

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economic Theories



Bachelor Thesis

Approaches to Common Stock Valuation

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BACHELOR THESIS ASSIGNMENT

Vera Gribanova

Business Administration

Thesis title

Approaches to common stock valuation

Objectives of thesis

The main purpose of my work is to use theoretical knowledge about approaches to common stock valuation in the process of making real investment decisions. In achieving my main goal, I will consider various techniques and approaches, theoretical aspects of the stock market. A study of the company's common stock will help predict the future behavior of the stock under study and make the right investment choice. The sub-goal of my work is to study approaches to common stock valuation, to be grounded in this topic and keep up with developing trends.

Methodology

In this thesis for analyzing and evaluating common stocks, I want to mention the use of two main approaches: absolute valuation that is sometimes called discounted cashflow method and relative valuation approach that rests on comparables. In the first method, we use the cash flow discounting path. In the second method, we rely on the market value of comparable stocks. Both approaches will be analyzed in the specific situations of individual companies.

The proposed extent of the thesis

30-40

Keywords

companies, valuation, DCF approaches, relative valuation, absolute valuation, common stock, capital market, market price, financial reports

Recommended information sources

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Expected date of thesis defence

2021/22 SS – FEM

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Declaration

I declare that I have worked on my bachelor 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 bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 15.03.2023

Acknowledgement

I would like to thank Ing. Jana Kalabisová, Ph.D. and all other persons, for their advice and support during my work on this thesis.

Approaches to Common Stock Valuation

Abstract

The main purpose of the author's work is to use theoretical knowledge about approaches to common stock valuation in the process of making real investment decisions. In achieving my main goal, the author will consider various techniques and approaches, theoretical aspects of the stock market. A study of the company's common stock will help predict the future behavior of the stock under study and make the right investment choice based on the fact of over or under valuation of a given stock. The sub-goal of the analysis is to study approaches to common stock valuation, to be grounded in this topic and keep up with developing trends and also decide which company out of three chosen for the analysis – Take-Two, Activision and Electronic Arts is more suitable for potential investments into gaming industry.

In this thesis for analyzing and evaluating common stocks, the author wants to mention the use of two main approaches: absolute valuation that is sometimes called discounted cashflow method and relative valuation approach that rests on comparables. In the first method, cash flow discounting path is used. In the second method, the author relies on the market value of comparable stocks. Both approaches will be analyzed in the specific situations of individual companies.

To conclude, the author highlights the following findings: both methods of valuation are extremely useful and should be used together, not individually; out of three companies chosen for the analysis (Electronic Arts, Take-Two and Activision), Electronic Arts proved itself to be more reliable and safer investment option based on analysis of P/B, P/E, P/CF, volatility and DDM model; The author concludes that investments in gaming industry should be treated with additional precaution due to the fact that the price of stock is highly dependent on the quality of individual products and reception of audience.

Keywords: companies, valuation, DCF approaches, relative valuation, absolute valuation, common stock, capital market, market price, financial reports, Take-Two, Activision, Electronic Arts, gaming

Přístupy k oceňování kmenových akcií

Abstrakt

Hlavním účelem autorovy práce je využití teoretických znalostí o přístupech k oceňování kmenových akcií v procesu rozhodování o skutečných investicích. Při dosahování mého hlavního cíle bude autor zvažovat různé techniky a přístupy, teoretické aspekty akciového trhu. Studie kmenových akcií společnosti pomůže předpovědět budoucí chování studovaných akcií a učinit správnou investiční volbu na základě skutečnosti nad nebo podhodnocené dané akcie. Dílčím cílem analýzy je studovat přístupy k oceňování kmenových akcií, být zakotven v tomto tématu a držet krok s vývojovými trendy a také rozhodnout, která společnost ze tří vybraných pro analýzu – Take-Two, Activision a Electronic Arts je vhodnější pro potenciální investice do herního průmyslu.

V této práci pro analýzu a hodnocení kmenových akcií chce autor zmínit použití dvou hlavních přístupů: absolutního ocenění, které se někdy nazývá diskontovaná metoda cashflow, a relativního oceňovacího přístupu, který spočívá na srovnatelných hodnotách. V první metodě se používá diskontní cesta peněžních toků. Ve druhé metodě se autor opírá o tržní hodnotu srovnatelných akcií. Oba přístupy budou analyzovány v konkrétních situacích jednotlivých společností.

Na závěr autor zdůrazňuje následující zjištění: obě metody oceňování jsou mimořádně užitečné a měly by být použity společně, nikoli jednotlivě; ze tří společností vybraných pro analýzu (Electronic Arts, Take-Two a Activision) se Electronic Arts osvědčilo jako spolehlivější a bezpečnější investiční varianta založená na analýze modelu P/B, P/E, P/CF, volatility a DDM; Autor dochází k závěru, že investice do herního průmyslu by mělo být zacházeno s dodatečnou opatrností vzhledem k tomu, že cena akcií je velmi závislá na kvalitě jednotlivých produktů a příjem publika.

Klíčová slova: společnosti, oceňování, DCF přístupy, relativní ocenění, absolutní ocenění, kmenové akcie, kapitálový trh, tržní cena, finanční zprávy, Take-Two, Activision, Electronic Arts, herní

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1 Introduction

The valuation of common stock is an important tool in business decision making for investors. There are many methods for valuing company stocks which can lead in different results. This is a rather important aspect that should be taken into account in the evaluation, since only with different approaches and analysis of all the results, more realistic values can be deduced.

In today's economy, it matters that shareholders skillfully manage their investment portfolio, separating securities such as bonds, stocks and assets. If the company is successful, the shareholders will receive a profit in the form of dividends. Therefore, shareholders should closely monitor the activities of the company, read the news, be as close as possible to the real atmosphere within the company, and of course, conduct a complete analysis of the financial condition of the organization. A correct assessment of the value of shares will help to avoid losses and wasted time.

This bachelor's thesis is devoted to modern methods of valuation of ordinary shares of video game companies, namely Activision Blizzard, Electronic Arts and Take-Two Interactive. This work consists of two parts: theory and practice. The theoretical part includes a description of common stock valuation models. The practical part focuses on the analysis of the obtained data of selected companies, collected from official sources, and the practical application of valuation models.

2 Objectives and Methodology

2.1 Objectives

The main purpose of the author's work is to use theoretical knowledge about approaches to common stock valuation in the process of making real investment decisions. In achieving my main goal, the author will consider various techniques and approaches, theoretical aspects of the stock market. A study of the company's common stock will help predict the future behavior of the stock under study and make the right investment choice based on the fact of over or under valuation of a given stock. The sub-goal of the analysis is to study approaches to common stock valuation, to be grounded in this topic and keep up with developing trends and also decide which company out of three chosen for the analysis – Take-Two, Activision and Electronic Arts is more suitable for potential investments into gaming industry.

2.2 Methodology

In this thesis for analyzing and evaluating common stocks, the author wants to mention the use of two main approaches: absolute valuation that is sometimes called discounted cashflow method and relative valuation approach that rests on comparables. In the first method, cash flow discounting path is used. In the second method, the author relies on the market value of comparable stocks. Both approaches will be analyzed in the specific situations of individual companies.

3 Literature Review

3.1 Foreword

This section contains all the information needed to help the author to achieve the goals of her bachelor thesis. Concepts of common stocks, investing, stock markets, as well as selected approaches to valuation that will be used in the practical part of the author's work are presented in this chapter. Because of the desire to get more extensive and accurate outcomes, the author tried to use as many sources as possible and include a variety of valuation methods.

3.2 Financial Analysis

3.2.1 Definition

According to many authors in the investment process, there is a financial analysis, which plays an informational and predictive role. Financial analysis can help a person to decide on the correct allocation of funds, the plans of the corporation, as well as the wise choice of securities for investment. For these purposes, economic analysis, capital market analysis, industry and securities analysis is used. The general economic analysis results in short-term (from 4 to 8 quarters) and long-term (from five years) economic forecasts. Such forecasts include information on production, productivity, profits, monetary and fiscal policy. These estimates will be the foundation for predicting the health of the capital markets, industry, or individual companies (Friedlob, 2003).

Referring to B. Graham and D. Dodd, the analysis of capital markets primarily results in assessments of the value and profitability of the equity and bond markets. Equity market valuations refer to markets, as they are represented by generally accepted indices (Graham, 1934).

Analysis of securities is aimed at assessing the prices and profitability of securities in the future, so that overvalued securities can be distinguished from undervalued ones.

3.2.2 Top-down and Bottom-up Approaches

According to authors, taking into account the formal mechanism for developing analytical forecasts for general economic, capital markets and sectoral forecasts, one can make a certain assumption that organizations act according to a top-down scheme: in order to select securities, they look at the economy at home and abroad, and only then take into account the factors of capital markets, sectors and industries (Avadhani, 2009).

Individual investors, on the other hand, should act from the bottom up, that is, in search of undervalued shares, go through the huge number of available shares, paying minimum attention to taking into account general factors.

In fact, many very large organizations use a bottom-up approach to investing, and many private investors with very limited resources move from the top down. It follows that the securities analyst must rely on different types of audiences. Top-down portfolio managers will look to him for confirmation that they are making the same assumptions, while bottom-up portfolio managers will be more interested in information about specific companies. Evaluations must take into account all the characteristics of the company and its business in order to determine the suitability of its securities for a specific portfolio (Higgins, 1995).

3.3 Common Stocks

Common stocks represent ownership shares in corporations. Ownership gives the holders of common stocks certain advantages over the holders of bonds. Holders of common shares can vote to elect the board of directors of the corporation. In turn, the board of directors exercises overall control over the corporation. Also, common shareholders can vote for changes in corporate articles and mergers. Holders of common shares are entitled to receive all profits from the business, which remain after all other holders of debt and equity securities have received their income or payments. However, the firm may wish to retain some portion of the profits to expand or improve the business. If the board of directors declares this, common shareholders receive dividends (Easley, 1997).

Dividends, in turn, are cash payments that allow the holders of a share to receive some return from their investment. For many investors, the attractiveness of common stock

dividends is manifested in their ability to increase over time. As the firm becomes more successful, so does the dividend payout. And vice versa, if the company has problems, there is a risk of a reduction in dividend payments or their complete cancellation until the financial position of the company is fully restored. Unfortunately, holders of common stocks are in the most disadvantageous position in the event of liquidation of the company, because all other creditors and holders of other securities will receive their money, and only after those common shareholders will receive proceeds from the liquidation. As a rule, common shareholders receive little from liquidation procedures. Common can have par value (equity) or a declared value on the registration certificate. The par value of common shares usually has little to do with the current price or book value of the shares. It is used primarily for accounting purposes and some legal needs (Molodovsky, 1965).

3.4 Securities Exchange

Trading on stock exchanges has been going on for a long time, in 1817 the first stock exchange (NYSE) in the United States appeared in New York, which is the largest in the world and, according to statistics, as of September 2021, the capitalization of the securities market was about 28.36 trillion US dollars. The next three exchanges by capitalization were NASDAQ, Shanghai Stock Exchange and Euronext (Atkins, 1997).

Over time, the number of exchange participants increased and the attitude towards securities trading became more serious, and the traded amounts grew astronomically. In 1934, the US Congress issued the "Securities Exchange Act of 1934". This law includes such sections as the Securities and Exchange Commission, transactions on unlisted exchanges, national exchanges, reporting requirements, quotation systems and much more. The fact is that the United States pays a lot of attention to the legal side.

In accordance with Section 4 of this document, The Securities and Exchange Commission (SEC) was established. As the Act says, The Commission includes five commissioners to be appointed by the President with the advice and consent of the Senate. No commissioner can do some other job in any other business, vocation, or employment than that of serving as commissioner, no may any commissioner participate in any stock-market operations or transactions of a character subject to regulation by the Commission.

This act has many legal restrictions and rules. For example, as stated in Section 9 "PROHIBITION AGAINST MANIPULATION OF SECURITY PRICES", it is unlawful for any person who is a member of a national stock exchange to create a false or misleading appearance of active trading in any security listed on a national stock exchange. Another rule from the same Section tells it is unlawful for any member of a national securities exchange to endorse or guarantee the performance of any put, call, straddle, option or privilege in relation to any security registered on a national securities exchange. This regulation was created with the aim of maintaining fair and fair trading between members of the exchange (Benston, 1973).

3.5 Techniques

3.5.1 Fundamental Analysis

Fundamental Analysis (FA) is a method of measuring the intrinsic value of a security-related to economic and financial factors. Fundamental analysts study everything that can affect the value of a security, from the state of the industry to the effectiveness of company management. In turn, the fundamental analysis includes the absolute and relative valuation of stocks (Petrusheva, 2016).

The absolute valuation of the stocks is based on various company information. An absolute valuation usually involves an analysis of financial information that can be found in the financial statements. Many absolute valuation methods focus primarily on a company's cash flow, dividend, and growth rate (A. Damodaran, 2011, p, 15). Well-known methods for absolute valuation of reserves include models such as the Dividend Discounted Model (DDM), the Discounted Cash Flow Model ((DCF), and the Residual Income Valuation Model (RI) (Wafi, 2015).

In the relative valuation, the value of an asset is compared to the values assessed by the market for similar or comparable assets (Damodaran, 2011). In other words, it is possible to compare companies' investments in the same industry.

As A. Damodaran wrote, to carry out a relative valuation of a share, it is necessary to determine comparable assets and obtain the market value of these assets. Next, it is needed to convert these values to standardized ones, since no one is comparing absolute prices. This standardization process creates price multiples. Next, the standardized value or multiple for the analyzed asset is compared with the standardized values for the comparable asset, monitoring any differences between firms that could affect the multiple to determine if the asset is undervalued or overvalued.

3.5.2 Dividend Discount Model

The Discounted Dividend Model, or DDM, is a quantitative method for valuing a company's shares based on the hypothesis that the current fair price of a share is equal to the sum of all future dividends of the company, discounted to their present value.

Depending on the variant of DDM, the analyst needs to predict future dividend payments, increase in dividend payments and the cost of equity. It is almost impossible to predict all variables with 100% accuracy. Thus, the theoretical fair price of a stock is often far from reality. Even though many analysts turned away from this model and considered it outdated (Damodaran, 2011), some companies for whom the dividend discounting model remains a useful valuation tool still use it.

There are different variations of this model due to the fact that forecasts of dollar dividends cannot be made indefinitely, so several versions of the dividend discounting model have been developed based on different assumptions about future growth (Damodaran, 2011)). In this work the author considers Gordon Growth Model.

The Gordon Growth Model is one of the simplest used variations of DDM GGM is called after American economist Myron J. Gordon, who offered the variation This model helps an investor to evaluate a stock's intrinsic value that is based on the constant rate of growth of potential dividends. The GGM is based on the hypothesis the flow of future dividends will grow at some constant rate in the future infinitely. A. Damodaran calls this speed a "steady state". The model is helpful in evaluating the value of a stable business with strong cash flow and sustained dividend growth. Generally, it supposes that the company

being evaluated has a stable constant business model and the company's growth occurs at a constant rate over time (Ichkitidze, 2022).

GGM is expressed by this way:

$$P = \frac{D_1}{r - g}$$

Where:

P = Stock price

r = value of next year

g = Growth rate in dividends forever

In Gordon's growth model, it is important to have an idea of a stable growth rate, since it is rational to apply it only to firms with a stable growth rate. There are two points to keep in mind when evaluating "stable" growth rates. Since the growth rate of a firm's dividend is expected to be perpetual, other measures of the firm's performance (including earnings) can also be expected to grow at the same rate. On the other hand, if in the long run the firm's profits grow faster than dividends, the payout ratio in the long run will tend to zero, which is also not a steady state. Thus, while the model requires the expected growth rate of dividends, analysts should be able to substitute the expected growth rate of profits and get exactly the same result if the firm is indeed in a steady state.

It also raises the question of what rate of growth is reasonable as a "stable" rate of growth. No one cannot ignore the estimates related to expected inflation and real economic growth. There also a need to take into account the company's growth rate, which cannot be higher than the economic growth rate, but can be less. Firms can get smaller over time in relation to the economy as a whole (Farrell, 1985)

3.5.3 Relative Valuation

Price to Free Cash Flow

Martani explain that Price to Free Cash Flow ratio or P/FCF is a valuation metric that compares the current share price of the company to its free cash flow per share. This is

measured on a TTM (trailing 12-month) basis and uses diluted shares outstanding. P/FCF is a measure that investors find useful for analyzing a company's finances in relation to its current stock price (Martani, 2009).

Free cash flow is directly related to the state of cash from the operating activities of the company, which, in turn, is related to the company's net profit. Companies can manage their free cash flow by, for example, increasing the time it takes to pay bills, or shortening the time it takes to receive their due, and delaying purchasing inventories. It also depends on which items the company considers to be capital expenditures, as things differ from company to company.

Low P / FCF readings often indicate an undervalued company whose stock is cheap relative to its free cash flow. Conversely, a high P / FCF ratio indicates that the stock is relatively overvalued. Thus, value investors prefer companies with relatively low stock prices and high total free cash flow.

It is best to compare the price / free cash flow ratio between similar companies in the same industry. But P / FCF can also be used to look at one company over a longer period of time to see if cash flow improves or decreases.

$$\text{Price to free cash flow} = \frac{\text{Price of Stock}}{\text{total free cash flow}}$$

Free cash flow is equal to operating cash flow (OCF) deducting capital expenditures.

$$\text{OCF} = \text{total sales} - \text{operating expenses}$$

Price to Cash Flow

According to Martani the price-to-cash flow ratio (P/CF) is a stock valuation indicator or multiple that measures the value of a stock in relation to its operating cash flow per share. The ratio uses operating cash flow (OCF), which adds non-cash costs such as depreciation and amortization to net income.

P/CF is especially useful for valuing stocks that have positive cash flow but are not profitable due to large non-cash spending (Martani 2009).

It is important to remember that the ratio of price to free cash flow is not the same as the ratio of price to cash flow. The difference is that the former subtracts capital costs from cash flow, thus leaving cash flow available to drive non-asset growth.

Price-to-Earnings (P/E) Ratio

Ghaeli explains that the Price Earnings Ratio (P/E Ratio) is the relationship between a stock price of a company and earnings per share (EPS). This is the ratio that gives investors a better idea of the value of the company. The P / E ratio shows market expectations and represents the price that an investor must pay for a unit of current or future profit (depending on the case).

When evaluating a company's stock, profit is important because investors want to know how profitable the company is now and how it will be in the future. In addition, if the company is not growing and the current level of profit remains constant, the P / E ratio can be interpreted as the number of years it takes for the company to pay the amount paid for each share (Ghaeli, 2017).

P/E ratio is represented by the following formula:

$$P/E \text{ ratio} = \frac{\textit{Price of Stock}}{\textit{earning per share}}$$

P/E tells very little if it's not compared historically or the competitor's P/E from the same field. The advantage of the P/E ratio is that it standardizes stocks of different prices and earnings levels.

Companies with a high Price Earnings Ratio indicates positive future results regarding stocks and investors are willing to pay more for them. The other side to this is that growth stocks are often higher in volatility, and this forces companies to do more to justify a higher valuation. For this reason, investing in growth stocks will be a risky investment. Stocks with high P/E ratios can also be called overvalued.

Companies with low price-to-earnings ratios are often considered value stocks because they are undervalued and below their benchmarks. This mispricing will be a great incentive to buy stocks before the market fixes them. Subsequently, the investor will receive a high profit.

Differences in P/E ratios of companies

Certified Financial Planner Frankel emphasizes that P/E ratios can vary. First, stock prices are constantly changing, and so are P/E ratios. P/E ratios also change quarterly as new earnings data are released. Secondly, there are different ways to calculate P/E depending on the annual period that is used to determine the company's annual profit. For example, using a company's earnings for the last four quarters, it is possible to calculate the P/E ratio for the last 12 months or TTM. Using a company's expected earnings for the next four quarters, one can calculate its forward P/E ratio (Frankel, 2007).

According to Frankel, there are several main factors that determine a company's P/E ratio. If the stock market rises, for example, by 81% in five years, the average P/E of stocks will also rise at the same time. The same applies to specific sectors - for example, if the market is positively biased towards the technology sector, this can lead to an increase in the price/earnings ratio of the technology sector. Also important is sustainability and any company-specific risks. Companies that are considered stronger or more stable by investors tend to trade at higher P/E ratios compared to similar companies that are considered less reliable or riskier.

Finally, perhaps most influential is the expectation of growth. Fast-growing companies often trade at astronomically high P/E ratios. The point is that these shares are traded based on their future earnings potential.

Shiller's CAPE ratio

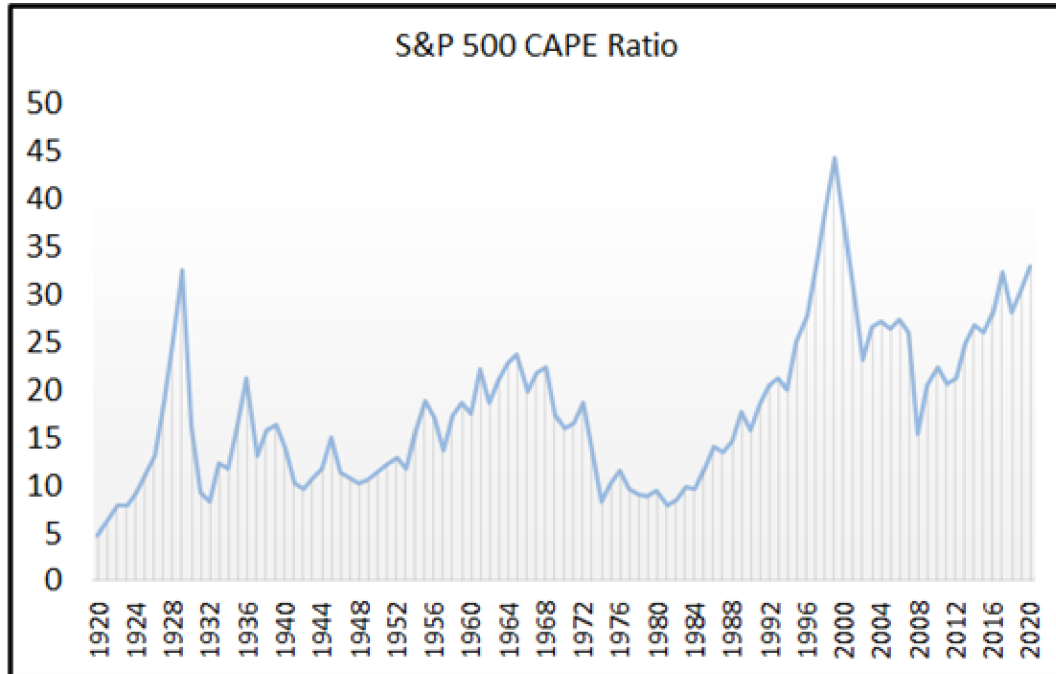
According to Keimling, over the past 100 years, US stocks have realized real capital gains of 7% per year. No other asset class—bonds, gold, or cash—provided a comparable return potential. However, stock markets are subject to strong fluctuations, and the possible return is highly dependent on the time of investment. Therefore, the main question for investors is how they can more accurately predict the long-term development of the stock

market. In the case of individual stocks, fundamental analysis of companies can provide information about future returns. Based on the well-known value effect, undervalued stocks generate greater capital gains than overvalued stocks. However, the question is if this statement can be applied to stock markets in general. Harvard and Yale professors Campbell and Shiller were the first to explore this issue for the US market. To this end, they calculated the price-to-earnings (PE) ratio for the S&P 500 by dividing the index value by the combined earnings of all companies in the index. So, they noticed that periods of high market valuation were often followed by years of low returns. However, classic PE has two drawbacks. First, corporate earnings are quite volatile and almost impossible to predict in practice. In addition, PE seem unattractive during crisis years, when low or negative corporate earnings provide lucrative buying opportunities. At such a time, PE does not take into account the potential for profit growth after the crisis. Campbell and Shiller developed the cyclically adjusted price-to-earnings ratio (CAPE), which relates the current market price to the inflation-adjusted average earnings over the previous 10 years. The purpose of the 10-year follow-up period is to ensure that returns are averaged over more than one return cycle (Campbell, 1988).

Adjusting for inflation gives earnings comparability even during periods of high inflation. In this way, CAPE measures whether a stock market's value is high or low relative to its level of return, adjusted for the business cycle it is likely to return to. According to Campbell this mean reversion is not due to changes in income, but in prices, which allows for more reliable long-term forecasts of returns than classical PE.

Next, the author would like to demonstrate the CAPE ratios over 100 years. The data is taken from Shiller's website and matches NASDAQ data.

Figure 1, S&P 500 CAPE Ratio



Source: Shiller, 2022

Price to Book value

The price-to-book value ratio compares a company's market value to its book value. The market value of a company is the price of its shares multiplied by the number of shares outstanding. The book value is the net assets of the company. The price-to-book ratio for a financial services firm is the ratio of the price per share to the book value of equity per share. Other things holding equal, higher earnings growth, higher payout ratios, lower cost of equity and higher return on equity should result in a higher price to book value ratio, with return on equity being the dominant variable. If anything, the strength of the relationship between price-to-book value and return on equity should be stronger for financial services firms than for other firms because the book value of equity is much more likely to match the market value of existing assets (Damodaran, 2011).

$$P/B = \frac{\textit{Market Capitalization}}{\textit{Book value of equity}}$$

Market capitalization is calculated as the current share price multiplied by the total number of diluted shares outstanding. Book value is the net difference between the book value of assets on the balance sheet less the company's total liabilities.

4 Practical Part

4.1 Overview of Companies

4.1.1 Activision

One of the largest companies in the field of computer games, Activision Blizzard, was formed in 2008 through the merger of Vivendi Games and game developer for game consoles and PC Activision. Vivendi Games at the time was a division of the French media holding Vivendi SA. It included the famous American game developer Blizzard Entertainment, which also became part of the combined company. Together with Blizzard Entertainment, the new company received such famous franchises as Warcraft, Diablo, Hearthstone and Overwatch. Activision, among other things, contributed to the joint portfolio in the form of the Call of Duty series. In 2013, Activision Blizzard spun off Vivendi SA to become independent, and in 2016 acquired Irish mobile game developer King Digital Entertainment, taking over the popular games Candy Crush Saga and Candy Crush Soda Saga.

Activision Blizzard currently has five divisions: Activision, Blizzard, King, Major League Gaming, and Activision Blizzard Studios. The gaming audience of the company exceeds 400 million users. It is led by CEO and President Bobby Kotick. The largest shareholder of Activision Blizzard is currently an American investment company Capital Group. It owns a 7.7% stake through its subsidiary Capital Research & Management. In second place is The Vanguard Group, an independent investment company with a 7.36% share. The developer's shares are traded on the NASDAQ exchange and are included in the S&P 500 index.

Figure 2, Dynamics of stock price changes Activision Blizzard, Inc.



Source: NASDAQ, 2022

Over the past seven years, Activision Blizzard shares have grown by 630%, but in five years they have added only 207%. For several years, investors' attention has been attracted by the good financial performance that Activision Blizzard has achieved due to the great popularity of its games. Activision Blizzard's revenue grew steadily from 2014 to 2018, cumulatively increasing by 70%.

In 2020, Activision Blizzard was one of the few companies that benefited from a global quarantine. Shares of video game developers in general and Activision Blizzard in particular are rising amid the social lockdown caused by the pandemic. It naturally increased the demand for video games around the world. In May, industry sales jumped 52% year-over-year to \$977 million, the best May result since 2008. In March, the growth was 63%, in April - 163%.

Under these conditions, Activision Blizzard shares almost did not notice the collapse in the share market this spring. Quotes returned to the highs of February in less than a month - by mid-April - and are now trading above these levels by 22%.

Since the beginning of 2019, Activision Blizzard has been optimizing. The goal is to redirect finances to the development of the most promising projects. The company laid off

800 employees from spin-offs and increased the number of leading franchise developers by 20%. Activision Blizzard abandoned the development of new products, focusing on existing franchises. The company plans to add new content to existing games and release new series to popular franchises like Call of Duty. This strategy provides a more even and predictable revenue stream, while creating games from scratch is costly and unpredictable in popularity.

In addition, the developer intends to create mobile versions of all its franchises in order to strengthen its position in the more profitable mobile segment. The mobile versions already released by the company were very warmly welcomed by the players: for example, Call of Duty: Mobile was downloaded by 150 million users on phones from October 2019 to February 2020. Activision Blizzard is currently working on a mobile version of the iconic Diablo series. The management of Activision Blizzard connects some hopes with the further development of the eSports industry.

Dividends. Activision Blizzard's shareholder payout has been steadily rising since the company began paying dividends in 2010. This attracts investors who prefer a dividend strategy. At the end of 2019, the company paid \$0.41 per share, which is 11% more than a year earlier. However, the dividend yield of securities is decreasing, which is associated with a faster growth in quotes.

Adequate debt load. Activision Blizzard has accumulated a large amount of money in its accounts and, thanks to this, has recorded a negative net debt for three years in a row. At the end of the first quarter, the developer's cash and cash equivalents reached \$5.91 billion. This is more than twice the long-term debt of \$2.68 billion. That is, if desired, the company can quickly pay off all debt.

4.1.2 Electronic Arts

Electronic Arts is an American corporation founded in 1982 that develops and distributes computer and console games. The headquarters is located in Redwood City, California. The flagship of the gaming industry began with publishing games, but by the late 1980s began to develop support for console games. Currently, the company's most successful

products are sports games and games based on popular movie licenses, such as Harry Potter. The corporation is also a distributor of the Rock Band series.

Electronic Arts receives most of its revenue from selling content in the form of add-ons to its games. Thus, each new game brings the company a stable cash flow for years to come. At the same time, the revenue from the sales of the games themselves is not so large. The mobile segment accounts for 12% of revenue and is growing at a moderate pace. In the last financial year the company managed to increase revenue by 11.9% to \$5.5 billion. The main growth driver of the indicator in 2020 was the services segment. The company is doing a good job of optimizing the business: operating expenses are growing at a slower rate than net profit. For fiscal year 2020, the cost of products increased by 3.6%.

Figure 3, Dynamics of stock price changes Electronic Arts Inc.



Source: NASDAQ, 2022

The company invests a significant share of its revenue in research and development. Electronic Arts constantly introduces the latest technologies in all business segments. The company's net profit in 2020 increased 3 times, however, this is not the result of operating activities and is of a one-time nature. In past periods, Electronic Arts has created a provision for income tax, which is reflected in the accounts and increased profit by \$1.5 billion.

Looking at the adjusted figure, excluding the provision for taxes, net income increased by 48% to \$1.508 billion.

The capital of the company increases from year to year, including due to retained earnings. Since Electronic Arts does not pay dividends, it can be assumed that the company creates reserves for large-scale investment projects. Stable operating cash flows keep the business running almost entirely, which is why Electronic Arts has a negative net debt. Accounts payable is only \$68 million. The minimum level of debt allows the company to feel stable in a crisis. Dividends. If one looks at the rest of the companies in the sector, you'll notice that Electronic Arts isn't the only high-tech company that doesn't pay dividends. Among the closest competitors, only Activision Blizzard regularly shares profits with shareholders, but the dividend yield of the company's shares fluctuates in the range of 0.5-1%.

4.1.3 Take-Two

Take-Two Interactive Software is an American video game company. The company owns two major publishing brands Rockstar Games and 2K. The latter, in turn, consists of two divisions: 2K Games and 2K Sports, which own and operate various game development studios. Take-Two's portfolio includes many successful video game series including BioShock, Borderlands, Civilization, Grand Theft Auto, NBA 2K, Red Dead and XCOM. Take-Two Interactive Software, Inc. (hereinafter Take-Two) is a developer, publisher and marketer of interactive entertainment for consumers around the world. The products created are designed for console gaming systems such as Sony PS4, Microsoft Xbox One, Nintendo's Switch and PC, including smartphones and tablets. The company was founded in 1993 and is headquartered in New York.

Take-Two's own development studios located in Australia, Canada, China, Czech Republic, Hungary, India, Spain, United Kingdom and United States. The licensed brand portfolio includes ioShock, Bully, Carnival Games, Dragon City, Grand Theft Auto, Kerbal Space Program, L.A. Noire, Mafia, Manhunt, Max Payne, Midnight Club, Monster Legends, Red Dead, Sid Meier's Civilization, XCOM.

Take-Two has license agreements in place with Sony and Microsoft to develop and publish software in Asia, Australia, Europe, North America and certain countries in Latin

America, the Middle East and Africa. About 75% of the company's revenue comes from the sale of platforms created by these software vendors.

Product sales are made through retail, digital download, online platforms and streaming services. At the same time, there is dependence on a number of major customers, including Sony, Microsoft, Steam, GameStop and Epic. Sales to this group of companies account for about 70% of Take-Two's total revenue.

Figure 4, Dynamics of stock price changes Take-Two Interactive Software, Inc.



Source: NASDAQ, 2022

Sales are carried out worldwide. The largest markets are Australia, Canada, France, Germany, Japan, the Netherlands, New Zealand, Singapore, South Korea, Spain, Taiwan, the United Kingdom and the United States. Sales outside the US account for approximately 42% of consolidated revenue. At the same time, Take-Two continues to implement initiatives to grow its segment in the Asia-Pacific market (China and South Korea) by increasing sales of existing products and expanding its presence in online games.

4.2 Industry Analysis

According to Macrotrends (The Research Platform for Long Term Investors) and checking the data through NASDAQ, in the Table 1 there can be seen the following market capitalization companies from 2010 to 2021:

Table 1, Historical market capitalization of the companies

Date (end of December)	Activision Blizzard (bln. USD)	Electronic Arts (bln. USD)	Take-Two Interactive Software (bln. USD)
2010	15.2	5.44	0.99
2011	14.14	6.84	1.13
2012	12.43	4.61	1.04
2013	12.97	6.99	1.49
2014	14.55	14.58	2.26
2015	28.18	21.37	2.91
2016	26.72	23.86	4.46
2017	47.74	32.36	12.48
2018	36.04	25.58	11.51
2019	45.12	31.41	13.82
2020	71.59	41.64	23.90
2021	51.76	37.33	20.49

Source: NASDAQ, 2022

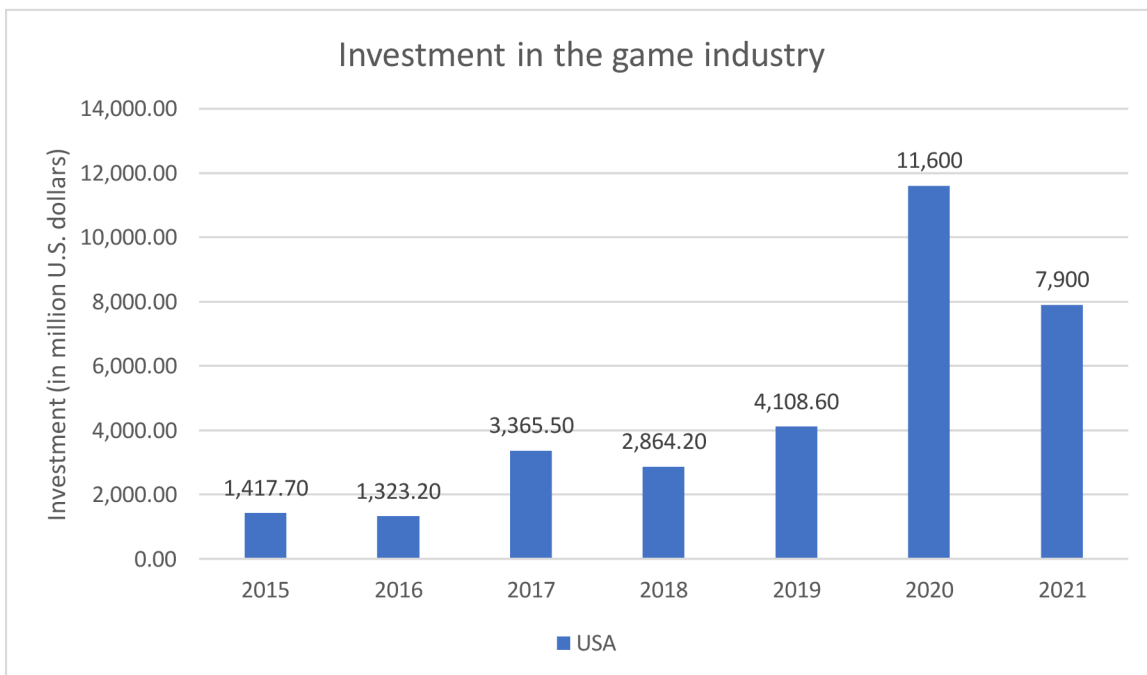
As can be seen from the table, the market capitalization of all companies has grown strongly from 2010 to 2021. So, for Activision Blizzard, it increased by 3.4 times, for Electronic Arts by 6.9 times, and for Take-Two Interactive Software by 20.7 times.

Analysis of the sector in which the company operates is a very important step for potential investors. It is extremely important to have a clear understanding of the products and services of companies that provide similar goods and services. Also, when evaluating a particular industry, analysts must take into account certain factors, such as the domestic labor market, government intervention, and others.

Video games are electronic games that can be played on a personal computer, game console, or mobile phone. Depending on the platform, video games are divided into computer and console. Modern video games offer photorealistic graphics and in many cases mimic striking resemblance to reality.

The video game industry in the United States is one of the largest in the world, spanning businesses of all sizes, from independent developers to multinational companies employing thousands of people working on a variety of tasks. According to Statista data compiled by Clement (2021), in 2021, the video game industry in the United States reached an all-time high of \$85.86 billion in revenue, up 11.9% from the previous year. The main sub-sectors of the video game industry are game development and publishing, hardware, interactive platforms and media, distribution, retail (digital and physical), and arcade and gaming establishments. To demonstrate the seriousness and scale of the gaming industry, it is important to pay attention to the data on funding received through investments in the US gaming industry.

Figure 5, Funding by investment in the gaming industry in US (2015 - 2021)

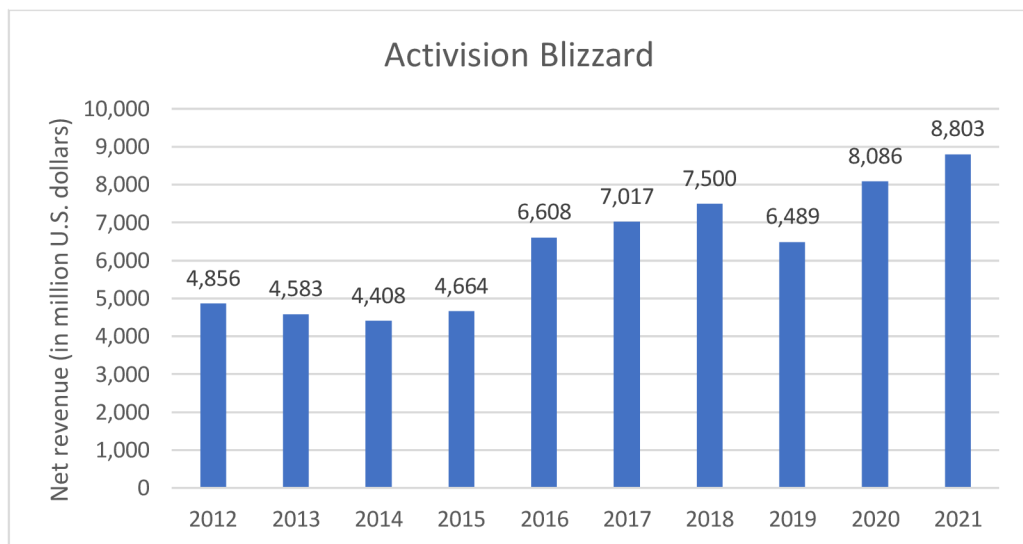


Source: own processing based on Yahoo Finance

From this graph, it can be seen that since 2019, investment in the gaming industry has increased significantly, which is not typical for many industries. It is worth remembering that during Covid-19 the number of players around the world increased greatly, because many other leisure activities became unavailable. Investors reacted to this change in the market, which led to this result. Further, the decline can be explained by the easing of restrictions associated with Covid-19, however, investment has not stopped and has not changed dramatically.

To support the assertion, useful is to present revenues generated by the following game industry companies from fiscal 2012 to 2021.

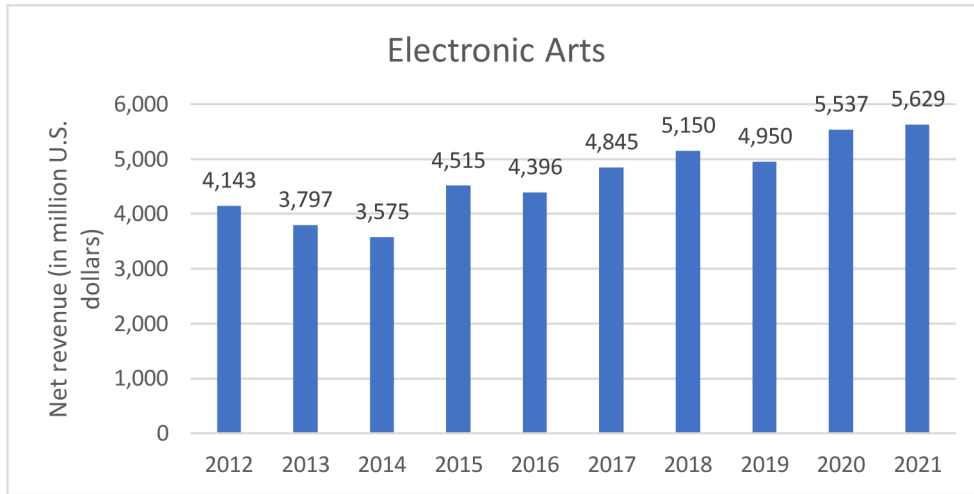
Figure 6, Net revenue by Activision Blizzard from (2012-2021)



Source: own processing based on Yahoo Finance

From this graph, it can be seen that the net profit of Activision Blizzard is gradually increasing, only in 2019 was a decrease. However, the trend is positively rising. In 2021, Activision Blizzard generated \$8.8 billion in annual revenue.

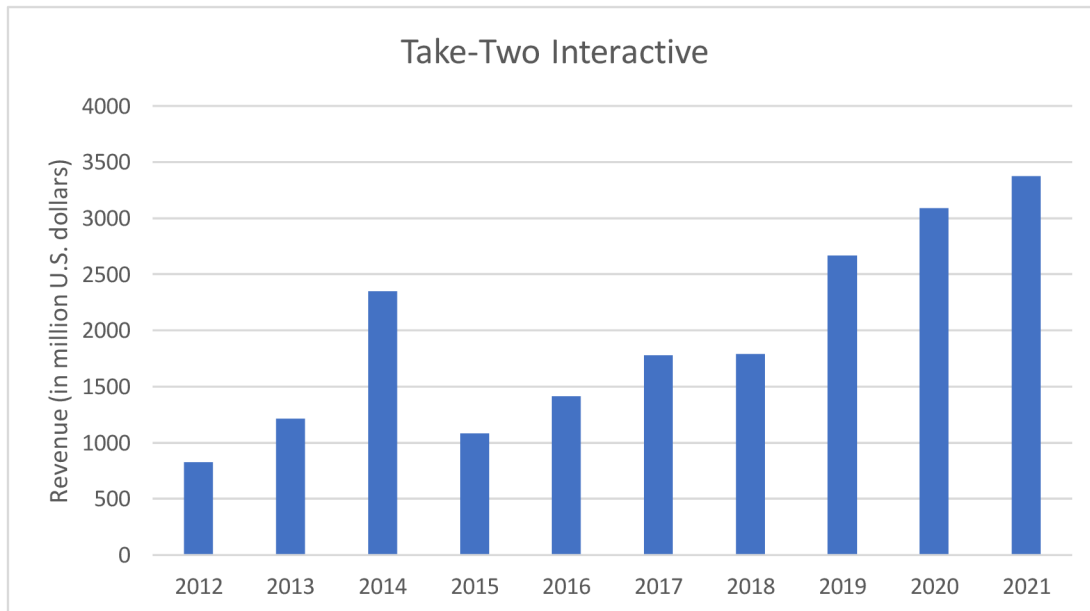
Figure 7, Net revenue by Electronic Arts from (2012-2021)



Source: own processing based on Yahoo Finance

It can be seen from the chart that Electronic Arts generated a net revenue of \$5.63 billion in FY 2021. This represents a slight increase in revenue from the previous year and continues to reflect a positive overall trend, given that 2016 revenue was less than \$4.4 billion.

Figure 8, Net Revenue Take-Two Interactive from (2012-2021)



Source: own processing based on Yahoo Finance

As it can be seen from the chart, video game publisher Take-Two Interactive generated \$3.37 billion in total revenue, up from \$3.09 billion in the previous fiscal year. It can also be concluded that there is a positive trend in the company's revenue.

4.3 P/B Analysis

In this part, the author focuses on calculating P/B values for all companies as of November 2022. In the following table, calculation of P/B value for all companies is presented.

Table 2, P/B ratios calculation

<i>Name</i>	<i>Price of Stock, USD</i>	<i>Book Value Per Share</i>	<i>P/B ratio</i>
Activision	72	23.33	3.08
Electronic Arts	130	27.39	4.74
Take-Two	109	57.97	1.8

Source: own processing

It is visible that EA has the biggest figure for P/B ratio indicator, so it is possible to say that the company's market valuation is significantly higher than their actual book value, especially compared with the rest of companies participating in the analysis. All in all, further reflections will be presented in the discussion section.

4.4 P/CF Analysis

In the next part, the author focuses on calculation of P/CF ratio, which would shed a brighter light on the company's valuation relatively to the cash flow generated by the company per period (one year). The following table presents the overview for each company.

Table 3, P/CF ratios calculation

<i>Name</i>	<i>Price of Stock, USD</i>	<i>Cash Flow Per Share</i>	<i>P/CF ratio</i>
Activision	72	2.95	24.4
Electronic Arts	130	6.12	21.24
Take-Two	109	0.75	145.33

Source: own processing

Consequently, it is possible to see that the situation with P/CF ratio is somewhat different compared to the calculation of the first set of ratios for each company (P/B ratios). Here, Take-Two has absolutely the biggest numbers exceeding two other companies by almost 7 times, which is quite astonishingly high.

4.5 P/E Analysis

Finally, the author focuses on calculating P/E ratios for the same list of companies. The overview of calculations is presented below.

Table 4, P/E ratio calculation

<i>Name</i>	<i>Price of Stock, USD</i>	<i>Earnings per Share</i>	<i>P/E ratio</i>
Activision	72	3.44	20.9
Electronic Arts	130	2.71	47.97
Take-Two	109	1.52	71.71

Source: own processing

Based on the calculation of P/E ratio, it is possible to say that the best situation is identified in Activision, where investors pay just 20 dollars for 1 USD of earnings. Undoubtedly, the worst situation is the one identified in Take-Two, where investors have to pay 71.71 just to get 1 USD in earnings.

4.6 Volatility Analysis

For the calculation of volatility, the author uses excel due to large amount of data needed to be processed. In addition to that, the author selects a time period of 2 years for the analysis. The output of volatility analysis for the first company, Activision, is presented below.

Table 5, volatility analysis of Activision

<i>Activision</i>	
<i>Date</i>	<i>Price of Stock</i>
01.12.2020	91.85659
01.01.2021	90.026382
01.02.2021	94.587067
01.03.2021	92.00499
01.04.2021	90.214355
01.05.2021	96.675354
01.06.2021	94.876053
01.07.2021	83.125893
01.08.2021	81.883278
01.09.2021	76.932701
01.10.2021	77.727982
01.11.2021	58.253735
01.12.2021	66.136879
01.01.2022	78.543137
01.02.2022	81.018417
01.03.2022	79.636635
01.04.2022	75.153282
01.05.2022	77.879997
01.06.2022	77.860001
01.07.2022	79.949997
01.08.2022	78.489998
01.09.2022	74.339996
01.10.2022	72.800003
01.11.2022	71.959999
04.11.2022	71.959999

<i>Volatility</i>
9.43896793
12%

Source: own processing based on Yahoo finance

Following the analysis, it is possible to conclude that the volatility of Activision on the time interval of 2 years (from the 1st of November 2020 until the 1st of November 2022) was 9.43 USD or 12% compared to the mean.

The output of volatility analysis for the second company, Electronic Arts, is presented below.

Table 6, volatility analysis of Electronic Arts

<i>Electronic Arts</i>	
<i>Date</i>	<i>Price of Stock</i>
01.12.2020	126.420212
01.01.2021	142.105225
01.02.2021	141.898209
01.03.2021	132.752106
01.04.2021	134.139374
01.05.2021	140.962967
01.06.2021	141.806274
01.07.2021	142.699203
01.08.2021	142.998276
01.09.2021	144.239929
01.10.2021	141.467514
01.11.2021	139.478531
01.12.2021	123.536705
01.01.2022	131.174454
01.02.2022	132.108078
01.03.2022	129.548752
01.04.2022	125.983665
01.05.2022	117.717361
01.06.2022	138.259308
01.07.2022	121.307213
01.08.2022	131.037613
01.09.2022	126.684006
01.10.2022	115.709999
01.11.2022	125.959999

<i>Volatility</i>
8.66423384
7%

Source: own processing based on Yahoo finance

Following the analysis, it is possible to conclude that the volatility of Electronic Arts on the time interval of 2 years (from the 1st of November 2020 until the 1st of November 2022) was 8.66 USD or 7% compared to the mean. When comparing this volatility to the volatility of the first company, it becomes evident that there is less risk involved when trading with Electronic Arts' stocks.

The output of volatility analysis for the third company, Take-Two, is presented below.

Table 7, Take-Two volatility analysis

<i>Take-Two</i>	
<i>Date</i>	<i>Price of Stock</i>
01.12.2020	180.509995
01.01.2021	207.789993
01.02.2021	200.449997
01.03.2021	184.460007
01.04.2021	176.699997
01.05.2021	175.380005
01.06.2021	185.559998
01.07.2021	177.020004
01.08.2021	173.419998
01.09.2021	161.220001
01.10.2021	154.070007
01.11.2021	181
01.12.2021	165.880005
01.01.2022	177.720001
01.02.2022	163.339996
01.03.2022	162
01.04.2022	153.740005
01.05.2022	119.510002
01.06.2022	124.529999
01.07.2022	122.529999
01.08.2022	132.729996
01.09.2022	122.559998
01.10.2022	109
01.11.2022	118.480003

<i>Volatility</i>
28.149835
18%

Source: own processing based on Yahoo finance

Following the analysis, it is possible to conclude that the volatility of Take-Two on the time interval of 2 years (from the 1st of November 2020 until the 1st of November 2022) was 28.14 USD or 18% compared to the mean. Thus, it is possible to say that the biggest risk is involved when trading stocks of Take-Two.

4.7 DDM Model

Finally, the very last piece of analysis that will be incorporated in the following thesis would be dividend growth model, whose essence had been explained previously by the author in the literature review. Thus, it is vital to underline that for successful creation of DDM model for each company selected for the analysis, it is essential to have a discount rate, which in that case would be WACC – weighted average cost of capital. Therefore, the calculation of intrinsic value of stocks will be split into two stages – calculation of WACC that will be used as a discount rate and then the calculation of intrinsic values for each investment option.

The author starts with the calculation of WACC for the first company, Activision. The calculations are presented below.

Table 8, WACC calculations for Activision

<i>Activision</i>			
<i>in millions USD</i>			
Cost of Debt			
Interest expense	108 USD		
Short-term debt	66 USD		
Long-term debt	- USD		
Cost of debt	163.64%		
Income tax expense	465 USD		
Income before tax	3,164 USD		
Effective tax	14.70%		
Cost of debt*(1-T)	139.59%		
Cost of Equity			
Risk-free rate	4.25%	(US treasury bonds)	
Beta	0.49		
Market return	6.09%		
Cost of Equity	5.15%		
Weight of Debt and Equity			
Total Debt	66 USD	0.00%	Weights
Market Cap	56,290,000,000 USD	100.00%	
Total	56,290,000,066 USD		
WACC	5.15%		

Source: own processing

Consequently, the author is able to conclude that WACC for Activision, which will be used as a discount rate for the future DDM model is equal to 5.15%.

The author continues with the calculation of WACC for the second company, Electronic Arts. The calculations are presented below.

Table 9, WACC calculations for Electronic Arts

<i>Electronic Arts</i>			
<i>in millions USD</i>			
Cost of Debt			
Interest expense	58 USD		
Short-term debt	81 USD		
Long-term debt	187 USD		
Cost of debt	21.64%		
Income tax expense	292 USD		
Income before tax	1,081 USD		
Effective tax	27.01%		
Cost of debt*(1-T)	15.80%		
Cost of Equity			
Risk-free rate	4.25%	(US treasury bonds)	
Beta	0.85		
Market return	5.50%		
Cost of Equity	5.31%		
Weight of Debt and Equity			
Total Debt	268 USD	0.00%	Weights
Market Cap	360,900,000,000 USD	100.00%	
Total	360,900,000,268 USD		
WACC	5.31%		

Source: own processing

Consequently, the author is able to conclude that WACC for Electronic Arts, which will be used as a discount rate for the future DDM model is equal to 5.31%.

Finally, the author calculates the final WACC for Take-Two. Calculations are presented below.

Table 10, WACC calculations for Take-Two

<i>Take-Two</i>			
<i>in millions USD</i>			
Cost of Debt			
Interest expense	26 USD		
Short-term debt	39 USD		
Long-term debt	211 USD		
Cost of debt	10.54%		
Income tax expense	47 USD		
Income before tax	465 USD		
Effective tax	10.11%		
Cost of debt*(1-T)	9.47%		
Cost of Equity			
Risk-free rate	4.25%	(US treasury bonds)	
Beta	0.79		
Market return	5.20%		
Cost of Equity	5.00%		
Weight of Debt and Equity			
Total Debt	250 USD	0.00%	Weights
Market Cap	18,090,000,000 USD	100.00%	
Total	18,090,000,250 USD		
WACC	5.00%		

Source: own processing

WACC for Take-Two is equal to 5%. Now, the author will proceed to the calculation of DDM model for each company.

Table 11, Activision DDM model

<i>Activision</i>					
Year	2018	2019	2020	2021	2022
Dividend Payout	0.39	0.4	0.41	0.44	0.45
Yearly Dividends	1.56	1.6	1.64	1.76	1.8
Growth Rate	-	2.56%	2.50%	7.32%	2.27%
WACC	5.15%				
Growth Rate	3.66%				
Intrinsic value	122.73444				
Current price	154.5				
Difference	-26%				

Source: own processing

The stock is overvalued due to the fact that the intrinsic value is lower than the current price.

Table 12, Electronic Arts DDM model

<i>Electronic Arts</i>			
Year	2020	2021	2022
Dividend Payout	0.17	0.17	0.19
Yearly Dividends	0.68	0.68	0.744
Growth Rate	-	0.00%	9.41%
WACC	5.31%		
Growth Rate	4.71%		
Intrinsic value	117.85784		
Current price	130		
Difference	-10%		

Source: own processing

The stock of Electronic Arts is slightly overvalued since the intrinsic value is slightly less than the current price of stock (10% difference).

However, the author is not able to calculate the DDM model for the final company due to the fact that this company does not actually pay out any dividends. Henceforth, there will be just 2 DDM models.

5 Results and Discussion

5.1 Comparison Between Companies

To begin with, it is worth starting by specifying that out of three companies, the author believes that the best one and the most suitable one for investment opportunities is Electronic Arts. The author comes to this conclusion based on the series of analyses including P/B, P/E, P/CF, volatility analysis and also DDM model.

To justify the choice, it is essential to compare the situation of Electronic Arts with the rest of companies selected for the analysis. When it comes to the outcome of P/E ratio analysis, Electronic arts does not really have the best situation because an investor has to pay around 40 USD for just 1 USD of earnings. Especially, in the context of the research, it is visible that Activision, for instance, is doing somewhat better in that component, since investors would have to pay just 20 USD for 1 USD in earnings. The same applies to the outcome of P/B analysis – the value of approximately 5 for this ratio is relatively high, especially when comparing the situation of EA with other companies chosen for the analysis. Yet, this also means that Electronic Arts can easily turn the situation to their benefit and trade at a higher value than their book value, which is good for the company itself but not so beneficial for future investors.

Nevertheless, Electronic Arts have the best value of P/CF ratio, and this value is significantly better than in the rest of the companies analyzed. What is even more important and especially nowadays, is the fact that EA has the lowest volatility with just 7%, compared to 12% for Activision and 18% for Take-Two. Undoubtedly, more risk usually leads to higher returns but yet, it is important to understand that strategies are different for every investor and the author is more focused on a safer investment opportunity.

Finally, the outcome of DDM model calculation underpins the author's assumption for going for Electronic Arts stocks – the difference between the intrinsic value and the actual price of stock is small compared to Activision (26% versus just 10% for Electronic Arts).

Thus, the author concludes the following: investing in Activision might be an interesting idea, but more risky than investing in Electronic Arts. As for the final company, the author believes that Take-Two is extremely overvalued and traded at a price significantly higher than it should be traded, especially given the fact that the company does not really pay out literally any dividends.

5.2 Perspectives

Of course, it is also wise to talk about the future of videogame industry and empathize on the potential development of the three companies selected, as well as on the potential development of the whole segment in the nearest future. As the author sees it, the coronavirus pandemic did eventually succeed in increasing revenues to almost all IT companies and companies whose service is not primarily dependent on physical activity of people, such as visiting a physical store, for instance. Henceforth, it does not really come as a big surprise that the investment into the industry, as well as the net income of corporations went up during the pandemic period, which is also noted by another author analyzing the same economic domain (Lopez, Cabarcos, 2020).

Nevertheless, the author of this study believes that the future of videogames is quite optimistic since the age of digitalization and technological revolution both spread quickly to communities that had not earlier had any access to high-tech devices such as computers and gaming consoles. On the other hand, the author believes that investing in this industry in general is a very risky move. Of course, the recommendation of investing in Electronic Arts did not disappear anywhere, but it is essential to understand that this recommendation is given in the context of the analysis. The author's recent precaution and remark about risky investment is justified by the long history of observations of this industry – whenever a given videogame produced by some company turns out to be a flop or does not turn out to be a real commercial success as the company had been planning prior to its launch, it inevitably reflects on the price of stock. For this purpose, investing into gaming industry is rather risky and what is more, the whole industry is living in numerous cycles – almost all price movements of stocks happen when the company is planning to release something and those releases do not usually happen quite often, just 1 time per year or in the case of

Take-Two, one time in 5 or even 8 years, which is a rather long period of time for waiting. The author comes to the same conclusion as another group of authors researching the same subject (Canina, 2013).

5.3 Recommendations

Finally, the author's final remark would be a quick recommendation that for future research in the same field, it would be more sensible to consider a wider span of companies and expand research by including such giants as Valve, Ubisoft, Sony, Nintendo. By doing so, it will be possible not just to see the situation with game-developers, but also with companies hosting those games and giving game developers a chance to be heard.

6 Conclusion

To conclude, the author highlights the following findings:

- 1) Both kinds of valuation proved themselves to be quite useful but at the same time, it is not possible to make any specific distinction and highlight that either of them (relative valuation and discounted or time value valuation) is better: both of them are useful and should be applied together for reaching more precise and better results.
- 2) Out of three companies chosen for the analysis (Electronic Arts, Take-Two and Activision), Electronic Arts proved itself to be more reliable and safer investment option based on analysis of P/B, P/E, P/CF, volatility and DDM model.
- 3) The author concludes that investments in gaming industry should be treated with additional precaution due to the fact that the price of stock is highly dependent on the quality of individual products and reception of audience.

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