts, as well as ordinary investors, go through the stock valuation procedure. When choosing assets for the current portfolio, it is important to have an idea of the current price position of the company in question, as well as the stock market as a whole. Otherwise, it is possible to incorrectly assess the risks of the portfolio or buy an illiquid and unprofitable company stock at an inflated price.

In the theoretical review of this work, the fundamental theories of the stock market, investments and the basics of fundamental and, partially, technical analysis of ordinary shares were considered. The main methods of valuation of ordinary shares of the fundamental approach were analysed, namely: the discounted cash flow method (FCFE, FCFF and DDM) and the relative approach method. Their advantages and disadvantages were evaluated, as well as the features of their application. Usually, the purpose of these methods of analysis is to establish a fair share price for further solving the relevance of the acquisition of the asset in question in a specific period of time.

In the practical part, an analysis of a set of ordinary shares of American companies related to the technology sector and the consumer goods sector was carried out, including an assessment of external macroeconomic, price-forming factors

To date, there is a lot of criticism regarding the fundamental methods of valuing securities described above, but to this day, they are the basis for most investment analysts. The efficient market hypothesis, despite a number of assumptions found, has proved its validity and still has no worthy alternatives.

2 Objectives and Methodology

2.1 Objectives

The main purpose of this thesis is to apply certain methods of stock valuation to a set of selected companies, compare the results obtained and suggest a potential investment decision. In addition to fundamental techniques, consider aspects of technical analysis and behavioural finance, and determine their impact on the valuation process of common shares.

Research questions:

- Which approach to the valuation of common stock most accurately meets modern realities and is suitable for a potential investor?
- How psychological behavior of market participants affect the common stock pricing?

Objects of research:

- Common stocks of the companies, 2 sets:
 1. Coca Cola, P&G, Estee Lauder.
 2. Intel, Qualcomm, Oracle.
- Financial indicators, indexes and stock prices in the time series: Stock price historical data, selected sector's price change historical data, financial reports of considered companies, macroeconomic indicators of US economy etc.
- Commonly used fundamental approaches to common stock valuation, namely: Discounted cash flow method, Relative valuation method.

2.2 Methodology

The theoretical part consists of a review of books, scientific articles and publications from official sources. The methods of valuation of common shares, used in the practical part of this work, are considered in the literature under study.

The practical part provides an analysis of the financial indicators of the companies selected for the review, as well as the macroeconomic indicators of the economy of the United States of America and the indicators of the industries to which the selected stocks belong. In terms of evaluating the selected stocks, growth rates estimation methods, FCF, FCFE, DDM calculation, as well as basic multipliers for comparative analysis are used.

The collected data for the practical part includes annual reports of companies, historical data of key indicators, as well as reports of the Federal Reserve system on monetary policy.

Methodological tools

- Stock valuation using fundamental methods: Discounted Cash Flow Method.
- Comparison of common stocks based on financial ratios over time. (P/E, P/B, P/S etc.)
- Data set of 2012-2022 (10 years)
- Sources: yahoo.finance.com, Investing.com, Bloomberg.com,

Inputs determinants of valuation

Growth rates.

Formula 1: Sustainable growth rate of FCF

$$g = ROE * RI$$

Where

g – Projected growth rate of cash flows

ROE – Return on Equity

RI – Rate of Investment

Formula 2: Return on Equity

$$ROE = \frac{Net\ income}{Stockholder's\ equity}$$

Formula 3: Rate of Investment

$$RI = \frac{\text{Net income} - \text{Dividends}}{\text{Net income}} = \frac{\text{Retained earnings}}{\text{Net income}}$$

Formula 4: Dividend Growth rate

$$\text{Dividend growth rate} = \frac{\text{Dividend yield}_t - \text{Dividend yield}_{t-1}}{\text{Dividend yield}_{t-1}}$$

Formula 5: Free cash flow growth rate.

$$\text{FCF Growth rate} = \frac{FCF_t + FCF_{t-1}}{FCF_{t-1}}$$

Weighted average cost of equity

Formula 6: Weighted Average Cost of Capital

$$WACC = \frac{MV \text{ of debt}}{MV \text{ of debt} + MV \text{ of equity}} * r_d(1 - T) + \frac{MV \text{ of equity}}{MV \text{ of debt} + MV \text{ of equity}} * r_e$$

Where

MV – Market Value

T – Tax Rate

r_d – expected rate of return represented by Cost of Debt

r_e – expected rate of return represented by Cost of Equity

Formula 7: Terminal value

$$TV = \frac{FCF * (1 + g)}{(WACC - g)}$$

Where

FCF = free cash flow for the last forecast period

g = terminal growth rate

d = discount rate (which is usually the weighted average cost of capital)

Formula 8: Post-tax Cost of Debt

$$\text{Post - tax Cost of debt} = \frac{\text{Interest expense} * (1 - \text{Tax rate})}{\text{Total debt}}$$

Relative valuation inputs

Formula 9: Price-to-Earnings ratio

$$\text{Price to earnings} = \frac{\text{Stock price}}{\text{Earnings per share}}$$

Formula 10: Price-to-Book value ratio

$$\text{Price to book} = \frac{\text{Stock price}}{\text{Book value per share}}$$

Formula 11: Price-to-Sales ratio

$$\text{Price to Sales} = \frac{\text{Stock price}}{\text{Revenues per share}}$$

Formula 12: Price-to-Cash Flows ratio

$$\text{Price to Cash Flow} = \frac{\text{Stock price}}{\text{Operating cash flows per share}}$$

3 Literature Review

3.1 Theory of investment

Investments could be called as any activity aimed at obtaining a positive result in the future. Investments do not necessarily have to be of a financial nature, but as a rule, the term used in relation to making a profit. More precisely, the investment process might be described as following: - An investment is an investment of capital in a particular object of entrepreneurial activity in order to obtain a positive result or direct profit in the future.

There are several generally accepted types of investments divided by the object of investment:

- Real investment (investment in the purchase of real tangible and intangible property)
- Financial investment (acquisition of assets through financial instruments)

By the investing objectives:

- Direct investment
- Portfolio investment
- Real investment
- Non-Financial investment
- Intellectual investment

In our case, we are considering the Portfolio investment.

Portfolio investment is the holding of financial assets or securities for the purpose of making a profit or increasing the value of capital. Portfolio investing involves passive investment without direct participation in the activities of the asset or money management. Passive investment instruments can be both financial instruments and physical assets in the form of precious metals, art or real estate. Thus, the characteristics of portfolio investment can cover several types of investment.

3.1.1 Investment and speculations

Before proceeding to the consideration of types of securities, it is worth separating the concept of investment from speculation.

Contrary to popular opinion, the term "investor" does not apply to all persons engaged in activities on the stock market in one way or another. In the first half of the 20th century, it was believed that any activity related to the acquisition of shares are considered as a speculation, the only asset for investment were bonds.

As B. Graham (2006) pointed out, the investor in his activities inevitably uses speculative actions, but they have reasonable reasons. As a rule, when conducting a transaction, an investor makes an informed decision after conducting a thorough analysis, adhering to an investment strategy and having fundamental knowledge behind him. While the speculator earns on short trades, and rather, does things similar to gambling.

Leverage is also a distinctive feature of speculative actions. Buying assets with borrowed money, the speculator bets on their growth, otherwise he risks losing the invested funds and becoming a debtor of a larger amount. Downside operations are also speculative as they relate to short trades; derivatives trading also applies to them.

A more accurate statement sounds like "An investment operation is one which, upon thorough analysis promises safety of principal and an adequate return. Operations not meeting these requirements are speculative" B. Graham (2006).

3.1.2 Efficient market theory and market psychology.

It is, generally assumed that the market operates on the hypothesis of an efficient market, and that participants react to fundamental changes and macroeconomic events rationally. However, theory does not always have anything in common with reality.

Fama's investment theory (1970), which has the same implications for investors as the Random Walk Theory, is based on a variety of assumptions about securities markets and how they work. The assumptions include the premise that all information relevant to stock prices is freely and widely available, "universally shared" among all investors, which is crucial to the validity of the efficient markets hypothesis.

Price changes are always efficient since there are always a significant number of both buyers and sellers in the market.

The theory's main conclusion is that because stocks always trade at their fair market value, it is almost impossible to acquire cheap stocks at a discount or sell overpriced stocks for a profit. Neither professional stock analysis nor properly applied market timing tactics can hope to outperform the overall market performance. If that is the case, the only way for investors to outperform is to take on far more risk.

According to Fama (1972) the theory has three variants: weak, semi-strong, and strong, which represent three distinct expected levels of market efficiency.

- Weak form - the weak form of the Efficient Market hypothesis assumes that security prices represent all publicly accessible market information but may not reflect new information that is not yet publicly available.

- Semi-strong form - the theory's semi-strong form dismisses the utility of both technical and fundamental investigation. The semi-strong form of the EMH contains the weak form assumptions and extends on them by assuming that prices react quickly to any new public information that becomes available, rendering fundamental analysis useless for forecasting future price movements.

- Strong form - according to the strong form of the EMH, prices always reflect the entirety of both public and private information. This contains all publicly available information, both historical and fresh, as well as insider information. Even information that is not publicly available to investors, such as confidential information known only to a company's CEO, is presumed to be already reflected into the company's current stock price.

The behavioral finance partnership between finance and other social sciences has resulted in a significant increase in our understanding of financial markets. In his work, Robert J. Shiller (2003) concluded that it is critical to use the correct standards when assessing behavioral finance's influence so far. We should not expect market efficiency to be so blatantly incorrect that quick profits are always available. Market efficiency, on the other hand, can be horribly incorrect in other ways. Efficient markets theory, for example, may lead to significantly inaccurate interpretations of large stock market bubbles.

The theory is known as price-to-price feedback. When speculative prices rise, resulting in profits for certain investors, it may draw public attention, encourage word-of-mouth enthusiasm, and raise expectations for further price increases. The discussion focuses on "new age" theories and "popular models" that explain price hikes. As a result of this process, investor demand rises, resulting in another round of price hikes. If the feedback is not blocked, it may result in a speculative "bubble" after several rounds, in which high expectations for future price increases justify very high current prices. The high prices are not sustainable in the long run, as they are only high due to expectations of more price increases, and the bubble eventually bursts, causing prices to decrease.

The efficient market hypothesis assumes that when irrational optimists buy stocks, smart money sells, and when irrational pessimists sell stocks, smart money buys, effectively reducing the influence of irrational traders on market prices. Financial theory, on the other

hand, does not always assume that smart money is able to fully compensate the influence of ordinary investors. It is extremely important to keep in mind the documented shortcomings of the theory of efficient markets and maintain an eclectic approach in future research. While theoretical models of efficient markets have their place as demonstrations or characteristics of an ideal society, they cannot be used as accurate descriptions of real markets in their pure form.

3.2 Stock market

The Stock market (or Security market, Equity market) is an economic relationship between market participants in the circulation and issuance of securities. It is one of the main parts of the world's financial markets and has the function of an environment for attracting and distributing capital through the securities. The securities market is developing along with the real economy, but in recent years, its volume exceeds the real indicators of economic development.

First, a distinction should be made between primary and secondary markets. According to Teweles and Bradley (1998), the initial sale of securities from the issuing corporation, or other body, to the investor is called a primary distribution. The issuer uses the funds raised by the sale to expand production, further research, build bridges, and like. Any trade of a security subsequent to its primary offering is said to be a secondary transaction.

An example of a primary market may be an IPO of a private company or the issue of government or corporate bonds.

According to Allis, Michaelle and O'Hara (1999) the first issue of shares or entry into the market is called an Initial Public Offering or IPO. The IPO initialization process is also called underwriting. To do this, a private company requires the services of a specialized underwriter agent, which is an investment bank. The choice of an underwriter lies with the issuer and depends on its goals and the reputation of the agent itself, at the same time, the investment bank also carefully weeds out its clients to make a more profitable and reliable transaction. Thus, the initial public offering process involves a complex combination of the tasks of the company, the underwriter and the syndicate members. The completion of the process provides new capital for the firm and new investment opportunities for the public.

In the secondary market, there is a process of securities circulation between market participants. In this case, the issuers of securities are not involved in the current resale processes, and the law of supply and demand applies to the formation of the value of

securities. An investor or other market participant is motivated to make a profit or increase the invested capital from holding shares, in the form of dividends, an increase in market value or payments on debt obligations.

Private and commercial investors, investment and hedge funds, traders or speculators act as market participants. In addition, market participants include commercial institutions in the form of stockbrokers, portfolio managers and stock exchanges that act as intermediaries between the stock market and the investor, receiving commission profits for various services.

The development of stock markets and the growth of their popularity over time raised the issue of security, as markets often became the object of fraud against investors or the state. This led to the emergence of special commissions, whose shoulders were responsible for regulating activities on financial exchanges, and regulatory laws. An example of such commissions is the SEC, established in 1934 in the United States and performing its functions to this day. However, the question of the level of regulatory intervention in market processes and their consequences is still open.

3.2.1 Common stocks

Securities today presented in the form of a large variety of various financial instruments that can be divided into first-order or primary stock instruments, such as: commercial and government bonds of different maturity, shares of companies and funds issued to raise capital for commercial purposes, savings certificates, etc. and second-order stock instruments (or derivatives), which include: Futures, options, swaps, etc.

Primary securities are considered classic for investment purposes. Usually, instruments of this type do not have high level of profitability, but also, with some exceptions, do not carry high risks. In contrast to the above, secondary or derivative instruments are risky and require special knowledge and special training to operate it. It is generally believed that operations with derivatives are purely speculative, but sometimes the condition of the derivatives market can serve as a kind of auxiliary indicator for understanding market sentiment or forecasting.

Shares, in turn, are divided into common and preferred stocks.

As Wachenheim (2016) stated common shares are the most popular type of shares and are issued in a larger volume than preferred shares. Common stocks give the holder the right to share the ownership of the company; this gives the right to vote in the re-election of the

management of the issuing company, as well as in deciding strategic corporate policy issues. Another distinguishing feature of ordinary shares from preferred shares is the payment of dividends. While preferred shares have a guaranteed fixed rate dividend payout, common stock dividends have a floating share of a company's earnings and, under adverse circumstances, may be forfeited a stipulated payout. However, more often than not, over the long-term investment horizon, common stocks outperform preferred stocks in terms of returns.

Compared to preferred shares, common shares are more risky, the reason for this lies in the order of payments to shareholders in the event of bankruptcy of the issuer and its liquidation. Common stock holders are last in line for compensation after creditors and preferred stock holders.

Preferred shares are securities that give the right to a share of the company's ownership, but have fewer rights than ordinary shares. Lesser rights refers to no or limited voting rights in corporate governance. At the same time, owners of preferred shares have more rights to payments. Preferred stock has some of the properties of bonds in that it pays fixed payments and is sometimes considered as a cross between equity and debt. It is also worth noting that the issuing company can fully or partially redeem a certain issue of preferred shares at a predetermined time and price.

The table was made to sum up basic expressed features that distinguish common and preferred stocks.

Table 1: Comparison of Common and Preferred stocks.

	Common stocks	Preferred stocks
Ownership	Yes	No
Voting rights	Yes	No
Board Representation	Well represented, in control	Somewhat represented, rarely in control
Fixed Dividend	No	Yes
Dividend Payment Order	After debtholders and preferred stockholders	After debtholders
Dividend payment guarantee	No	Guaranteed

Source: own sources

Stocks fall into two categories: growth stocks and value stocks.

Graham (2003) Growth stocks are stocks whose value rises faster than the market average. At the same time, financial indicators can often indicate that the company is overvalued. Usually, the issuers of such shares have a certain advantage over their competitors; this may be a patent, the production of a highly demanded product or service, high technology, or legislative support for a particular domestic market. Another feature of this category of shares is their dividend policy. Since growth stocks are most often in the technology sector, most of their profits are reinvested in the development of the company, depriving shareholders of dividends or reducing their share to a minimum.

Value stocks are the opposite of growth stocks. Value stocks are stocks of established companies that are currently undervalued by the market. The profit indicators of these companies may show a temporary unsatisfactory result due to business restructuring, re-equipment of production or a change in strategic goals. It also happens that fundamental indicators do not affect the price of such shares at all, but by certain external factors, such as the news background, political and economic risks of the sector or region, or a scandal related to the company's management. Such companies may lag behind the market average and competitors, but over time, as they solve destabilizing problems, they will catch up with the market.

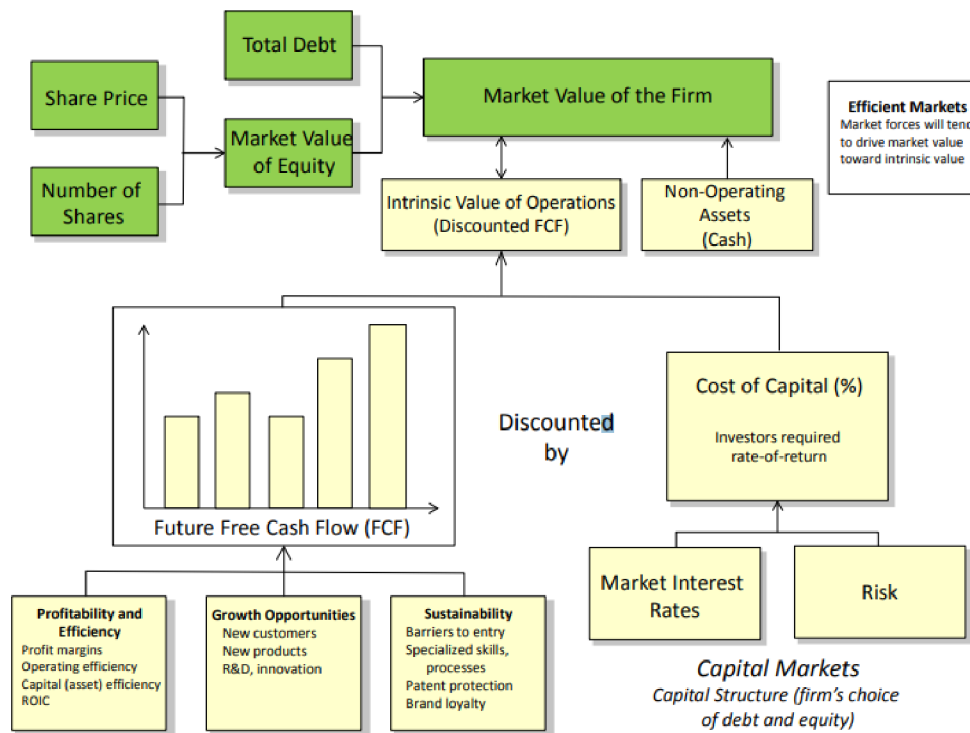
3.3 Valuation methods.

There are many methods for valuing common stocks. Conventionally, they are divided into fundamental and technical analysis. Fundamental analysis looks at real data about the company, its activities and the economic environment, determining the true value of the company and comparing the so-called multiples with the performance of similar firms or the average for the sector. The result of fundamental analysis for the investor is the verdict: is the company undervalued in the market, or, on the contrary, overvalued. In turn, technical analysis is based on the study of historical data on price changes of the asset in question, determining patterns and predicting future price changes. In technical analysis, it is assumed that price movements are driven by the psychology of market participants, which can be predicted. Technical analysis can be applied to any markets and assets, but its principles are suitable for assets that are more volatile.

3.3.1 Fundamental approach.

Damodaran (2006) The purpose of the fundamental analysis is to determine the intrinsic value of the company based on internal and external factors, financial statements, the state of the economy in the country and the state of the sector in which it operates. Thus, it is possible to obtain real estimated values that can be compared with the market value and determine whether the security is overvalued or, on the contrary, undervalued. One of the most famous fundamental analysts is Warren Buffett, the managing director and owner of a controlling stake in the Berkshire Hathaway holding company.

Figure 1 Firm valuation structure



Source 365financialanalyst.com

It is generally assumed that the market operates according to the efficient market hypothesis, which was developed largely thanks to the writings of Eugene Fama (1970). The essence of the theory is that the market always reacts to changes in price-forming factors, and, in the case of an event associated with a certain stock and a sharp price change, the activity of market participants over time will return the price to a fair one. However, there is a fact of market inefficiency in the short term, as the market needs time to "regulate". Thus, when an undervalued stock is detected, an investor has the opportunity to purchase an asset that is becoming more expensive.

According to Damodaran (1994) In general, there are three fundamental approaches to evaluation. The first is an estimate of discounted cash flows, which determines the ratio of the value of an asset to the present value of expected cash flows. The second is relative, comparing the prices of the associated assets relative to financial indicators, such as profit, book value, etc. The third uses option-pricing models that share common characteristics. In this paper, the first and second methods, respectively, will be considered and applied.

Fundamental analysis is a very complete method that necessitates a thorough understanding of accounting, finance, and economics. Fundamental analysis, for example, necessitates the ability to analyze financial accounts, an awareness of macroeconomic dynamics, and knowledge of valuation procedures. It largely forecasts future growth using publicly available data, such as a company's previous earnings and profit margins.

Fundamental analysis can be done from the top-down or from the bottom-up. An investor who uses the top-down technique begins his or her study by considering the overall health of the economy. An investor attempts to establish the overall direction of the economy and selects the industries and sectors of the economy presenting the best investment opportunities by examining numerous macroeconomic parameters such as interest rates, inflation, and GDP levels. Following that, the investor evaluates specific prospects and prospective opportunities within the identified industries and sectors. Finally, they examine and choose specific stocks from the most promising industries.

The bottom-up technique is another option. Instead of beginning on a bigger scale, the bottom-up strategy begins with an examination of individual stocks. The bottom-up approach's rationale is that individual stocks may outperform the industry as a whole. The bottom-up method focuses mostly on microeconomic indicators such as a company's earnings and financial measures. Analysts who take this method do a thorough evaluation of each organization in order to obtain a better grasp of its operations.

3.3.2 Discounted Cash Flow method

Damodaran (2005) The majority of our assets are purchased with the expectation of future cash flows. The value of an asset is determined by the predicted cash flows from that item, not by what someone thinks it is worth. Simply put, assets with larger and more predictable cash flows should be valued more than assets with lower and more unpredictable cash flows. The present value of an asset's predicted cash flows is used to calculate its value in DCF valuation.

The cash flow for each time period is reduced to its present value using the compound-interest term.

Formula 13: Present value of DCF

$$Value = \frac{E(CF_1)}{(1+r)^1} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \dots + \frac{E(CF_n)}{(1+r)^n}$$

Where

$E(CF_t)$ = Expected cash flow in period t

r = Discount rate reflecting riskiness of estimated cash flows

n = Life of asset

Working with time periods that extend to infinity while maintaining any kind of logic is extremely difficult in the actual world. As a result, when using the DCF technique to evaluate a corporation, the distant future is often integrated into a single number indicating the projected sale price (terminal value) at some relatively near point in time. As a result, if equation were to be terminated at time period t rather of continuing indefinitely, the formula would be altered as indicated in equation. Typically, we forecast 5 to 10 years of individual cash flows before estimating the value of the company at the conclusion of the time (TV $_t$).

Formula 14: Present value of DCF using TV

$$Value = \sum_{n=1}^t \frac{CF_n}{(1+r)^n} + \frac{TV_t}{(1+r)^t}$$

where

CF = cash flow

r = discount rate

n = time periods, time 5 1 to t

TV = terminal value.

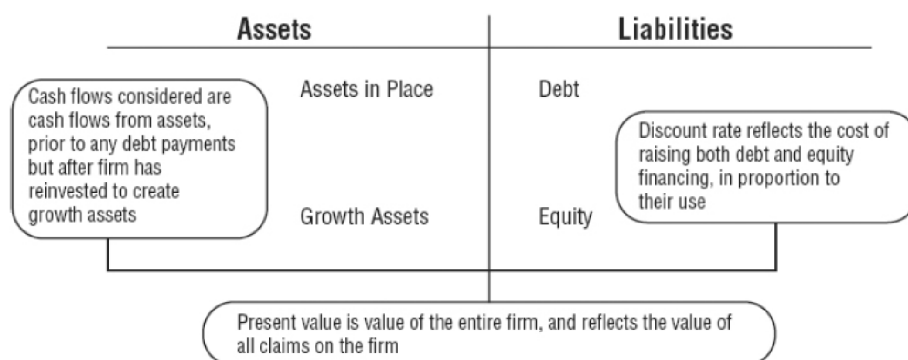
In the DCF framework, an asset's value is the present value of the asset's predicted cash flows. When it comes to valuing a business, this premise can be extended to say that the value of a firm is the sum of the values of the individual assets possessed by the company. While strictly valid, there is a significant distinction between valuing a collection of assets and valuing a firm. A firm or a business is a living entity with assets it already has and assets it plans to invest in the future. When we examine at a company's financial balance sheet, we can see this clearly.

A financial balance sheet is a great place to start when determining the differences between valuing a company as an operating entity and valuing it as a collection of assets. We must make the best decisions not only in terms of existing assets, but also in terms of projected future investments and their profitability when analyzing business continuity. While it may seem risky, expanding assets make up a significant portion of the market value of growing organizations. We focus on the available assets and analyze the value of each asset individually in an asset-based valuation. The value of a firm is calculated by adding up the value of its assets.

A liquidation valuation is a type of asset-based valuation in which we value assets based on the assumption that they will be sold in the near future. The value resulting from the valuation of individual DCF assets should theoretically remain the same, but the urgency associated with the rapid liquidation of assets may lead to a decrease in value. The discount amount will be determined by the number of possible buyers of assets, asset attributes and the state of the economy.

According to Larrabee and Voss (2012) There are two approaches to DCF valuation we can take. The first step is to appraise the entire company, including existing assets as well as potential growth assets; this is known as firm or enterprise evaluation. Free cash flows to the firm are the cash flows before debt payments and after reinvestment needs, while the cost of capital is the discount rate that reflects the composite cost of financing from all sources of capital.

Figure 2 Enterprise valuation structure.

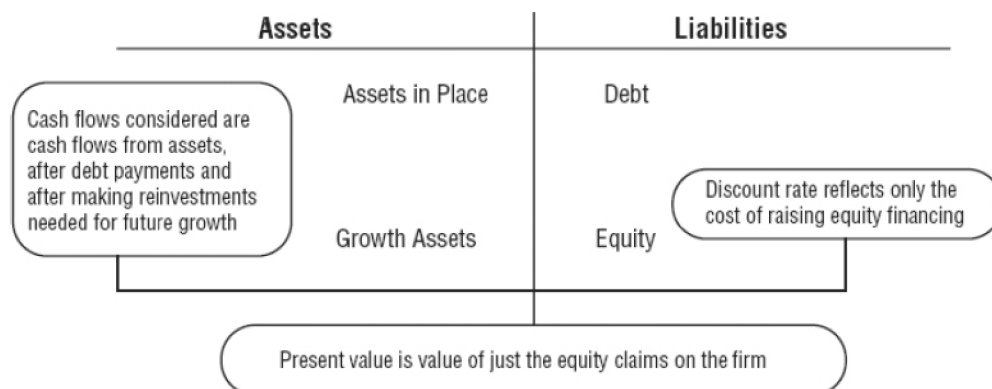


Source: Damodaran (2017)

The second method is to simply value the business's ownership stake, which is known as equity valuation. Free cash flows to equity are the cash flows after loan payments and

reinvestment needs, while the cost of equity is the discount rate that represents only the cost of equity financing.

Figure 3: Equity valuation structure.



Source: Damodaran (2017)

Advantages and limitation of DCF method

The DCF score may be the only method to acquire a closer estimate for true believers, although the benefits may be more subtle than they are ready to concede. On the plus side, a proper DCF analysis necessitates analysts' understanding of the firms they are reviewing and the ability to ask difficult questions about cash flow sustainability and risk. Discounted cash flow projections are created for people who believe in Warren Buffett's dictum that we should acquire underlying businesses rather than stocks. Furthermore, DCF valuation is fundamentally the polar opposite in that it forces analysts to focus on intrinsic variables that define value rather than market perception.

A DCF score may be the only way to get close to an estimate for genuine believers, but the benefits may be more subtle than they are ready to concede. On the plus side, a proper DCF analysis necessitates analysts' understanding of the firms they are reviewing and the ability to ask difficult questions about cash flow sustainability and risk. Discounted cash flow projections are created for people who believe in Warren Buffett's dictum that we should acquire underlying businesses rather than stocks. Furthermore, DCF valuation is fundamentally the polar opposite in that it forces analysts to focus on intrinsic variables that define value rather than market perception. As a result, DCF models are likely to find that stocks are overpriced if stock prices grow disproportionately relative to underlying earnings

and cash flows, while DCF models are likely to find that stocks are undervalued if stock prices decrease disproportionately.

When evaluating DCF, however, there are several limits. DCF calculations can be manipulated by sloppy analysts to produce value estimations that have nothing to do with intrinsic value. We also need a lot more information to use DCF models to evaluate the company because we have to predict cash flows, growth rates, and discount rates. Finally, if market perceptions outrun fundamentals, DCF models may indicate that every stock in the sector, if not the entire market, is overvalued. This creates a conundrum for portfolio managers and equity research experts who must discover stocks to buy even in the most overpriced markets. They can stick with their DCF calculations and decide that everything is overvalued, potentially putting them out of business, or they can adopt a more market-sensitive method. It's hardly surprising that many people choose for the latter option.

Estimating discount rates and risks

The discount rates employed in discounted cash flow appraisals should reflect the riskiness of the cash flows. The cost of debt, in particular, must contain a default premium or spread for the default risk in the debt, and the cost of stock must include a risk premium for equity risk.

Fabozzi and Drake (2009) Investors who purchase assets expect to generate returns across the time span in which the asset is held. Their actual returns over this holding period may differ significantly from their expected returns, and there is discrepancy between real and expected returns that creates risk. The variance or standard deviation of the distribution measures the spread of actual returns around expected returns; the higher the departure of actual returns from expected returns, the greater the variance. It is worth noting that in practice, expected returns and variances are usually approximated using previous returns rather than expected future returns. When we do this, we assume that previous returns are good predictors of future return distributions. When this assumption is violated, as when the asset's attributes have changed dramatically over time, historical estimates may no longer be good risk gauges.

Although there are several reasons why actual returns may differ from predicted returns, we may categorize them into two groups: firm-specific and market-wide. Risks stemming from firm-specific actions harm one or a few investments, whereas market-wide risks affect many or all assets. This distinction is crucial in assessing risk in finance.

While most traditional risk and return models in finance agree on the first three elements of the risk analysis process, they disagree on assessing non-diversifiable or market risk.

At the moment, the main method of determination in finance is CAPM.

Damodaran (2005) The CAPM formula is used to calculate an asset's expected returns. It is based on the concept of systematic risk (also known as non-diversifiable risk), for which investors must be rewarded in the form of a risk premium. A risk premium is defined as a rate of return that is higher than the risk-free rate. When it comes to investing, investors want a bigger risk premium when they take on more risky ventures. CAPM will be described in more detail in the FCFF method chapter.

The model considers the asset's sensitivity to non-diversifiable risk, commonly known as systematic risk or market risk in the financial sector and often represented by the quantity beta, as well as the market's expected return and the expected return of a notional risk-free asset.

The following is the formula for estimating an asset's expected return given its risk:

Formula 15: Capital Asset Pricing model

$$ER_i = R_f + \beta_i(ER_m - R_f)$$

Where

ER_i =expected return of investment

R_f =risk-free rate

β_i =beta of the investment

$(ER_m - R_f)$ =market risk premium

The excess return that investing in the stock market gives above a risk-free rate is referred to the equity risk premium. This extra profit compensates investors for taking on the additional risk of stock purchases. The premium size varies depending on the level of risk in a portfolio and also changes over time as market risk swings. High-risk investments are, usually compensated by a higher premium.

The CAMP is a remarkable model insofar as it capture an asset's exposure to all market risk in one number—the asset's beta—but it does so at the cost of making restrictive assumptions about transactions costs and private information.

Another way to model asset pricing is the Arbitrage pricing model. The arbitrage pricing model reduces these assumptions, requiring merely that assets with the same market

risk exposure trade at the same price. It allows for various sources of market risk and assets with varying exposures (betas) to each source of market risk.

Stephen Ross, an economist, created the arbitrage pricing theory in 1976 as an alternative to the capital asset pricing model. Unlike the CAPM, which assumes that markets are perfectly efficient, APT assumes that markets occasionally misprice securities before the market corrects and securities return to fair value. Arbitrageurs attempt to profit from any deviations from fair market value by using APT.

Formula 16: Arbitrage pricing model

$$E(R)_i = E(R)_z + (E(I) - E(R)_z) * \beta n$$

Where

$E(R)_i$ =Expected return on the asset

R_z =Risk-free rate of return

βn =Sensitivity of the asset price to macroeconomic factor n

E_i =Risk premium associated with factor i

Damodaran (2006) Some assumptions are shared by all three risk and return models. They all assume that only market risk is rewarded, and they calculate the expected return as a function of risk measurements. The CAPM has the most restricted assumptions about how markets work yet produces the model with the fewest inputs, with only one risk element requiring estimation. The APM makes fewer assumptions, but the model is more sophisticated, at least in terms of the parameters that must be estimated. The CAPM has the advantage of being a simpler model to estimate and employ in general, but it will underperform the richer APM when an investment is sensitive to economic factors that are not well reflected in the market index.

Dividend Discount Model

When investors buy shares in publicly traded corporations, they typically expect two sorts of cash flows: dividends during the holding period and a predicted price at the conclusion. Because future dividends determine this predicted price, the value of a stock can be described as the present value of dividends in perpetuity.

Formula 17: Present value of stock using DDM

$$\text{Value per share of stock} = \sum_{t=1}^{t=\infty} \frac{E(DPS_t)}{(1 + K_E)^t}$$

where

$E(DPSt)$ = Expected dividends per share in period t

k_e = Cost of equity

Expected dividends and the cost of equity are the model's two key input factors. We make estimates about future profit growth rates and payment ratios to arrive at the predicted dividends. The riskiness of a stock determines its necessary rate of return, which is assessed differently in different models: market beta in the capital asset pricing model (CAPM) and beta coefficients in arbitrage and multifactor models. When the temporal shift is caused by predicted changes in interest rates or risks over time, the model is flexible enough to take into account time-varying discount rates.

Let's start with the most basic model for valuing the stock of a growing company that pays out as much dividends as it can.

The Gordon growth model

The Gordon growth model ties a stock's value to its expected dividends in the future, the cost of equity, and the expected dividend growth rate.

Formula 18: Gordon growth model

$$\text{Value of stock} = \frac{DPS_1}{K_e - g}$$

where

DPS_1 = Expected dividends next year

k_e = Required rate of return for equity investors

g = Growth rate in dividends forever

The assumption that the growth rate of dividends will be constant over a long period of time has little to do with reality. The Gordon model can be used for firms whose profit growth is not highly volatile and can be calculated with an average annual value as constant.

In conclusion, the Gordon growth model is best suited for companies that grow at a rate that is comparable to or lower than the economy's growth rate and have well-established dividend payout policies that they aim to maintain in the future. Because stable enterprises

typically pay high dividends, the firm's dividend payout must be consistent with the assumption of stability.

Two-Stage Dividend Discount Model

The two-stage growth model distinguishes between two stages of growth: an initial phase in which growth rates are not stable, and a succeeding steady state in which growth rates are stable and expected to remain so in the long run. Although the initial growth rate is usually larger than the steady growth rate, the model can be used to assess organizations that are likely to have low or even negative growth for several years before returning to stable growth.

The cost of equity in the dividend discounting model is stated as:

Formula 19: Present value of two-stage DDM

*Value of the stock = PV of dividends during extraordinary phase
+PV of terminal price*

$$P_0 = \sum_{t=1}^{t=n} \frac{DPS_t}{(1 + K_{e,hg})^t} + \frac{P_n}{(1 + K_{e,hg})^n}$$

where

DPS_t = Expected dividends per share in year t

ke = Cost of equity (hg: high-growth period; st: stable-growth period)

P_n = Price (terminal value) at the end of year, where $n = \frac{DPS_{n+1}}{K_{e,st} - g_n}$

g_n = Steady state growth rate forever after year n

This method can be simplified if the extraordinary growth rate (g) and payout ratio are fixed for the first n years.

Formula 20: Simplified present value of two-stage DDM

$$P_0 = \frac{DPS_0 * (1 + g) * (1 - \frac{(1 + g)^n}{(1 + K_{e,hg})^n})}{K_{e,hg} - g} + \frac{DPS_{n+1}}{(K_{e,st} - g_n)(1 + K_{e,hg})^n}$$

Where g – growth rate during the high growth period.

The terminal growth rate (g_n) in this model is constrained by the same constraint as applies to the growth rate in the Gordon growth rate model. Furthermore, the payout ratio must be in line with the expected growth rate. The payout ratio in the stable phase should be higher

than in the growth phase if the growth rate is predicted to reduce significantly after the initial development period. A steady company might pay out more dividends than one that is rising.

Advantages and limitations of DDM

The dividend discount model has a number of attractive advantages with respect to free cash flows. DDM is popular among conservative investors due to its simplicity and clear logic. The investor needs to make fewer assumptions to predict dividends than in the case of free cash flows. When forecasting dividend payments, it is not necessary to take into account such parameters as capital expenditures, depreciation and working capital. In addition, the positive side of the dividend flow is a fixed rate, independent of not very significant fluctuations in cash flow.

However, the use of DDM has a number of problems. Using this method, we accept dividends as cash flows. Many firms can pay only a part of the money earned, leaving a certain balance in their own capital for further development. Thus, shareholders do not receive the entire share of the company's profits in the form of dividends, but the value of their invested capital increases in proportion to the company's capital, which the dividend discount model does not take into account.

On the other hand, there are companies that pay dividends that exceed their own cash flows. As a result, there will be a cash deficit and an increase in the debt burden, while according to the discount model the company will be highly valued.

Free cash flow to equity model.

The free cash flow to equity (FCFE) model is not that different from the standard dividend discount model. In reality, a free cash flow to equity model might be described as a model in which potential dividends are discounted, rather than actual payouts. As a result, the three versions of the FCFE valuation model given in this section are basic variations on the dividend discount model, with one major difference: the models replace dividends with free cash flows to equity.

$$\text{FCFE} = \text{NI} + \text{D} - \text{Capex} - \text{Change in non-cash WC} - \text{NDI} - \text{DR}$$

Constant growth model

The constant growth FCFE model designed to value firms that are growing at a stable rate and are in steady state.

Formula 21: Present value of FCFE

$$P_0 = \frac{FCFF_1}{K_e - g_n}$$

Where

P0 = Value of equity today

FCFE1 = Expected FCFE next year

ke = Cost of equity of the firm

gn = Growth rate in FCFE for the firm forever

Two-stage growth FCFE Model

The two-stage FCFE model is intended to value a company that is predicted to grow substantially faster than a mature company in the short term before slowing down.

Formula 22: Present value of two-stage FCFE

$$P_0 = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1 + K_e)^t} + \frac{P_n}{(1 + K_e)^n}$$

where

FCFE_t = Free cash flow to equity in year t

P_n = Value of equity at the end of extraordinary growth period

ke = Cost of equity in high-growth (hg) and stable-growth (st) periods

As an alternative to the dividend discount model, the FCFE model can be used. Because the two methodologies sometimes produce different estimates of equity value, it is interesting looking at when they produce comparable estimates, when they produce different estimates, and what the discrepancy informs us about the firm.

Free cash flow to firm model

After operating expenses, taxes, and any capital investments needed to achieve future growth in both fixed assets and working capital, but before financing expenses, the cash flows to the firm can be estimated.

$$FCF \text{ to firm} = EBIT(1 - t) - (\text{Capital expenditures} - \text{Depreciation}) \\ - \text{Change in working capital}$$

The value of the firm can then be written as:

Formula 23: Present value of FCFF

$$\text{Value of firm} = \sum_{t=1}^{t=n} \frac{CF \text{ to firm}_t}{(1 + WACC)^t}$$

Cost of capital approach

The value of a company is calculated using the cost of capital approach, which involves discounting the free cash flow to the company (FCFF) at the weighted average cost of capital. The tax benefits of debt (in the use of the after-tax cost of debt in the cost of capital) and the predicted higher risk associated with debt are incorporated into this value. The version of the model utilized will depend on future growth assumptions, just like the dividend discount model and the FCFE model.

We begin by valuing the firm rather than the equity as part of the cost-of-capital strategy. The value of the firm's equity is calculated by subtracting the market value of nonconformity claims from this estimate. The cost-of-capital approach argues that the cost of capital incorporates both the tax advantages of borrowing as well as the predicted costs of bankruptcy. Discounted cash flows are cash flows for a company computed as if it had no debt and no interest expenditure tax benefits. Despite popular belief that the capital cost approach necessitates the assumption of a constant debt ratio, it is flexible enough to allow for changing debt ratios over time. In fact, one of the model's strongest features is how easily changes in the financing structure can be accounted for utilizing the discount rate rather than cash flows in the valuation.

The notion that equity investors and creditors of a corporation are ultimately partners who give capital to the organization and participate in its success is the most novel and counterintuitive principle behind its valuation. In business valuation models, the key distinction between equity and debt holders is the nature of their cash flow requirements: creditors have pre-claims for set cash flows, whereas equity investors get residual claims for leftover cash flows.

A corporation that is growing at a pace that it can continue in perpetuity—a stable growth rate—may be valued using the stable growth model, just as it can be evaluated using the dividend discount and FCFE models.

Formula 24: Present value of FCFF

$$\text{Value of firm} = \frac{FCFF_1}{WACC - g_n}$$

where

FCFF1 = Expected FCFF next year

WACC = Weighted average cost of capital

gn = Growth rate in the FCFF

As in the dividend discounting and FCFE models, two conditions must be met. The growth rates used in the model should be less than or equal to the growth rates of the economy in which the company in question operates. The firm must also meet the assumptions of stable growth.

$$\text{Reinvestment rate in stable growth} = \frac{\text{Growth rate}}{\text{Return on capital}}$$

If reinvestment is calculated using net capital expenditures and working capital change, net capital expenditures should be comparable to those of other companies in the industry, and working capital change should not be negative. A cash inflow is created by a negative change in working capital, and while this may be viable for a company in the short term, it is risky to assume it indefinitely.

This model, like many stable-growth models, is susceptible to assumptions about predicted growth rates. The fact that the discount rate employed in valuation is the WACC, which is much lower than the cost of equity for most companies, adds to this. Changes in the return on capital, which is used to assess the reinvestment rate, can have a major impact on firm value.

Valuing Operating Assets

The current value of predicted free cash flows to the firm can be stated as the firm's value in the most generic instance.

Formula 25: Present value using FCFF

$$\text{Value of firm} = \sum_{t=1}^{t=\infty} \frac{FCFF_t}{(1 + WACC)^t}$$

where

FCFF_t = Free cash flow to firm in year t

WACC = Weighted average cost of capital

If the firm reaches steady state after n years and starts growing at a stable growth rate gn after that, the value of the firm can be written as:

Formula 26: Value of operating assets of the firm

$$\text{Value} = \sum_{t=1}^{t=\infty} \frac{FCFF_t}{(1 + WACC)^t} + \frac{[FCFF_{n+1}/(WACC - g_n)]}{(1 + WACC)^n}$$

The operating income of the firm and how much is reinvested to maintain that operating income rising are used to calculate free cash flow to the firm:

$$FCFF = EBIT(1 - \text{Tax rate}) - (\text{Capital expenditures} - \text{Depreciation}) - \text{Change in noncash working capital}$$

Adjusted present value approach

We start with the worth of the firm without debt in the adjusted present value (APV) approach. We examine the net effect on value as we add debt to the company, taking into account both the benefits and costs of borrowing. To do so, we assume that the primary advantage of borrowing is a tax benefit, and that the key cost of borrowing is the increased chance of bankruptcy.

We evaluate the firm's value in three steps using the APV method. We start by evaluating the firm's value without using any leverage. The present value of the interest tax savings obtained by borrowing a specific amount of money is then considered. Finally, we assess the impact of borrowing the amount on the likelihood of the company going bankrupt as well as the projected cost of bankruptcy.

The estimation of the unlevered firm's worth is the first stage in this method. This is done by valuing the company as if it had no debt and discounting the estimated free cash flow at the unlevered cost of equity.

Formula 27: Value of unlevered firm using APV method

$$\text{Value of unlevered firm} = \frac{FCFF_0(1 + g)}{\rho_u - g}$$

where

FCFF₀ = current after-tax operating cash flow to the firm

ρ_u = unlevered cost of equity

g = the expected growth rate.

Expected tax benefits from borrowing

The estimated tax advantage from a given level of debt is calculated in the second phase of this approach. This tax advantage is based on the firm's tax rate and is discounted at the cost of debt to reflect the cash flow's riskiness.

Formula 28: Expected tax benefits

$$\text{Value of tax benefits} = t_c D$$

Where

T_c = tax rate

D = debt

The tax rate used here is the firm's marginal tax rate and it is assumed to stay constant over time.

Estimating Expected Bankruptcy Costs and Net Effect

The third step is to assess the impact of a specific debt level on the firm's default risk and estimated bankruptcy costs. The present value of predicted bankruptcy costs can be determined if π_a is the probability of default after the increased debt and BC is the present value of the bankruptcy cost.

PV of expected bankruptcy cost

$$= (\text{Probability of bankruptcy})(\text{PV of bankruptcy cost}) = \pi_a BC$$

Because neither the chance of bankruptcy nor the cost of bankruptcy can be calculated directly, this stage of the adjusted present value approach provides the most severe estimating difficulty.

3.3.3 Relative valuation

In valuing an asset, relative valuation, also known as comparable valuation, is a very valuable and successful approach. In relative valuation, similar, comparable assets are used to value another asset.

The goal of discounted cash flow valuation is to determine an asset's value based on its cash flow, growth, and risk characteristics. The goal of relative valuation is to determine the value of an item by looking at how similar assets are currently priced in the market.

Relative valuation consists of two parts. The first is that prices must be standardized in order to evaluate assets on a relative basis, which is commonly done by translating prices into multiples of some common variable. They usually take into account profit, book value and revenue. The second step is to discover similar assets, which might be difficult because there are no two assets are identical. The challenges are exacerbated when evaluating equity in enterprises because firms in the same industry can differ in terms of risk, growth potential, and cash flows.

Earnings Multiples

One of the most intuitive ways to think of an asset's worth is as a multiple of the earnings it generates. When purchasing a stock, it is typical to consider the price paid as a multiple of the company's profits per share (EPS). When buying a business, rather than simply the stock, it is typical to look at the worth of the company as a multiple of its operating income (EBIT), or earnings before interest, taxes, depreciation, and amortization (EBITDA). Although a lower multiple is preferable to a greater one as a buyer of equity or a firm, these multiples will be influenced by the growth potential and risk of the business being acquired.

Book Value or Replacement Value Multiples

Investors frequently use the relationship between the price they pay for a stock and the book value of equity (or net worth) as a metric for determining whether a stock is overvalued or undervalued; the price-to-book value ratio that emerges can vary significantly across industries, depending on the growth potential and quality of the investments in each. When appraising enterprises, we estimate this ratio by taking the firm's market value or enterprise value (net of cash) and dividing it by the book value of all assets or capital (rather than just the equity). Those who consider that book value is not a valid indicator

Revenue Multiples

An alternate option, which is significantly less influenced by accounting choices, is to utilize the ratio of a company's worth to its revenues. For equity investors, this ratio is known as the price/sales (PS) ratio, which divides the market value of the shares by the firm's revenues. This ratio can be changed for company value as the enterprise value-to-sales (VS) ratio, where the numerator is the market value of the firm's operating assets.

While the draw of multiples remains their simplicity, there are four stages to effectively utilize them. To begin, we must define the multiple consistently and measure it consistently across the organizations being compared. Second, we must understand how the multiple varies across enterprises in the market. In other words, we need to know what a high, low, and typical value for the multiple in question are. Third, we must determine the basic characteristics that determine each multiple and how changes in these fundamentals affect the multiple's value. Finally, we must identify truly comparable organizations and account for variances in essential characteristics among them.

Relative valuation, like any other valuation tool, has limitations. The assumption that the market has correctly valued the business is the most significant limitation. Investing in a dot-com because its P/E ratio was 60 versus the industry average of 90, for example, proved

to be a costly mistake during the Internet bubble. Second, all valuation metrics are based on historical data. Stock prices are heavily influenced by investors' expectations of future performance, and most relative valuation metrics do not account for growth.

Robotics, artificial intelligence (AI), and self-driving car technology have all made significant advances in recent years. These breakthroughs have the potential to significantly alter the growth of existing businesses in ways that are difficult to predict.

3.3.4 Technical approach

Dow Theory

The Dow Theory is a financial theory that states that the market is in an upward trend if one of its averages (such as industrials or transportation) advances above a previous significant high and is accompanied or followed by a similar advance in the other average. For example, if the Dow Jones Industrial Average (DJIA) reaches an intermediate high, the Dow Jones Transportation Average (DJTA) is likely to follow suit within a reasonable period.

Dow believed that the stock market as a whole was a reliable measure of overall business conditions in the economy, and that by analyzing the market as a whole one could accurately gauge those conditions and identify the direction of major market trends as well as the likely direction of individual stocks.

As Robert Edwards and John Magee (2001) stated Dow's theory based on six main assumptions or tenets, which are may be explained as:

1. Market discounts everything. Because they reflect the combined market activities of thousands of investors, including those with the greatest foresight and the best information on trends and events, the Averages discount everything known, everything foreseeable, and every condition that can affect the supply of or demand for corporate securities in their day-to-day fluctuations. Even unforeseeable natural disasters, when they occur, are quickly assessed and their potential consequences are discounted.

2. The three trends. The "market" or the price of stocks in general, fluctuates in trends, the most important of which are its Major or Primary Trends. These are large up or down movements that typically last a year or more and result in a general appreciation or depreciation in value of more than 20%. Secondary Swings in the opposite direction interrupt movements in the direction of the Primary Trend at regular intervals — reactions or "corrections" that occur when the Primary Move has temporarily "gotten ahead of itself."

(Both Secondaries and the intervening segments of the Primary Trend are frequently referred to as Intermediate Movements — a term that will come in handy in later discussions.)

3. Major Trends Have Three Phases: Dow concentrated on primary or major trends, which he believed usually occurred in three distinct phases: accumulation, public participation, and distribution. The accumulation phase represents the most astute investors' informed buying. If the previous trend was downward, these astute investors recognize that the market has already absorbed all of the so-called "bad" news. When prices begin to rise rapidly and business news improves, the public participation phase begins, and this is when the majority of technical trend-followers begin to participate. When newspapers begin to print increasingly bullish stories, when economic news is better than ever, and when speculative volume and public participation increase, the distribution phase begins. During the final phase, the same informed investors who began to "accumulate" near the bottom of the bear market (when no one else wanted to buy) begin to "distribute" before anyone else begins to sell.

4. The Averages Must Confirm Each Other. Dow's reference to the Industrial and Rail Averages meant that no significant bull or bear market signal could occur unless both averages gave the same signal, thereby confirming each other. He believed that both averages had to exceed a previous secondary peak in order to confirm the start or continuation of a bull market. He did not believe that the signals had to occur at the same time, but he did recognize that a shorter time interval between the two signals provided stronger confirmation. When the two averages diverged, Dow assumed that the previous trend was still in place. This is the most frequently questioned and difficult to justify of all the Dow principles. Nonetheless, it has withstood the test of time; the fact that it "worked" is not disputed by anyone who has thoroughly examined the records. Those who have disregarded it in practice have frequently come to regret their apostasy. That is, no valid signal of a trend change can be produced solely by the action of one Average.

5. Volume Must Confirm the Trend. Dow as a secondary, but important factor in confirming price signals identified volume. Simply put, volume should increase or expand in the direction of the major trend. In a major uptrend, volume would increase as prices rose and decrease as prices fell. In a downtrend, volume should increase as prices fall and decrease as prices rise. Dow regarded volume as a secondary indicator. His actual buy and sell signals were entirely based on closing prices. Today's sophisticated volume indicators

assist in determining whether volume is increasing or decreasing. Savvy traders will then compare this information to price action to see if the two are correlating.

6. A Trend Is Assumed to Be in Effect Until It Gives Definite Signals That It Has Reversed. This tenet serves as the foundation for many modern trend-following approaches. It applies a physical law to market movement, which states that an object in motion (in this case, a trend) tends to stay in motion until external forces cause it to change direction. Traders can use a variety of technical tools to help them spot reversal signals, such as the study of support and resistance levels, price patterns, trendlines, and moving averages. Some indicators can provide even earlier warnings of momentum loss. Regardless of all of this, the odds are that the current trend will continue.

The concepts embodied in Dow Theory are still valid today, and they are important as the foundation thinking for technical analysis. The concepts of waves, major secondary, and minor movements are completely descriptive of market reality. Other Dow Theory constructs are equally important: that all information is discounted; that major market movements are like the tide and, as it were, raise all boats; and that trends tend to persist. These are not just theoretical musings, but actual observations.

The Dow Theory, in this editor's opinion, is no longer adequate for its original — or even secondary — purpose. It's a simple theory put forth in a simple time. Expounders of Dow Theory have implicitly recognized the need for incremental changes to the doctrine with the addition of Rails (now Transportations) and Utilities ad infinitum. Thirty stocks may have been sufficient to reflect the American economy at the time. No one can deny that a simple paradigm must be altered to reflect an economic structure that is geometrically more diverse than Dow and Hamilton's. As we enter the twenty-first century, the American and global economies will require more sophisticated econometrics than the Dow can provide.

In order to signal Bull or Bear Markets, the Dow Theory required that the Rails and Industrials move in unison. In the twenty-first century, there is a similar need for harmonic convergence among averages to indicate the overall state of the markets.

When all three indexes agree on the direction of their trends, whether up, down, or sideways, Bulls may be assumed to be safe in general, and Bears visa-versa in general. Failure of the three to be in accord is a clear indication of mixed markets and should prompt one to adjust his bets and portfolio to account for economic uncertainty. Capital should naturally flow to the most productive area. What is the point of riding the Dow down when the NASDAQ is soaring? If the investor adheres to the book's philosophy, he will never sit

passively through an extended downtrend. He will be hedged at the very least, if not outright short.

3.4 Sustainability.

Today, the issue of sustainable development is becoming more and more relevant. The public has become more concerned about the environmental legacy and human impact on the environment. More and more countries are developing and introducing regulations regarding the environment and human rights on a legislative basis, which also entails changes in the situation in the corporate world. Violation of such regulations often leads to large-scale scandals and sanctions, especially if well-known corporations or industrial giants are involved in them. The sustainable development order is now becoming a force to be reckoned with in order to remain competitive.

In this regard, when analyzing a company, it is worth taking into account the environmental factor, otherwise the investor may not notice the risks of possible problems in the future. To date, there is already a calculated indicator of risks associated with sustainable development for companies - the ESG rating.

According to Xiong (2021) The ESG (Environmental; Social; Governance ;) rating measures the managerial, environmental and social risks of a company, which in the long term may affect its activities. Indicators of this kind are referring to external factors, but, usually, they are rarely being taken into account in the traditional analysis of companies. One of the most commonly used ESG scoring systems is the MSCI ESG.

From an environmental point of view, the rating considers such factors as the impact on climate change, the use of non-renewable resources, environmental pollution and the use of "green" technologies. Regarding social factors, the following are taken into account: problems of human capital, the quality of the product or service produced, and social assessment. In addition to the above factors, corporate governance issues such as ethics, accounting practices, board composition and others are considered.

4 Practical Part

4.1 Selected sample of companies.

Six companies registered in the United States were selected for the analysis. It was decided to take as a basis two sectors of the American market, namely the high-tech sector and the sector of basic consumer goods. In the first case, companies such as Intel(INTC), Qualcomm(QCOM) and Oracle(ORCL) were selected, in the case of the consumer goods sector, Coca-Cola(KO), Procter & Gamble(PG) and Estee lauder(EL) were selected.

Table 2: Sample of selected companies.

Sector	Consumer staples			High-tech		
Company	KO	PG	EL	INTC	QCOM	ORCL
Mkt.cap.	263.575B	364.81B	94.372B	195.09B	170.605B	199.923B

Source: Investing.com

Coca cola

The Coca-Cola Company is a non-alcoholic beverage company that manufactures, markets, and sells sparkling soft drinks, water, enhanced water and sports drinks, juice, dairy and plant-based beverages, tea and coffee, and energy drinks. Coca-Cola, Diet Coke, Coca-Cola Zero, Fanta, Sprite, Minute Maid, Georgia, Powerade, Del Valle, Schweppes, Aquarius, Minute Maid Pulpy, Dasani, Simply, Glaceau Vitaminwater, Bonaqua, Gold Peak, Fuze Tea, Glaceau Smartwater, and Ice Dew are among its brands. Europe, the Middle East and Africa, Latin America, North America, Asia Pacific, Bottling Investments, and Global Ventures are its business segments. Asa Griggs Candler founded the company in 1886, and it is headquartered in Atlanta, Georgia.

Procter & Gamble

Procter & Gamble Co. manufactures branded consumer packaged goods. Beauty, Grooming, Health Care, Fabric & Home Care, and Baby, Feminine & Family Care are its business segments. William Procter and James Gamble founded the company in 1837, and it is headquartered in Cincinnati, Ohio.

Estee Lauder

The Estée Lauder Companies, Inc. produces skin care, makeup, fragrance, and hair care products. Estée Lauder, Clinique, Origins, MAC, Bobbi Brown, La Mer, Jo Malone London, Aveda, and Too Faced are among the brands it sells. Department stores, multi-brand

retailers, upscale perfumeries and pharmacies, and prestige salons and spas are among its distribution channels. Estee and Joseph Lauder founded the company in 1946, and it is headquartered in New York, NY.

Intel Corp.

Intel Corporation creates, manufactures, and sells computer products and technologies. It provides computer, networking, data storage, and communications platforms. The company's business is divided into the following divisions: Client Computing Group (CCG), Data Center Group (DCG), Internet of Things Group (IOTG), Non-Volatile Memory Solutions Group (NSG), Programmable Solutions Group (PSG), and All Other. On July 18, 1968, Robert Norton Noyce and Gordon Earle Moore founded the company, which is headquartered in Santa Clara, California.

Qualcomm

QUALCOMM, Inc. is a company that develops, designs, and sells digital telecommunications products and services. Qualcomm CDMA Technologies (QCT), Qualcomm Technology Licensing (QTL), and Qualcomm Strategic Initiatives are its business segments (QSI). Franklin P. Antonio, Adelia A. Coffman, Andrew Cohen, Klein Gilhousen, Irwin Mark Jacobs, Andrew J. Viterbi, and Harvey P. White founded the company in July 1985 and it is headquartered in San Diego, CA.

Oracle

Oracle Corp. provides products and services that address every aspect of corporate information technology environments. It operates in three business segments: cloud and licensing, hardware, and services. Lawrence Joseph Ellison, Robert Nimrod Miner, and Edward A. Oates founded the company on June 16, 1977, and it is headquartered in Austin, Texas.

4.2 Fundamental analysis

In this part of the practical work, the principles of fundamental analysis of ordinary shares applied. A top-down approach to stock analysis was chosen. First, the macroeconomic factors of the country in which the selected companies operate are considered, then an analysis of their sectors and microeconomic indicators of specific companies.

4.2.1 Macroeconomic analysis

Since the assessment of the company's activities is directly influenced by the macroeconomic situation in the country/region in which the company operates, an analysis of the current indicators of the American economy was carried out. Many external economic and political factors can affect the performance of both a particular sector and a single company. All six companies from the sample belong to the American market.

At the moment, the global market is at the stage of recovery from the global pandemic of 2020. The most severe restrictive measures that we have seen in recent years are weakening. The global economy is gaining momentum anew in new realities. However, the US monetary policy to support the country's economy and the post-pandemic consequences, now, have led to an increase in inflation in almost all regional markets. The economies of the countries do not have time to develop, and the indicators of stock markets on positive sentiment have gone far from reality.

Current economic policy

The main task of the US Federal Reserve today is to contain uncontrolled inflation. In this regard, a gradual increase in key rates is expected in 2022.

According to Monetary policy report from 24 February 2022 the inflation in the United States reached its highest level since the early 1980s in the second half of last year, despite continuing remarkable advances in economic activity. The labor market tightened significantly more as a result of high demand for workers and limited supply, with the unemployment rate reaching the median of Federal Open Market Committee (FOMC) participants' estimates of its longer-run normal level and nominal wages rising at their fastest rate in decades. With demand strong and continued supply chain bottlenecks and labor supply constraints, inflation climbed significantly last year, running well above the FOMC's longer-run target of 2 percent and extending out to a broader variety of items.

The quick spread of the Omicron variation appeared to be creating a slowdown in some areas of the economy as 2022 began, but with Omicron instances declining dramatically since mid-January, the slowdown is predicted to be brief.

To assist the ongoing economic recovery, the FOMC kept its policy rate near zero in the second half of last year. The Committee began phasing out net asset purchases in November and accelerated the pace in December; net asset purchases will be completed in

early March. With inflation well above the FOMC's longer-run target and a healthy labor market, the Committee believes it will be appropriate to raise the federal funds rate target range soon.

Table 3: Projections of main US macroeconomic indicators.

Variable	Median projection			
	2021	2022	2023	2024
Change in real GDP	5.5	4.0	2.2	2.0
September projection	5.9	3.8	2.5	2.0
Unemployment rate	4.3	3.5	3.5	3.5
September projection	4.8	3.8	3.5	3.5
PCE inflation	5.3	2.6	2.3	2.1
September projection	4.2	2.2	2.2	2.1

Source Federal reserve monetary police report (2022)

The Federal Reserve increased its holdings of Treasury securities by \$80 billion each month from June 2020 to November 2021 and its holdings of agency mortgage-backed securities by \$40 billion per month. In December 2020, the Committee stated that it would continue to raise its securities holdings at least at this rate until the economy achieved significant further progress toward its maximum-employment and price-stability targets. The Committee determined that this condition had been met in November of last year and began to slow the monthly pace of its net asset purchases. In December, the Committee indicated that, in view of recent inflationary trends and additional improvements in the labor market, it would double the rate at which it reduced its monthly net asset purchases.

The FOMC voted at its January meeting to continue cutting net asset purchases at this accelerated rate, which will end them in early March, and issued a statement of principles for its planned approach to considerably lowering the size of the Federal Reserve's balance sheet.

A number of attendees at the conference expressed their belief that the conditions will likely warrant commencing to reduce the size of the balance sheet later this year. The Committee will continue to evaluate the implications of incoming data for the economic outlook in determining the appropriate stance of monetary policy. The Committee remains

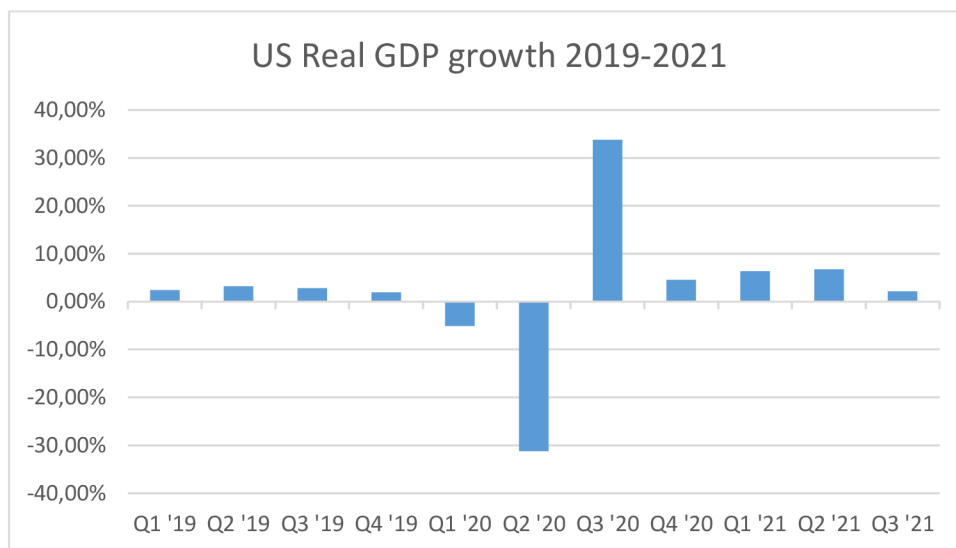
steadfast in its commitment to price stability and maximum employment, and it is ready to utilize its instruments to prevent higher inflation from becoming entrenched while promoting a durable growth and a healthy labor market.

Real GDP growth

According to the Bureau of Economic Analysis' "advance" estimate, real gross domestic product (GDP) expanded at an annual rate of 6.9 percent in the fourth quarter of 2021. Real GDP climbed by 2.3 percent in the third quarter.

Real GDP climbed by 5.7 percent in 2021 (from the 2020 annual level to the 2021 annual level), compared to a 3.4 percent fall in 2020. Real GDP increased in 2021 because of gains in all main subcomponents, led by PCE, non-residential fixed investment, exports, residential fixed investment, and private inventory investment. Imports have grown.

Figure 4: US Real GDP growth 2019-2021



Source: statista.com

PCE growth represented increases in both commodities and services. Within commodities, "other" nondurable products (including games and toys as well as medications), apparel and footwear, and recreational goods and automobiles were the major contributors. Food and lodging, as well as health care, were the biggest donors to services. Nonresidential fixed investment increased due to increases in equipment (dominated by information processing equipment) and intellectual property products (driven by software as well as research and development), which were somewhat offset by a decline in structures (widespread across most categories). The increase in exports represented an increase in items

(mostly non-automotive capital goods), which was countered in part by a decline in services (led by travel as well as royalties and license fees).

Interest rates

Following its Jan. 25-26 meeting, the Federal Reserve declared that interest rates would remain unchanged, with the federal funds rate remaining in a range of 0 to 0.25 percent. Despite the current rate inaction, Fed observers predict the central bank to raise rates several times in 2022, with a high possibility of doing so at its next meeting in March.

The Fed's announcement was widely anticipated, and it comes as inflation in the United States is on the rise, thanks to a strong rebound, supply chain concerns, and trillions in form of fiscal stimulus. While Federal Reserve Chairman Jerome Powell stated that the bank would keep interest rates low for the time being, the Fed will continue with its faster taper of bond purchases begun in December. This step cuts liquidity in the financial system faster than previously predicted, and if the Fed maintains this pace, it will stop buying bonds in March.

While the federal funds rate has little impact on mortgage rates, which are mostly determined by the 10-year Treasury yield, they frequently move in the same direction for similar reasons. The Fed has been a large buyer of mortgage-backed securities, which has helped to stabilize the market and keep mortgage rates low, but it is reducing its purchases more swiftly in the near term. Nonetheless, the 10-year Treasury yield has risen sharply in recent weeks as the market prices in the possibility of the Fed boosting interest rates.

"Mortgage rates have risen since the beginning of the year, rising by one-half percentage point at one point since late December levels," says Greg McBride, Bankrate's chief financial analyst. "There will be spurts toward higher rates this year as the Fed raises rates and begins to let some of its bond holdings mature, but there will also be moments when rates fall owing to economic or geopolitical concerns."

The Fed's resolve to hold rates around zero for as long as it takes the economy to recover has been a big windfall to the stock market. Low interest rates benefit stocks, making them appear to be a more appealing investment when compared to rates on bonds and fixed income instruments such as CDs.

Investors held a floor under stocks as long as the Fed kept interest rates low and provided unprecedented assistance to the market. Following the initial decrease in markets

in the weeks following the introduction of the coronavirus in the United States, stocks rallied significantly through 2021.

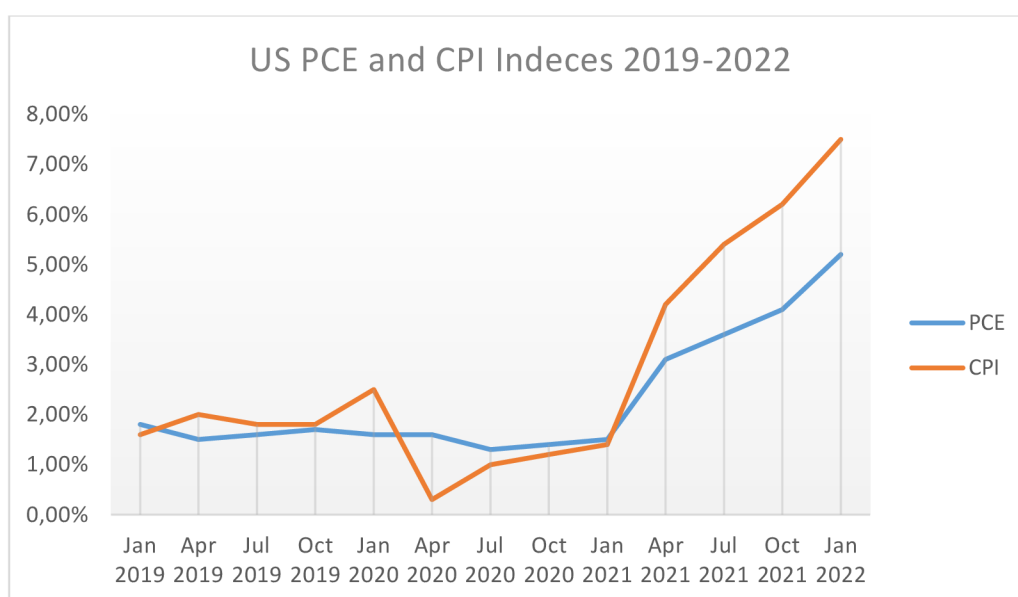
However, some aspects of the Fed's assistance, such as bond purchases, are being decreased, and rate hikes are on the horizon. Moreover, markets have priced that in, with the S&P 500 in a steep drop to begin the year.

Inflation has been high for much of the last year, and the Fed has been preparing to raise interest rates in the near future. However, rates remain historically low, so it makes prudent to consider how to capitalize on potentially higher rates.

Inflation

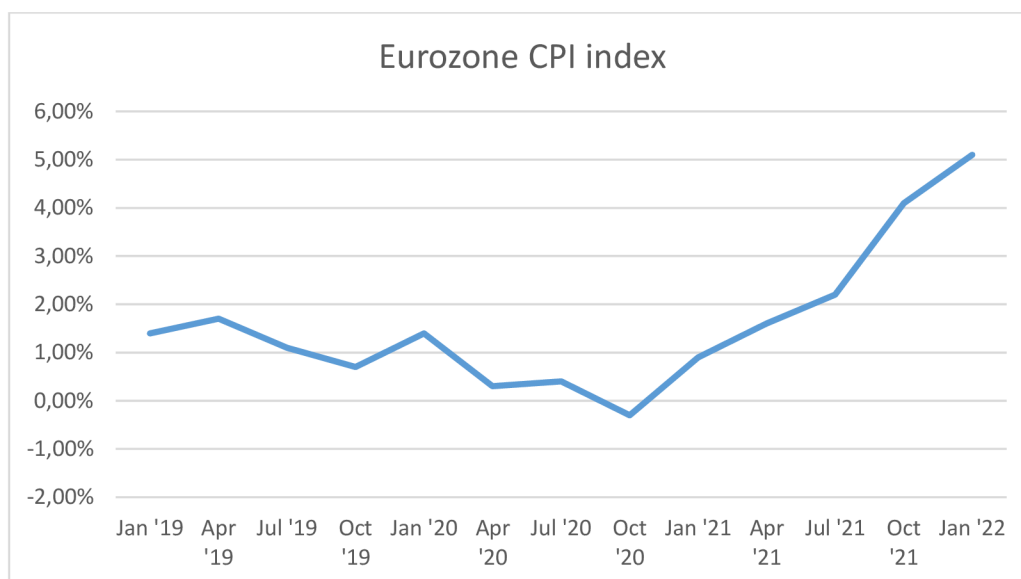
The personal consumption expenditures (PCE) price index increased 5.8 percent in the year ending in December, while the index that excludes food and energy goods (so-called core inflation) increased 4.9 percent—the highest values for both measures in almost 40 years. The upward pressure on inflation from pricing of commodities experiencing both supply chain bottlenecks and high demand, such as automobiles and furniture, has persisted, and rising inflation has spread to a broader variety of categories. Services inflation has also accelerated, owing to substantial pay increases in some service industries and a significant increase in housing rentals. While measures of near-term inflation predictions rose significantly last year, measures of longer-term inflation forecasts rose just slightly.

Figure 5: US PCE and CPI Indexes (2019-2022)



Source: investing.com

Figure 6: Eurozone CPI index (2019-2022)



Source: investing.com

In the second half of 2021, consumer prices rose significantly more. Monthly rises in personal consumption expenditures (PCE) prices averaged almost the same in the second half as they did in the first; bringing the 12-month change in December to 5.8 percent, well over the Federal Open Market Committee's longer-run target of 2 percent. The core PCE price index, which excludes more volatile food and energy prices, climbed 4.9 percent last year as supply chain bottlenecks, hiring challenges, and other capacity constraints in the face of high demand imposed widespread upward pressure on prices. These were the most significant price rises since the early 1980s. A second significant rise in the consumer price index (CPI) in January indicated that price pressures had not yet begun to ease.

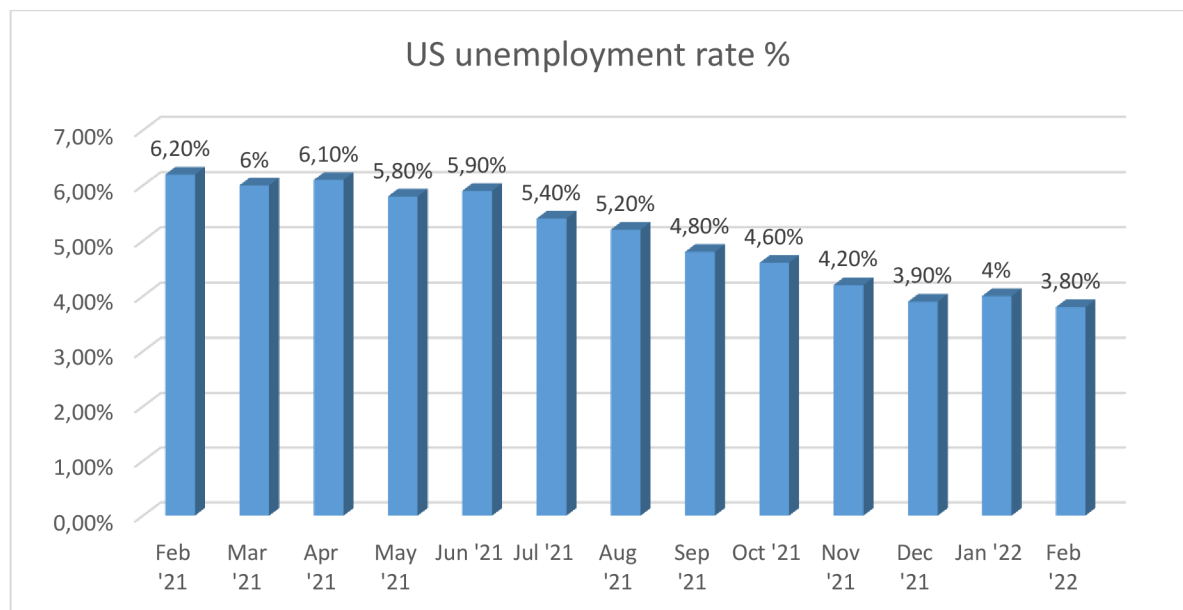
Rising inflation was driven in the first half of 2021 by sharp increases in prices for certain goods, such as motor vehicles, which experienced strong demand coupled with severe supply chain bottlenecks; a recovery in demand for non-housing services, where many prices rebounded after softening earlier in the pandemic; and rapid increases in energy prices. Prices for those things continued to climb in the second half, and prices for food and beverages, as well as housing services, began to rise more rapidly (as increases in the costs of food commodities, labour, and transportation were passed on to consumers) (as rents began to reflect the large increase in housing demand).

Labour market statistics

Even though labour demand has been exceptionally high, labour supply has been reluctant to recover. The labour force participation rate remains well below projections of its longer-run trend, owing mostly to a wave of retirements among the elderly and an increase in the number of people out of the labour force and involved in caring obligations. Fear of the virus or the necessity to quarantine has also affected labour supply because of the ongoing pandemic. Furthermore, savings buffers built up during the epidemic may have allowed some people to stay out of the labour force.

Last year, pay and employment growth were widespread across jobs and industries, with the lowest-paid jobs seeing the greatest increases in both median wages and employment. Wage rise in the leisure and hospitality business has escalated considerably, implying a shortage of available workers in the industry, in conjunction with a slow employment rebound and rising job postings. Median incomes increased across racial and ethnic groups, leaving wage disparities across groups largely changed in comparison to 2019.

Figure 7: US unemployment rate



Source: statista.com

4.2.2 Industry analysis

In this chapter of the practical part, the main indicators and the situation in the high-tech industry and the consumer staple goods were considered.

Tech sector

Information technology is a highly concentrated industry, with only a few corporations accounting for more than half of the sector's weight, including the two behemoths Apple and Microsoft. As the favourable impact of fiscal stimulus fades, the impact of stay-at-home behaviour during the COVID-19 epidemic and increased consumer demand for personal computers, gaming gear, software, and personal devices may decline. Furthermore, ongoing supply chain concerns continue to be a challenge for procuring semiconductors, resulting in large order backlogs for business and consumer electronics.

In the United States, business investment in information processing, software, and industrial equipment has expanded dramatically. The technology sector continues to play a critical role in improvements in robotics and automation, the shift toward big data and cloud computing, the software and artificial intelligence that power it, and the smartphones, tablets, and network interfaces that allow us to utilize it. Higher wages, labour shortages, and input inflation have led in an increase in investment in productivity- and labour-enhancing technology in the aftermath of the COVID-19 epidemic.

Investor's optimism about future growth potential has pushed many valuation measures well above their historical averages, and higher interest rates may weigh on investor's perceived value of future earnings—though there is little evidence of a direct relationship between Technology relative performance and interest rates. Furthermore, several sector's major corporations face mounting legislative and antitrust issues.

According to Deloitte (2022) some of the specific themes we see playing a foundational role in 2022 and beyond include:

- **Taking cloud and everything-as-a-service to the next level.** As more businesses embrace cloud and service-based IT to drive innovation and transformation, and as XaaS providers proliferate, more work will be required to manage the technical and operational complexities of hybrid, multi-cloud approaches.
- **Creating the supply chains of the future.** As technology firms continue to recover from pandemic-induced supply chain disruptions, they will begin to plan ahead of time for future uncertainty and other systemic risks. To accomplish this, they will create systems that are more visible and resilient.
- **Building the next iteration of the hybrid workforce.** Tech companies will evolve their cultures, accelerate experimentation with collaboration solutions, and develop

better approaches to managing tax implications as they gain more experience with a hybrid workforce.

- **Leading the charge to create a sustainable future.** Despite the fact that the tech industry is working to address critical sustainability issues, growing stakeholder pressure and potential changes to environmental, social, and governance (ESG) reporting rules will drive tech companies to focus more on reducing and reversing environmental impact.

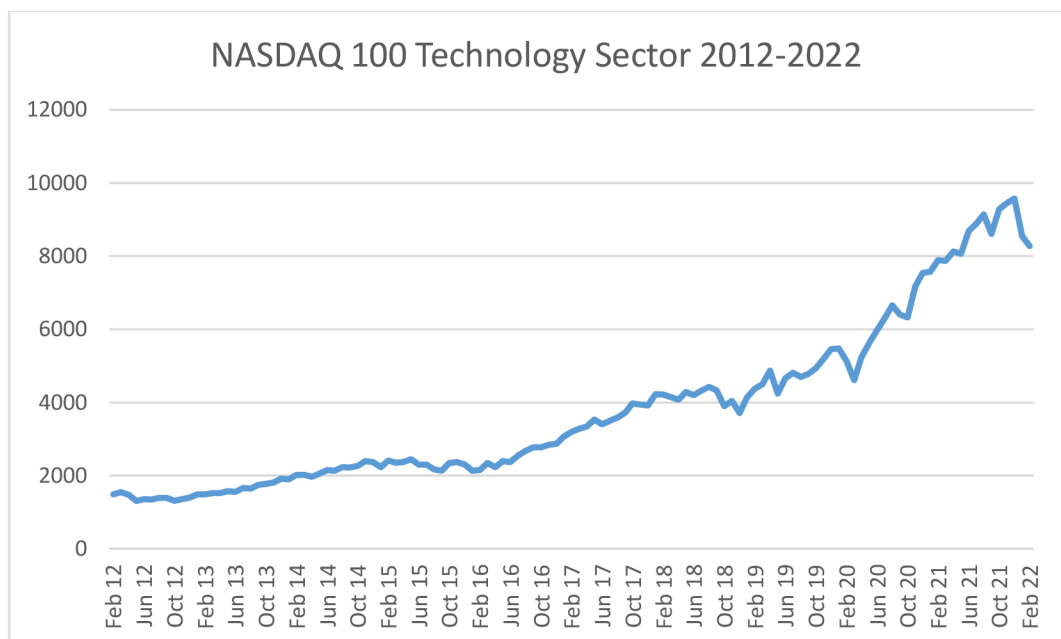
Technology sector's performance

In 2020, Wall Street was propelled by the technology sector to end the pandemic-driven historically shortest bear market and usher in a new bull market. Cyclical sectors such as financials, industrials, energy, materials, and consumer discretionary took center stage in 2021.

Three factors are primarily responsible for this sectoral shift. First, as a result of its stellar performance, the technology sector has become overvalued since the beginning of 2021, and investors are concerned that a significant correction is on the way.

Second, because of the rapid nationwide deployment of COVID-19 vaccinations and a faster-than-expected reopening of the economy, the cyclical sectors that had been hit by the pandemic became profitable.

Figure 8: NASDAQ 100 Technology Sector 2012-2022



Source: Investing.com

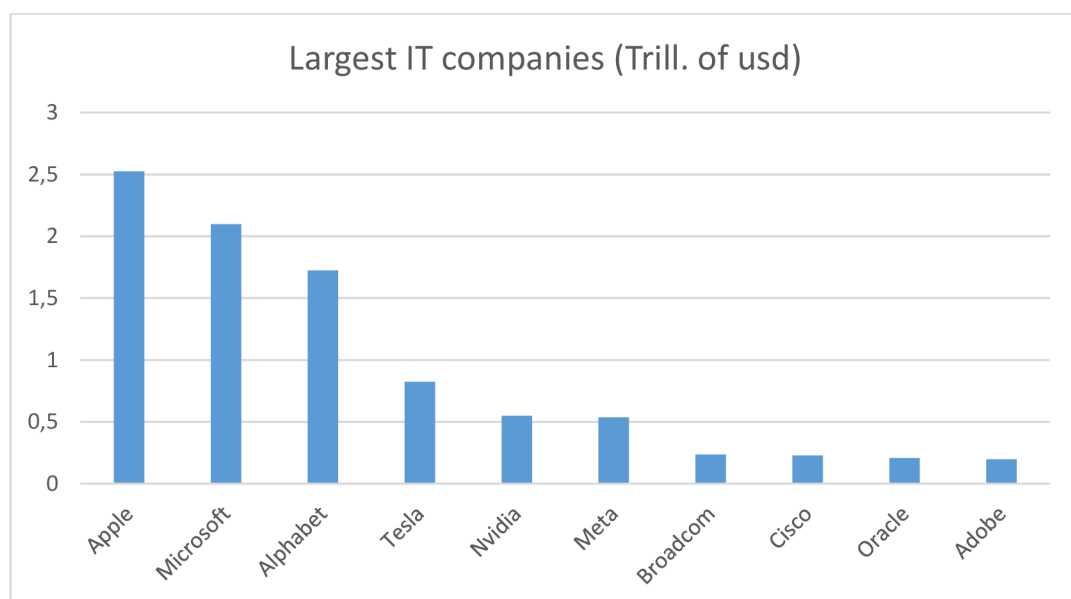
As we can see from the dynamics of historical price changes, the technology sector took off at a record pace after the outbreak of the pandemic, overtaking the rest of the market. However, the sector has obviously overtaken the fundamentals and has been on a downward trend since the end of 2021.

Top leading companies from Tech Sector

The largest American technology companies operate across a wide range of industries, offering products and services that disrupt traditional business models or create new models that revolutionize entire industries. With high-tech products and high-value-added services, actors in the tech industry are competing fiercely to gain and keep a share of a number of highly lucrative markets.

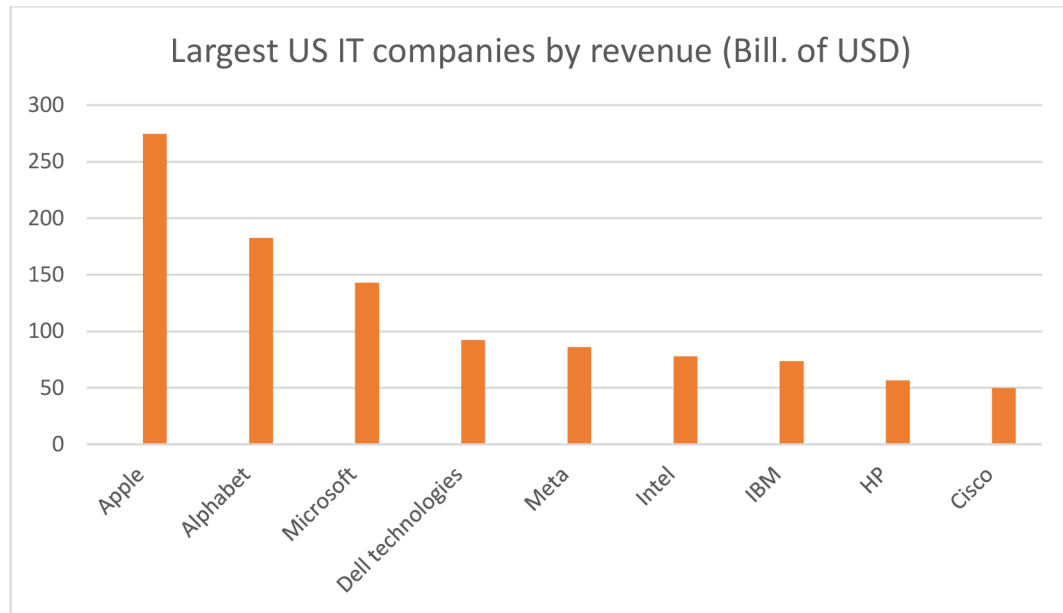
This battle for market share is made all the more intense because, in many tech businesses, the "winner takes all" law ensures that the dominant player receives the lion's share of profits. And the infamous five American big tech companies, Apple, Microsoft, Amazon, Alphabet (Google), and Facebook, are proof of this phenomenon, with their unrivaled dominance over their respective main businesses: smartphones, office software, e-commerce, search engines, and social media.

Figure 9: Six largest US Technological sectors' companies by Market cap.



Source: Companiesmarketcap.com

Figure 10: Top US Technological companies by revenue.



Source: Investing.com

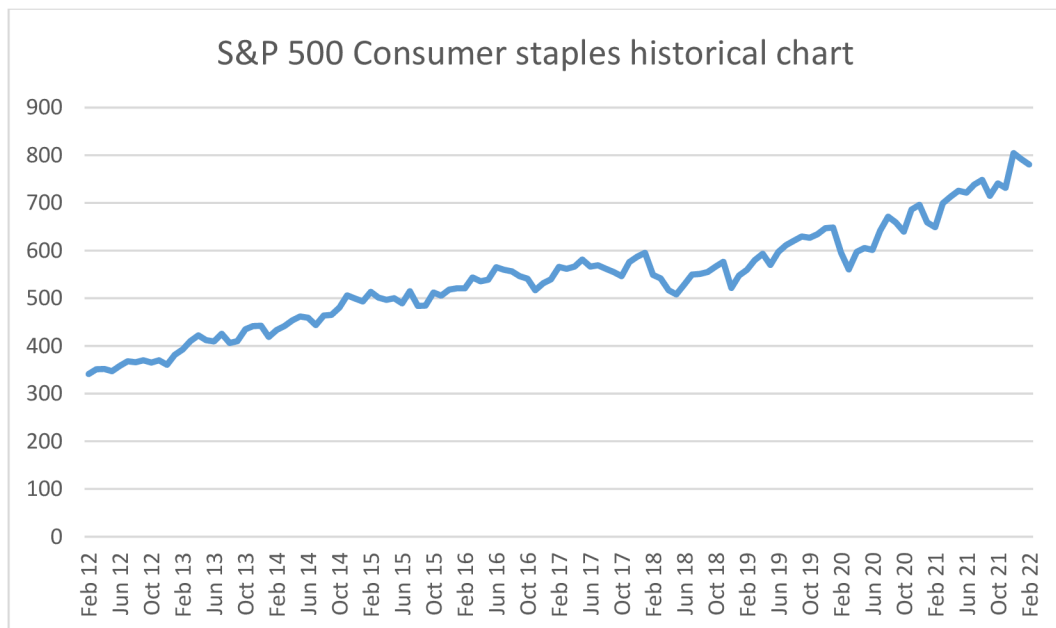
Consumer staples sector

The consumer staples industry is made up of companies that manufacture and sell items that are considered necessary for daily use. Consumer staples include household goods, food, beverages, hygiene products, and other items that people are unwilling or unable to cut from their budgets even when they are in financial trouble.

Due to higher raw material costs and supply chain constraints, input costs for several consumer staples increased considerably in 2021. Prices for resin, pulp, and oil, for example, have skyrocketed. Aluminium prices have reached their highest point since 2008. In certain situations, these raw materials are incorporated into the products themselves, such as garbage bags or toilet paper. They may have an impact on the cost of packaging for other consumer staples such as soda cans, foil wraps, and plastic packaging. High wheat and corn prices are also affecting packaged-food manufacturers. Input costs are not the sole driver of cost inflation for many consumer staples companies; manufacturing, freight, and logistics expenses have all risen.

However, not every business or organization can capitalize on this backdrop. Finding companies with pricing power and large gross profit margins may be one key to investing in consumer staples in the near term. Pricing power refers to a company's ability to raise prices on its products while passing on higher costs to customers without losing too many customers. High gross profit margins imply that a corporation can effectively pass on significantly higher input prices with relatively minor price increases on its items.

Figure 11: S&P 500 Consumer staples historical data chart



Source: investing.com

As the economy recovered from the COVID-19 pandemic, the sector underperformed, as would be expected for a traditionally defensive sector whose constituents are typically less affected by changes in the business cycle. However, a peak in the rate of economic growth and the associated potential for higher market volatility could weigh on cyclical sectors, increasing the relative attractiveness of the Consumer Staples sector's more defensive and larger-cap stocks.

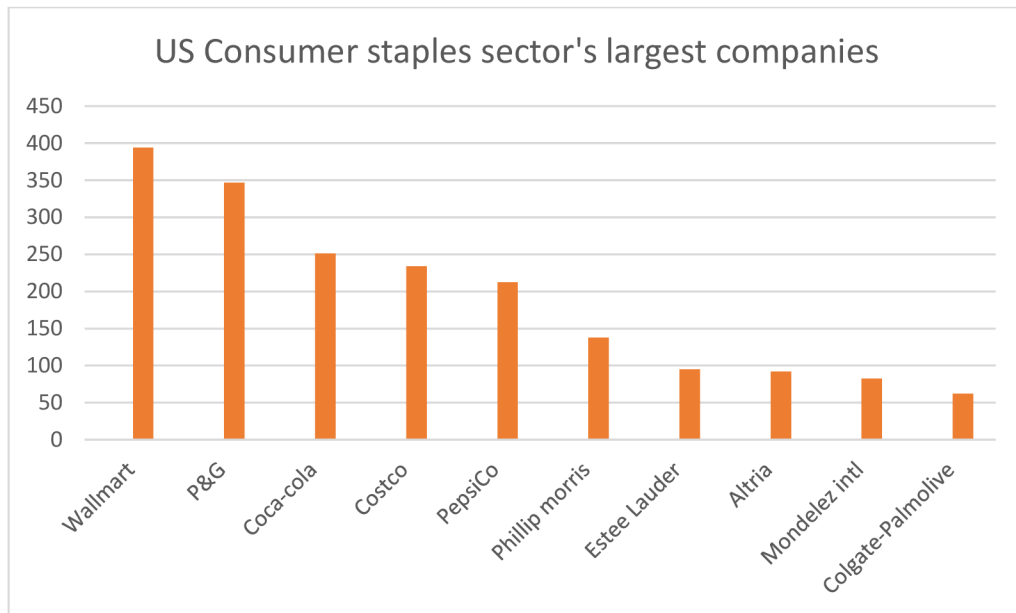
The sector underperformed as the economy recovered from the COVID-19 pandemic, as would be expected for a traditionally defensive sector whose constituents are typically less affected by changes in the business cycle. However, a peak in the rate of economic growth and the associated risk of higher market volatility could weigh on cyclical sectors, increasing the relative attractiveness of Consumer Staples' more defensive and larger-cap stocks.

Many of the sector's valuation measures are still higher than their historical averages, as are nearly all of the other sectors. However, in terms of relative attractiveness and cost, the Consumer Staples sector is in the middle of the pack. The ongoing rise in transportation and commodity costs has weighed on earnings, but many Consumer Staples companies have been able to pass some of those higher costs on to consumers. And the reopening of restaurants is increasing wholesale food demand, which bodes well for fundamentals—

especially if companies can maintain higher prices as input costs presumably fall in the coming months.

Largest companies of US consumer staples sector

Figure 12: US Consumer staples sector's largest companies by Marketcap.



Source: Yahoo! finance

Sector's opportunities

- It has a generally stable earnings profile
- Companies have engaged in aggressive cost-cutting
- Restaurant openings are supporting wholesale food demand
- If inflationary pressures allow for significantly more pricing power, the sector could perform better than expected.

- Risks to the economy, such as the COVID-19 delta variant or aggressive rate hikes by the Federal Reserve in response to rising inflation concerns, could support this defensive sector more than is currently anticipated.

Sector's threats

- While this defensive sector typically struggles during periods of economic growth, signs of a peak in the rate of growth and increased volatility may make it more appealing to investors.

- Many companies in this industry are facing higher input costs, despite their success in raising prices.

- A rise in interest rates, combined with faster-than-expected economic growth, could lead to underperformance.

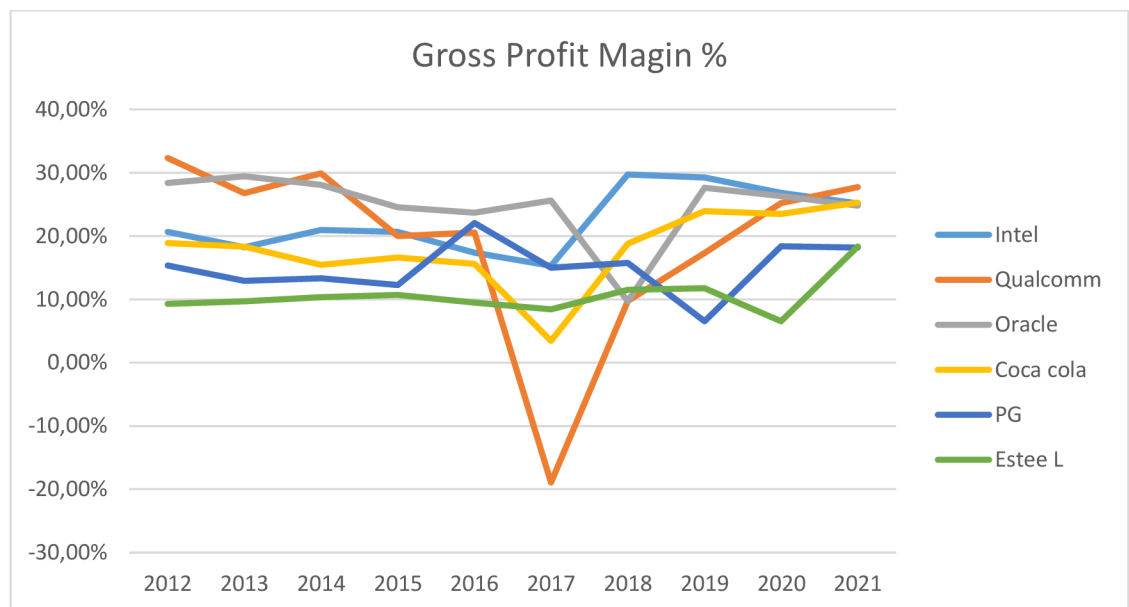
4.3 Common stock valuation

4.3.1 Profitability analysis

In this section, the main indicators of profitability of companies from the selected sample are considered. A brief analysis of the key fundamental reasons for the trend change was carried out.

In Figure 13, we can observe the change in gross profit margin indicators for companies in the period 2012-2021.

Figure 13: Gross profit margin



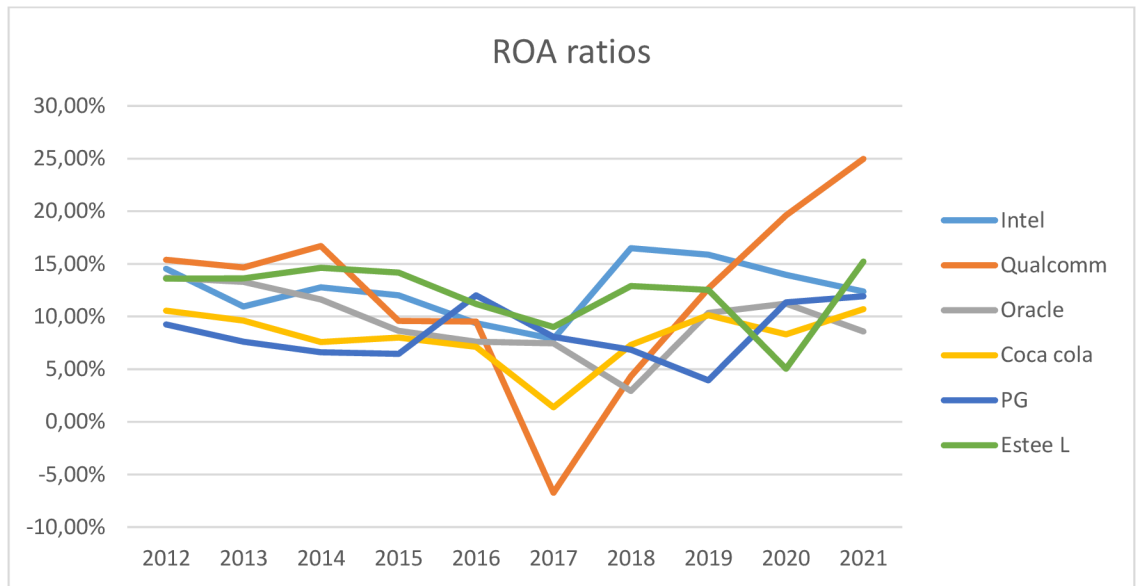
Source: macrotrends.net

According to historical data, the Coca-Cola Company and Procter & Gamble turned out to be the least volatile of the selected companies.

According to historical data, Qualcomm's indicators turned out to be the most volatile of the selected companies with negative values up to -20% in 2017, but in subsequent years there was a recovery and rapid growth in profitability. Most of the companies under consideration had a drop in the indicator in 2017. The indicators of the consumer goods sector turned out to be the most stable, while having a relatively low margin of return, which is typical for this sector. In recent years, profit margin has a generally positive trend for all companies.

Figures 14 and 15 show the historical change in the ratio of return on assets and return to equity, respectively. Indicators show how effectively the company's capital is managed. These indicators are different tools, but closely related to each other. The main difference lies in accounting for the debt, because if a company has no debts, then its equity and assets will be equal.

Figure 14: Return on assets.

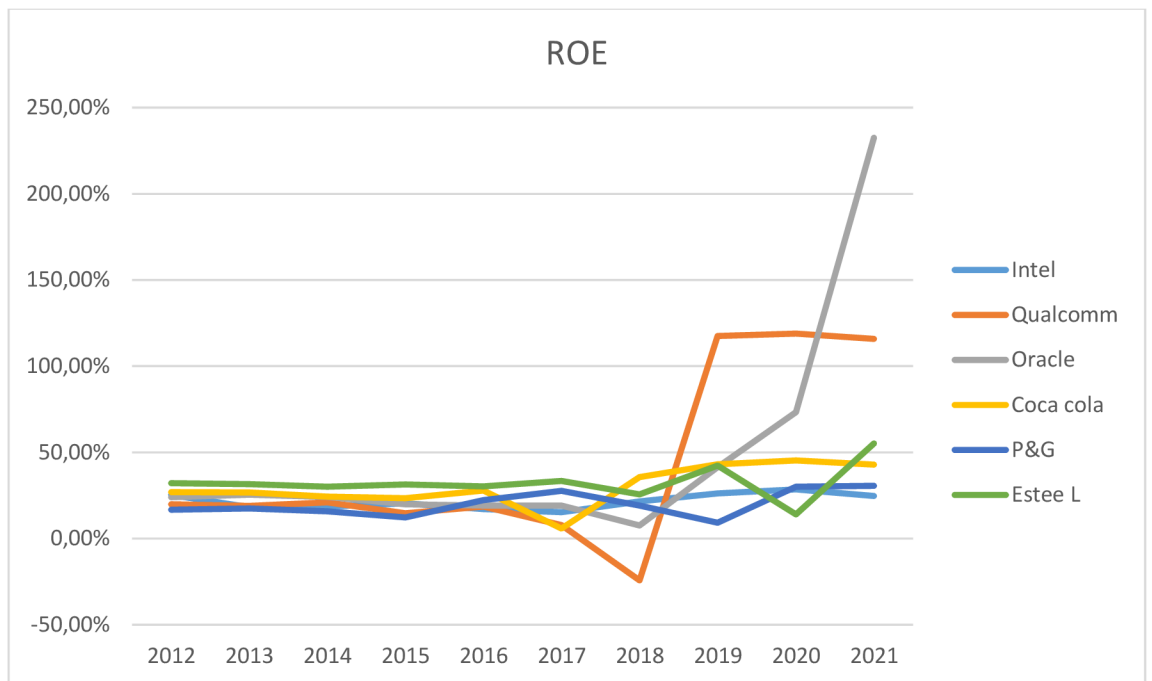


Source: Macrotrends.net

As we can see from the graph, the volatility of the indicator of most companies lies within 10 percent. The exception is Qualcomm, whose indicator has dropped to negative values, as it was in the historical Profit margin data. In the subsequent period, the campaigns of both sectors showed similar results, and in 2020-2021, Estee Lauder and Qualcomm showed an increase in the ratio of return to assets reaching a 10-year historical maximum.

In turn, the ROE indicator reveals extreme changes for Qualcomm and Oracle IT companies, which have shown impressive results in the growth of Return on equity that has gone beyond 100%.

Figure 15: Return on equity

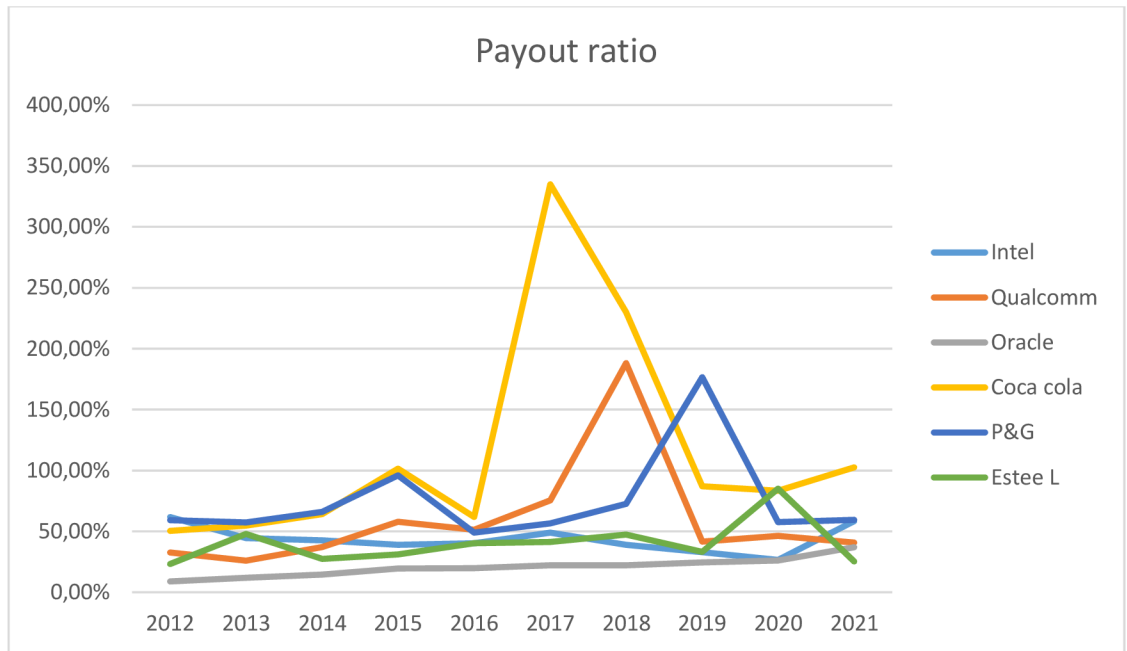


Source: Macrotrend.net

According to the received data, Qualcomm and Oracle companies are singled out from the list. Their ROE indicator is unstable, and shows rapid growth in 2019-2021, which may attract the attention of a potential investor. However, considering purely this indicator may become erroneous, since the reason for such indicators may lie in fundamental problems within the company.

Figure 16 shows the historical change in the payout ratio of the companies in question. The coefficient shows how much of the profit the company pays to its shareholders.

Figure 16: Payout ratio

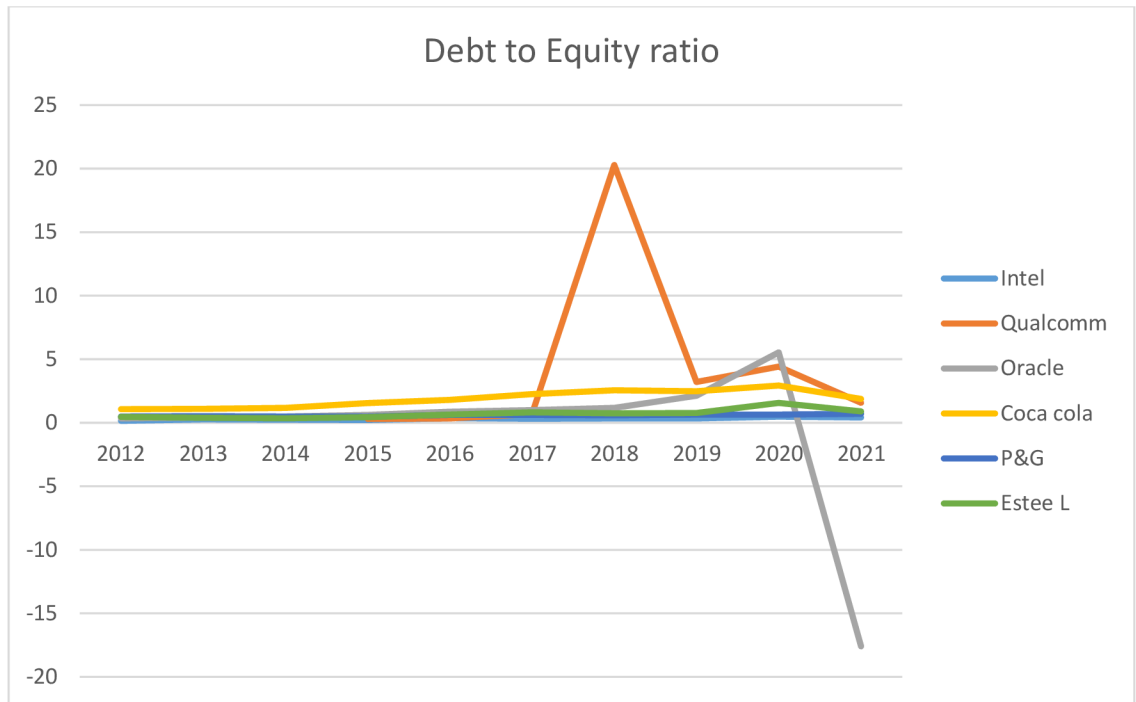


Source: Macrotrend.net

As you can see on the graph, some of the companies on the list had revenue problems in the period from 2017 to 2019. Coca Cola has a payout ratio in 2017 exceeding 300%, which suggests that the company had to use external sources to maintain the stability of payments to its shareholders. The company was able to recover only by 2019, but the ratio is still extremely high, holding near the 100% mark. Qualcomm and P&G had similar problems in 2018 and 2019, having a payout ratio in the range of 170-180%. Nevertheless, the companies returned to rational indicators in the following years.

The last indicator selected for this part of the analysis is the Debt to Equity ratio. The indicator shows the ratio of the company's debt obligations to the share capital. With the help of this ratio, the assessment of the financial leverage of the company is determined.

Figure 17: Debt to equity ratio



Source: Macrotrend.net

According to the obtained indicators, it is clear that most companies have a stable capital structure, which cannot be said about Qualcomm and Oracle, whose results show a strong discrepancy. The D/E indicator for Qualcomm in 2018 reached the mark of 20 points, then gradually returning to acceptable. Oracle has a negative indicator of -18 points in the last year under review, which indicates financial problems within the company. Oracle has negative shareholder equity indicators in 2021. Taking into account the data obtained, it was decided to exclude Qualcomm and Oracle from the fair value assessment by FCFE model.

4.3.2 Absolute valuation

In this chapter, the main models of discounted cash flow are applied, which were described in the literary part. The fair value of the companies' shares was calculated using 3 approaches: the Dividend Discounting Model, the free cash flow model to equity and the Free cash Flow Model to the firm.

Before starting to calculate the actual cost, it is necessary to determine the basic input data required for each specific model.

Estimating growth and discount rates

A different approach is used to determine the pace of each model. 3 types of growth rates were calculated for the companies in question. You can observe the obtained results of growth rates in Table 4

Table 4: Growth rates estimation.

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
FCF growth rate(Av. 10 year annual change)	2,3%	28.51%	2.54%	3,41%	2,06%	17,64%
Dividend growth rate (5y annual change)	5.38%	10.87%	17.44%	3.53%	4.92%	11.74%
Sustainable growth rate	12.21%	17.26%	38.58%	8.34%	5.02%	19.48%

Source: own calculations.

The growth of free cash flow was obtained on the basis of average percentage changes in annual indicators of companies over a period of 10 years. The growth of dividends is carried out by a similar method, and is obtained by the average value of the change from year to year.

Due to the limited access to the historical reports of the companies issuing the selected shares, it was decided to use the Sustainable growth rate for calculations using FCFE and FCFF models. Another reason for this decision was the high volatility of the calculated indicators in recent years, which makes it impossible to obtain growth rates using the classic method of percentage changes in annual values.

The next step is to determine the discount rate values. Cost of equity and WACC were calculated for use in FC FE and FCFF models, respectively.

The CAPM model was used to calculate the cost of equity. As a Risk Free Rate, the yield of 10-year US Treasury bonds was taken. Risk premium or the expected market yield was chosen at 6%. The Beta coefficient values were taken from freely available sources. The results of calculations for CAPM in Table 5.

Table 5: Table 5: Cost of equity using CAPM model.

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
Beta	0.55	1.26	0.81	0.66	0.45	1.1
Cost of equity	5.62%	9.88%	7.18%	6.28%	5.02%	8.92%

Source: Own calculations based on data from Yahoo! Finance and Market Watch

Weighted average cost of capital was calculated using data from the financial statements of companies, the effective tax rate and the cost of equity received at the previous stage.

Table 6: Weighted Average Cost of Capital

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
Weight of Equity	84.61%	91.83%	72.15%	86.18%	91.82%	92.41%
Weight of Debt	15.39%	8.17%	27.85%	13.82%	8.18%	7.59%
Cost of Equity	5.62%	9.88%	7.18%	6.28%	5.02%	8.92%
Cost of Debt *(1-Tax)	1.43%	3.11%	3.13%	2.95%	1.25%	1.84%
WACC	4.98%	9.33%	6.05%	5.82%	4.71%	8.38%

Source: own calculations based on data from Yahoo! Finance

After receiving the results of growth rates and discount rates, you can start using the dividend discount model.

The first model used is Gordon growth DDM, which implies a stable growth of dividend payments over time. The results of calculating the actual cost through the Gordon growth dividend discount model can be seen in Table 7. The model was applied for Coca Cola and Qualcomm, it is impossible to apply this model for other companies, since companies with growth rates above the discount rate will receive negative intrinsic values.

Table 7: Gordon growth DDM

Company	Coca cola	Qualcomm
Dividend growth rate	3.53%	6.73%
Cost of equity	5.48%	9.88%
Intrinsic value	80.88\$	119.05\$
Market price	61.39\$	156.69\$

Source: Own calculations

According to the results obtained, Coca Cola is undervalued by the market by approximately 25%, which may be a signal to buy or hold shares of this issuer. Qualcomm, in turn, is overvalued by \$ 36, or 25%, which is a reason to sell or hold shares for a potential investor.

For the remaining companies, a two-stage discounted dividend model of was applied. For all companies, a period of rapid growth is selected for 5 years, except Estee lauder, with a growth period of 10 years.

Table 8: Multi-stage DDM

Company	Intel	Oracle	P&G	Estee L
High growth rate	6.33%	12.49%	4.9%	14.75%
Stable growth rate	4%	5%	3%	6%
RRR	4.88%	7.18%	5.02%	8.92%
Number of HG Years	5	5	5	10
Intrinsic value	99.37\$	80.56\$	189.32\$	257.3\$
Market price	51.44\$	81.39\$	152.47\$	274\$

Source: own calculations

According to the results of the two-stage dividend discounting model, Intel is almost twice undervalued by the market, Oracle has a market price almost identical to the internal one defined in the model. Procter& Gamble is undervalued by the market by 20%. Estee Lauder has an indicator close to the market, however, the company is overvalued by \$ 20.

The next discounting model is the FCFE model. In this case, WACC is used as the discount rate. To calculate the internal value of a company, it is required to calculate its Free Cash Flow to Equity in the zero year, in our case for 2021. The results of FCFE calculations can be seen in Table 9. The FCFE formula via net income was chosen for the calculation. The data was taken from the companies' financial report for 2021.

Table 9: FCFE estimation.

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
Net income	19.87	9.043	13.746	9.771	14.035	2.87
D&A	11.792	1.582	2.916	1.452	2.735	0.651
WC Change	7.761	-1.723	-3.537	-2.044	-1.549	0.757
CapEx	20.329	1.888	2.135	1.367	2.787	0.637
Net borrowings	-.818	-1.181	9.151	-1.77	3.2	-0.626

FCFE	0.754	9.279	27.215	10.13	12.332	2.753
------	-------	-------	--------	-------	--------	-------

Source: own calculations based on data from Yahoo! Finance

Having received the results of the estimated FCFE and Cost of Equity, we can proceed to the calculation of the internal value through the discounted FCFE model.

During the analysis of the profitability of the selected companies, it was found that Qualcomm and Oracle have ongoing changes in the capital structure of the companies, which can be seen in Figure 17 showing the ratio of debt to equity of the company. Thus, it was decided to exclude the company's data from the assessment of internal value according to the FCFE discount model. The results of the internal cost calculation for other companies can be seen in Table 10.

Table 10: Multi-stage FCFE DCF model

Company	Coca cola	P&G	Estee Lauder	Intel
Growth rate	8.34%	5.02%	19.48%	12.21%
Cost of equity	5.48%	5.02%	8.92%	5.62%
FCFE ₀ (bill.)	10.13	12.332	2.753	0.754
Number of shares	4.34	2.4	0.232	4.07
PV of equity (bill.)	395	557.914	60.66	234.53
Intrinsic value	91.01\$	232.46\$	261.46\$	22.85\$
Market Price	61.35\$	152.13\$	275.98\$	51.72\$

Source: own calculations based on data from Yahoo! Finance

According to the results of the calculation, it was found that Coca Cola is one and a half times undervalued by the market at the moment having an internal value of \$ 91 against the market value of \$ 61. Procter & Gamble is also undervalued in a similar ratio. The value of Estee Lauder is close to the market and lags by \$ 15 or 5%. Intel, in turn, is overestimated by the market by more than 2 times.

The 3rd selected discount model is the FCFE discount model. To calculate it, it is required to have FCFE data in the initial period. The WACC was calculated in advance at the beginning of the current chapter. The calculated data obtained are shown in Table 11

Table 11: FCFE Estimation

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L

FCFE	0.754	9.279	27.215	10.13	12.332	2.753
Change in net debt	-2.818	-1.181	9.151	-1.77	3.2	-0.626
FCFF	3.572	10.46	18.064	11.9	15.532	2.127

Source: own calculations

Table 12: Multi-stage FCFF DCF Model

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
FCFFo	3.752	10.46	18.068	11.9	15.532	2.127
WACC	4.98%	9.33%	6.05%	5.82%	4.71%	8.38%
Number of shares	4.07	1.13	2.67	4.34	2.4	0.232
TV	727.5699	510.157	1024.283	682.3872	1218.606	141.2748
PV	565.4517	363.565	801.7768	549.8748	1002.911	101.551
Intrinsic value	138.93\$	321.74\$	300.29\$	126.7\$	417.88\$	437.74\$
Market price	51.44\$	156.69\$	81.39\$	61.35\$	152.13\$	275.98\$

Source: own calculations

As a result of the calculations, all 6 companies were greatly underestimated. The recommendation for all companies in this case is to buy or hold. The reason for such a strong discrepancy between the results and the FCFE model lies in the debt leverage to all listed companies.

4.3.3 Relative valuation

In the relative valuation section, the key indicators of companies are considered, namely: P/E, P/B, P/S and P/FCF. Comparison of these indicators is correct only within one industry. In this case, industries such as semiconductors, computer software, beverages and household products are considered. The sectors are presented in the tables of indicators, respectively, for each company.

The first indicator of comparison is the ratio of cost to profit. The results of comparing the current P/E indicators with the sector averages are presented in table 13. One of the simplest methods of obtaining an indicator is dividing the price per share by earnings per share.

Table 13: Price to Earnings ratio

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
Sector	Technology	Technology	Technology	Consumer staples	Consumer staples	Consumer staples
Industry	Semi-conductors	Semi-conductors	Computer software	Beverages (non-alcoholic)	Household products	Household products
P/E	10.30	17.96	30.56	27.36	26.91	31
Sector's average	31.41	31.41	31.41	24.92	24.92	24.92
Industry average	113.32	113.32	107.62	106.96	43.54	43.54

Source: Macrotrends.net and Damodaran online

Based on the data obtained, we see that the P/E indicator for all companies is below the average for the corresponding industry. This suggests that the companies in question are probably undervalued relative to their competitors from the same industry. This confirms the results of the conducted fair value analysis through the FCFE model. As a result, the result can be considered as a signal to buy/hold the shares in question.

The next indicator to evaluate is the Price to book value. The results of the collected data are shown in table 14. The indicator shows the ratio of the market value to the book value of the company.

Table 14: Price to book ratio

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
P/B	2.06	15.20	N/A	11.38	8.26	15.77
Sector's average	4.57	4.57	4.57	4,1	4,1	4,1
Industry average	7.45	7.45	14.52	8.42	10.39	10.39

Source: Macrotrends.net and Damodaran online

Intel has a P/B value of 2.06, which is several times lower than the industry average, and in general is a good indicator as it less than 3. Qualcomm, in turn, has 15.2 with an industry average of 7.45, which is an alarming sign for an investor that the company is highly overvalued. Thus, Qualcomm is a less attractive investment option relative to its Intel counterpart within the price-to-book value ratio. Coca Cola also cannot boast of an attractive result with 11.38 against 8.42 for the industry. Procter&Gamble and Estee Lauder, being representatives of the same industry, show mixed results. PG and EL, with an industry average of 10.39, have 8.26 and 15.77 points, respectively.

The Price to sales indicators are presented in Table 15. The indicator compares the market capitalization with the company's sales or revenue over the past 12 months, the lower the indicator, the more attractive the investment.

Table 15: Price to sales ratio

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
P/S	2.50	4.86	5,45	6.78	4.94	5.67
Sector's average	5.07	5.07	5.07	1.39	1.39	1.39
Industry average	8.34	8.34	12.44	4.38	3.99	3.99

Source: Macrotrends.net and Damodaran online

Once again, Intel shows the lowest result of 2.5 points, which is below 8.34 in the industry, and below 4.86 in the case of Qualcomm. Oracle has 5.45 versus 12.44 for the industry, which also indicates good market expectations. PG and EL have similar results of 4.94 and 5.67, which is higher than the average of 3.99.

The fourth and last indicator selected for this section is P/FCF. The indicator shows the ratio of the company's price to free cash flow and is a more accurate analogue of P/CF, excluding capital expenditures. A low indicator indicates that the company is undervalued and vice versa.

Table 16: Price to Free Cash Flow ratio

Company	Intel	Qualcomm	Oracle	Coca cola	P&G	Estee L
P/FCF	21.94	13.97	34.53	22.61	26.13	38.04

Sector's average	35.76	35.76	35.76	42.76	42.76	42.76
------------------	-------	-------	-------	-------	-------	-------

Source: Macrotrends.net and Damodaran online

Qualcomm is ahead of Intel in terms of P/FCF with 13.97 versus 21.94, both indicators are below the average for the technology sector. Oracle has the highest index close to the sector average of 35.76. Coca Cola, P&G and Estee Lauder have 22.61, 26.13 and 38.04 points, respectively, which is below the sector average of 42.76.

In the case of the P/FCF indicator, it was not possible to obtain data on industries, a comparison was made with the average indicator for the sector. Among the companies in the technology sector, Qualcomm has the best result with 13.97 against 35.76 in the sector, followed by Intel with P/FCF at 21.94 and Oracle with 34.53. All three companies have an indicator below the sector average, which indicates undervaluation. Coca-Cola, P&G and Estee Lauder have 22.61, 26.13 and 38.04, which is a good result relative to the average for the sector, respectively, all companies are undervalued at the moment.

Environmental, Social. Governance.

Finally, it was decided to add an ESG assessment for all 6 companies to assess the possible risks of the company related to the Environment, Social and Governance reasons. Data received from the supplier Sustainalytics.com.

Table 17: ESG risk rating.

Company	Intel	Qualcomm	Oracle	Coca-cola	P&G	Estee L.
Industry	Semi-cond.	Semi-cond.	Software	Beverage	Household products	Household products
ESG Risk score	16.7 Low risk	18.1 Low risk	14 Low risk	22.5 Medium risk	25.9 Medium risk	27 Medium risk
Ranking in the same industry	12 out of 303	21 out of 303	32 out of 1001	35 out of 587	24 out of 102	30 out of 102

Source: Sustainalytics.com

Table 17 shows the ESG risk assessment indicators for the companies in question, as well as their place in the list of companies in the same industry. Intel, Qualcomm and Oracle have low risk indicators, being in the top layer of the rating, while Coca-Cola, P&G and Estee Lauder have average indicators, this is due to higher volumes of industrial production. Nevertheless, all 3 companies in the consumer sector have a rating above the average for the relevant industry.

5 Results and Discussion

Summing up the results of the analysis, we can say that the current macroeconomic situation is extremely uncertain. High inflation, rising interest rates and rising energy prices have a negative background for the stock market as a whole. However, the winter and spring fall of the main US indices can also be viewed on the positive side. The overestimation of some of the leading sectors of the American economy on the eve of 2021 became obvious and alarmed many participants in economic society, resembling another bubble. The decline in prices brought them closer to fair value, and brought the supporters of the bullish rally to their senses. Also, the current price bottom is a good opportunity for long-term investors to buy additional assets into their portfolio.

The efficiency of the technology sector, as described above, has suffered a big drop since the end of 2021. The end of the pandemic means a decrease in demand for digital entertainment, devices and software. Another reason for the slowdown is the continued disruption of supplies due to a shortage of semiconductors. The expected supply recovery is of a medium-term nature, the adjustment of additional production capacities of a high-tech product takes time. Nevertheless, technology companies have other development goals in the near future, including the development of cloud and hybrid databases and data analysis listed in the practical part, the introduction of a hybrid workforce in production and the achievement of a more environmentally friendly production of the technology sector.

In the case of the consumer goods sector, the situation is ambiguous. As a rule, during periods of recessions or uncertainty, companies in this sector are strengthened by being more stable types of investments. The demand for basic necessities does not fall even with the most pessimistic developments. However, at the moment there is an increase in the cost of energy carriers or crowds, which carries an increase in production and logistics costs. Companies in this sector will have to sacrifice profits to maintain the current volume of supplies, although many companies have already successfully shifted the upcoming costs to their consumers.

In the section of the dividend discount model, data on the value of firms of all six selected companies were obtained. Two approaches of stable and two-stage growth of companies were used. In terms of the forecast of dividend payments, Intel, Procter & Gamble and Coca-Cola were undervalued by the market, while the market price of Qualcomm and Estee Lauder turned out to be higher than the values obtained in the model. The results for

Oracle turned out to be close to the market with the estimated cost lagging behind the market value of \$1.

With regard to the FCFE model, the fair price of Coca-Cola and Procter & Gamble was significantly higher than the market, with a difference of about 50%. In this case, a recommendation for a potential investor to buy. Estee Lauder was overestimated by the market by 5%, while Intel, according to the calculated results, was overestimated by more than twice. Oracle and Qualcomm were not included in the calculation of this model due to the unstable capital structure of the company, which is one of the conditions for using the FCFE discount model.

The following results were obtained from calculating the internal value of companies through the FCFF model: all six companies are undervalued by the market to varying degrees. The values obtained are at least twice as high as their market values, which means a good buying opportunity for each of the options under consideration. Such a result may look implausible; it is possible to check this result in the subsequent part of the evaluation, comparative evaluation.

In a comparative assessment, the following data were obtained:

According to the P/E parameters, all the companies under consideration have lower indicators than those corresponding to their industry. This confirms the assessment obtained in the FCFF model, since all companies are undervalued in this comparison.

In terms of P/B, Intel and P&G have a good result, having 2.06 and 8.26 respectively. It is generally assumed that an indicator less than 3 means a good opportunity for an investor, which we see in the case of Intel. P&G has a higher indicator, but less than the industry average. Qualcomm, Coca-Cola and Estee Lauder have an inflated indicator, which suggests that the companies are overvalued.

The P/S indicator of all companies in the technology sector was below the corresponding industry average. What can not be said about the companies in the consumer goods sector, All three companies are ahead of the average by 1-2 points.

In terms of sustainability, all the companies in the list showed good results relative to their industry averages. Nevertheless, IT companies have very low risk indicators, thereby being more attractive to the investor.

Conclusion

This thesis was devoted to the review and practical application of methods to the valuation of ordinary shares. Six companies from the technology and consumer sectors were selected as the object of the study. A Top-down approach was used to evaluate the selected stocks. A macroeconomic analysis of the US economy was carried out, as well as an analysis of the sectors to which the selected companies belong. In the absolute valuation section, the Dividend discount model, Free Cash Flow to Equity and Free Cash Flow to Firm model were applied. The key indicators P/E, P/B, P/S and P/FCF were considered in the relative evaluation. In addition to the selected indicators, ESG risk assessment indicators were added.

When evaluating the value of shares by different methods, sometimes we got divergent results. Nevertheless, with a comprehensive assessment of all the factors considered, risks and calculations, it is possible to deduce the final result for the investor. The problem may be which factors a particular investor will consider more important and which less.

Answers to research questions received during the writing of the work:

- Which approach to the valuation of common stock most accurately meets modern realities and is suitable for a potential investor?

Depending on the time horizon of investment, fundamental and technical approaches may be applicable to varying degrees. Since in our case we reject short-term investments of a speculative nature, the reference approach to valuation is fundamental. Since the shares reflect the state of the issuing company, first of all it is necessary to analyze the fundamental indicators of the company, including financial analysis and analysis of external factors, such as the state of the economy and industry trends.

However, the use of technical analysis as an auxiliary is always welcome. Since the market does not always give a rational assessment and is prone to spontaneous unrest, understanding the current general market trends can be useful knowledge when planning purchases.

- How psychological behavior of market participants affect the common stock pricing?

Since the theory of an efficient market has exceptions, including the formation of financial bubbles, it is obvious that the psychological behavior of market participants is directly related to the valuation of securities. It is well known that almost always with major fundamental events, the market overreacts violently with a subsequent correction. Another unspoken pattern is that the stock market lives slightly ahead of time on general expectations.

Thus, understanding the psychology of the market and the ability to interpret its trends can become a useful tool in making an investment decision.

References

Books:

Brealey, Richard A., Stewart C. Myers, and Franklin Allen. Principles of Corporate Finance. New York, NY: McGraw-Hill/Irwin, 2006. ISBN 978-1259144387

Damodaran A. Damodaran on valuation: Security Analysis for Investment and Corporate Finance. 2nd edition. 2006 ISBN: 978-0-471-75121-2

Damodaran A., Valuation approaches and metrics : a survey of the theory and evidence. Boston : Now Pub, Foundations and trends in finance, v. 1, issue 8., 2005. ISBN: 9781601980144 1601980140

Damodaran, Aswath. Investment Valuation: Tools and Techniques for Determining the Value of Any Asset. Investment Valuation. Hoboken, N.J.: Wiley, 2012. ISBN 978-1118011522

David T. Larrabee, Jason A. Voss. Valuation Techniques: Discounted Cash Flow, Earnings Quality, Measures of Value Added, and Real Options. Wiley, 2012 ISBN 1118421795, 9781118421796

Edgar Wachenheim. Common Stocks and Common Sense: The Strategies, Analyses, Decisions, and Emotions of a Particularly Successful Value Investor. 2016 ISBN: 978-1-119-25960-2

Edwards, Robert; Magee, John. Technical Analysis of Stock Trends. Snowball Publishing, 2010 ISBN 10: 1607962233

Eugene F. Fama, Merton H. Miller, Marcus Miller. The Theory of Finance. Holt, Rinehart and Winston, 1972. ISBN 0030867320, 9780030867323

Frank J. Fabozzi, Pamela Peterson Drake. Finance: Capital Markets, Financial Management, and Investment Management. Wiley 2009 ISBN: 978-0-470-40735-6

Graham, Benjamin. The Intelligent Investor. HarperBusiness, 2003. ISBN-10. 9780060555665.

Robert D. Edwards, John Magee, W. H. C. Bassetti. Technical Analysis of Stock Trends. CRC Press, Taylor & Francis Group, 2018 ISBN 1138069418, 9781138069411

Williams, J.B. The Theory of Investment Value. Harvard University Press, Cambridge, MA, 1983. ISBN 9781607964704

Articles:

James X. Xiong. The Impact of ESG Risk on Stocks. The Journal of Impact and ESG Investing Fall 2021

Robert J. Shiller. From Efficient Markets Theory to Behavioral Finance. New Haven. Journal of Economic perspectives 2003 DOI: 10.1257/089533003321164967

Russell J. Fuller & Chi-Cheng Hsia (1984) A Simplified Common Stock Valuation Model, Financial Analysts Journal. Vol. 40, No. 5, pp. 49-56 ISSN: 0015-198X

Online sources.

Investing.com financial portal. <https://www.investing.com/>

Macrotrends database <https://www.macrotrends.net/>

Statista database. <https://www.statista.com/>

Sustainalytics ESG ratings database. <https://www.sustainalytics.com/>

US Federal reserve board. <https://www.federalreserve.gov/>

WorldBank database. <https://www.worldbank.org/en/home>

Yahoo! Finance Financial portal. <https://finance.yahoo.com/>

Aswath Damodaran's website. <https://pages.stern.nyu.edu/~adamodar/>

