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Approaches to common stock valuation

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Objectives of thesis

Main objective of this Diploma Thesis is to find the intrinsic value of common stock of chosen companies (Amazon, Walmart, Target and Costco which stocks are listed in NASDAQ) and compare results to point out the relative differences among them. Factors which affect the Intrinsic value of common stock will be identified using relevant techniques i.e. financial analysis, econometric modeling.

Methodology

This Diploma Thesis consits of two parts. Literature review provides theorethical background of two commonly used valuation approaches. First Method consider profitability, stability, earnings growth and dividends of a firm. The second method considers comparative value of the market stock price and also finds out rate of future growth applied by the market.

Practical section starts with the financial analysis. It is followed by estimation of appropriate stock price using different stock valuation methods. In addition to this research, regression analysis will be included, which helps to identifie different internal and external factors that affect stock price of chosen firms.

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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 29th November 2021   _____

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Approaches to common stock valuation

Abstract

Main objective of this Diploma Thesis is to find the intrinsic value of common stock of chosen companies (Amazon, Walmart, Target and Costco which stocks are listed in NASDAQ) and compare results to point out the relative differences among them. Factors which affect the Intrinsic value of common stock will be identified using relevant techniques i.e. financial analysis, econometric modelling.

This Diploma Thesis consist of two parts. Literature review provides theoretical background of two commonly used valuation approaches. First Method consider profitability, stability, earnings growth and dividends of a firm. It includes different methods used in stock valuation. The second method considers comparative value of the market stock price and also finds out rate of future growth applied by the market.Practical section starts with the financial analysis. It is followed by estimation of appropriate stock price using different stock valuation methods. In addition to this research, regression analysis will be included, which helps to identified different internal and external factors that affect stock price of chosen firms. The Data For analytical part is taken from Yahoo Finance which of 10 years of Time Period(2010-2020).

In conclusions, Final result of this research is better understanding about the investment decisions in different stock markets and Also what are the major internal and external factors which affects the Common Stock price. It helps Investor to make decision about the purchase of stock or selling of the Stock.

Keywords: Stock Valuation, Financial Analysis, Absolute Valuation Approach, Comparable Valuation Approach, Intrinsic Value, Regression Model, Financial Ratios.

Approaches to common stock valuation

Abstrakt

Hlavním cílem této diplomové práce je zjistit vnitřní hodnotu běžných akcií vybraných společností (Amazon, Walmart, Target a Costco, jejichž akcie jsou uvedeny v NASDAQ) a porovnat výsledky s cílem poukázat na relativní rozdíly mezi nimi. Faktory, které ovlivňují vnitřní hodnotu kmenových akcií, budou identifikovány pomocí příslušných technik, tj. Finanční analýzy, ekonometrického modelování.

Tato diplomová práce se skládá ze dvou částí. Přehled literatury poskytuje teoretické základy dvou běžně používaných přístupů k oceňování. První metoda zvažuje ziskovost, stabilitu, růst zisku a dividendy firmy. Obsahuje různé metody používané při oceňování akcií. Druhá metoda zvažuje srovnávací hodnotu tržní ceny akcií a také zjišťuje míru budoucího růstu uplatňovanou trhem. Praktická část začíná finanční analýzou. Následuje odhad vhodné ceny akcií pomocí různých metod oceňování akcií. Kromě tohoto výzkumu bude zahrnuta regresní analýza, která pomáhá identifikovat různé vnitřní a vnější faktory, které ovlivňují cenu akcií vybraných firem.Analytická část Data pro je převzata z Yahoo Finance, která je 10 let časového období (2010-2020).

Závěrem lze říci, že konečným výsledkem tohoto výzkumu je lepší porozumění investičním rozhodnutím na různých akciových trzích a také to, jaké jsou hlavní vnitřní a vnější faktory, které ovlivňují cenu kmenových akcií. Pomáhá investorovi při rozhodování o nákupu akcií nebo prodeji akcie.

Klíčová slova: Ocenění akcií, finanční analýza, přístup absolutního ocenění, přístup srovnatelného ocenění, vnitřní hodnota, regresní model, finanční ukazatele.

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DDM	Dividend Discount Model
DCF	Discounted Cash Flow
FCFF	Free Cash Flow to Firm
FCFE	Free Cash Flow to Equity
CAGR	Compound Annual Growth rate
COE	Cost of Equity
COC	Cost of capital
DCM	Dividend Capitalization Model
CAPM	Capital Asset pricing Model
CAPEX	Capital Expenditure
WC	Working Capital
EBITDA	Earning before Interest,Tax,Depreciation and Amortization
EBIT	Earning before Interest and Tax
CFO	Cash Flow From operations.
FCF	Free cash Flow
WACC	Weighted Average Cost of Capital
FV	Future Value
PV	Present Value
TV	Terminal Value
P/B Ratio	Price to Book Ratio
P/S Ratio	Price to Sales Ratio

1 Introduction

Every investor who wants to enter the market must have the ability to measure stock. In fact, stock measurement is a measure of the internal (or theoretical) value of a stock. The importance of stock measurement stems from the fact that the internal value of the stock is not attached to its current value. By knowing the internal value of the stock, the investor may determine whether the stock is higher - or lower than its current market price.

The basic monetary policy is that the collateral value is based on the current value of future cash flows. Similarly, conventional stock measurement tests the difficult task of predicting the future.

The main purpose of this Diploma Thesis is to find the internal value of the standard stock of selected companies (Amazon, Walmart, Target and Costco NASDAQ listed) and compare the results to show the related differences between them. In any measurement method there is some consideration to calculate the internal value of a standard stock. It is necessary to examine the motive behind the thought. Factors affecting the internal value of the general stock will be identified using appropriate strategies namely financial analysis, economic model. The composite measurement model will be developed at the end after the computerized internal value in all modes. By considering the percentage of different ways to complete the internal value of the Stock.

2 Objectives and Methodology

2.1 Objectives

The main agenda of this Diploma thesis is to find the real value of the common stock of selected companies (Amazon, Walmart, Target and Costco NASDAQ listed shares) with different measurement strategies. An appropriate explanation for the different assumptions that will be considered during the various measurement strategies will be concluded. The value obtained after all the different measurement strategies will be compared with others to find the related differences between them. Finally, a composite model of all the different estimates that will be created using the percentage ratio from all the different values. Percentage Weight is considered How important the measurement method is. Using the Integrated Measurement model resulted in the final amount of different stocks. Detection of factors that affect the internal value of the most common stock should be done in the form of a Regressions analysis. By analysing different factors compared to the previous and current stocks it has helped to determine the value relationship between the stock price and the different factors affecting the stocks. The questions will be answered in this thesis as follows:

1. What is the actual practice to carry out stock valuation?
2. What is intrinsic value of common stock of chosen companies using the different valuation techniques?
3. What is the relative difference between value resulted from the different valuation techniques?
4. What are the Internal and external factors which affects the intrinsic value of common stock of chosen companies?

2.2 Methodology

Theoretical part is represented by literature review from various sources such financial books, scientific journals, various articles and publications where chosen stock valuation methods needed for practical part are assessed.

The practical part includes stock analysis of Amazon, Walmart, Target and Costco company. The stock analysis of selected companies has been done through profitability analysis using Dupont method and intrinsic values of chosen stocks are calculated using valuation models. The valuation model used for analysis includes absolute method - Discounted Cash Flow (DCF) approach in which particularly Free Cash Flow to Firm (FCFF) and Equity (FCFE) are used. Relative valuation techniques using multiples are utilized in the companies analysis in order to support results and having proper understanding about the stated research questions.

Data collection for valuation part is proceeded in the period from 2016 to 2020 from publicly available sources such as annual reports (balance sheet, income statements, cash flow statements) of selected firms, obtained from global agency Morningstar, which emphasizes on gathering and analyzing financial information hence secondary data sources are used. Limitation of data collection provided by Morningstar implies only 5-year preceding period covered and reduced financial statements thus a more detailed view is found in 10-K annual reports, which is ensured by US Securities and Exchanges Commission that show in-depth picture of enterprises' financial performance. The latest period was selected as it is assumed that potential investment decision will be made in the near future.

2.2.1 Input determinants of valuation

Each measurement method deals with specific input decisions so that analysts can apply this data to models and estimate fair share value. These indicators play an important role in determining the internal value of stock.

As mentioned earlier, this work attempts to use complete and related measurement methods. The first is represented by two types of DCF models, which are considered the basis for a complete stock analysis. It is based on the idea that a company can be measured by the cash flow generated by the entire existence of a firm.

To perform any DCF model analysis in the stock market, first of all, you need to outline the expected Free Cash Flow. Second, growth rates that will take the rise or fall of FCF during the forecast period and the discount factor should be identified. To calculate future FCF values, the following variables apply to FCFF and FCFE models:

Table 1 DCF variables

Variable	Source	Used in	Description
Net income	Income Statement	FCFF, FCFE	Earnings received by a company after all expenses paid, tax and cost deductions
(+) Net noncash charges	Cash Flow Statement	FCFF, FCFE	Expenses that do not imply cash outflows; includes depriciation and amortization costs
(+) Changes in operating assets and liabilities	Cash Flow Statement	FCFF, FCFE	Compare changes in operating assets and liabilities which is represented by the difference between current assets and current liabilities, from previous fiscal year
Cash paid for interest on debt and finance leases, net of tax	Income Statement	FCFF	Tax shield on interest, which is aimed to reduce income tax obligations due to expenses on interest payments
(-) Purchases of property and equipment	Cash Flow Statement	FCFF, FCFE	Purchase of fixed assets and long-term investments
(-) Proceeds from property and equipment sales and incentives	Cash Flow Statement	FCFF, FCFE	Expenses for proceding of property and equipment sales and incentives
(-) Property and equipment acquired under finance leases	Cash Flow Statement	FCFF, FCFE	Payment for lease for assets that compnay has taken for use
(-) Net change in short-term borrowings	Cash Flow Statement	FCFF, FCFE	Compares change in short-term borrowings
(-) Proceeds from issuance of long-term debt	Cash Flow Statement	FCFF, FCFE	Payment for proceding of long-term debt
(-) Repayments of long-term debt	Cash Flow Statement	FCFF, FCFE	Payment for paying long-term debt
(-) Premium paid to extinguish debt	Cash Flow Statement	FCFF, FCFE	Payment for extinguish debt
(=) FCFF/FCFE			

Source: own elaboration

For both types of DCF methods, two-stage models are decided to be used as the selected companies usually tend grow faster than stable frims. Hence, growth rate for first stage (5 year projection period) and terminal growth are rquired to be established.The more detailed description about FCFF anf FCFE models are described in the following part of literarture review.

Growth rates

As we have previously stated, one of assumptions of the FCF models is to determine growth rate of future cash flows. Usually, analysts estimate this indicator based on previous historical data, considering some important financial indicators of selected company's performance. It is significantly important to point out that despite identification of many factors and determining risks related to changes in expected cash flows, there is no certain way to define appropriate growth rate as it is considered to be a subjective indicator and can be only established approximately based on analyst's estimates. However, there are some suggestions, described by Reilly and Brown (2011), which implies multiplication of ROE and investment rate as a growth rate. In the analysis, the ROE-based growth will be applied for first 5-year period of two-stage model, while the terminal growth at perpetuity is based on projected real GDP growth rate with some adjustments due to previous financial analysis of profitability. The first stage growth rate is expressed in the following formula:

Formula 1 Growth rate of FCF

$$g = ROE * RI,$$

Where

g – Projected growth rate of cash flows

ROE – Return on Equity

RI – Rate of Investment

From the formula above, a Return on Equity (ROE) and Rate of Investment (RI) are separately identified. The first indicator measures firms' net earnings in relation to equity of stockholders. In general, the ratio can be expressed by the following mathematical equation:

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Formula 2 Return on Equity

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

In the practical part, ROE ratio is also used to examine firm's profitability under the conditions of DuPont approach, which implies that three components of ROE are analyzed independently thus the direct influence on this value can be found.

Another part of FCF growth rate is Rate of Investment (RI) or sometimes it is called as Retention Rate (RR), which represents the amount of income generated back into the business in the form of retained earnings. It can be expressed by the ratio in the Formula 3:

Formula 3 Rate of Investment

$$\textbf{RI} = \frac{\textbf{Net Income} - \textbf{Dividends}}{\textbf{Net Income}} = \frac{\textbf{Retained earnings}}{\textbf{Net Income}}$$

Weighted Average Cost of Capital (WACC)

Formula 4 Weighted Average Cost of Capital

$$\text{WACC} = \frac{\text{MV of debt}}{\text{MV of debt} + \text{MV of equity}} rd(1-T) + \frac{\text{MV of equity}}{\text{MV of debt} + \text{MV of equity}} re,$$

MV – Market Value

T – Tax Rate

rd – expected rate of return represented by Cost of Debt

re – expected rate of return represented by Cost of Equity

Therefore, WACC multiplies sources of debt and equity by proportion of total equity. Costs of debt and equity are examined as follows:

Post-tax Cost of debt

Cost of debt determines cost of borrowed funds that a firm taken, i.e., it's an interest rate on long-term financing terms that an enterprise pays off (after taxes paid). This indicator can be determined by the following equation:

Formula 5 Post-tax Cost of Debt

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

Cost of equity

Cost of equity is a required rate f return on common stock, adjusted for risk of a selected company. It is also used as a discounting factor for FCFE model. Stowe, Robinson, Pinto and McLeavey (2207) defines two methods of calculating cost of equity:

1. An equilibrium approach, using Capital Asset Pricing Model (CAPM) or Arbitrage Pricing Theory (APT)
2. Total sum of bond yield and risk premium

Multiples approach

In relative valuation, the valuation ratios of price to earnings ratio, price to book value ratio, price to sales ratio and price to cash flows ratio are used, which are described as follows:

Formula 6 Price-to-Earnings ratio

$$Earnings\ multiplier = \frac{Stock\ value}{Earnings\ per\ share\ (EPS)}$$

Formula 7 Price-to-Book value ratio

$$Price-to-Book = \frac{Stock\ value}{Book\ value\ per\ share}$$

Formula 8 Price-to-Sales ratio

$$Price-to-Sales = \frac{Stock\ value}{Revenues\ per\ stock}$$

Formula 9 Price-to-Cash Flows ratio

$$Price-to-Cash\ Flows = \frac{Stock\ value}{Operating\ Cash\ Flows\ per\ Stock}$$

3 Literature Review

3.1 Fundamental Analysis

Basic analysis is an investment method that uses available economic information, such as historical financial statements or alternatively basic information about a company, to make investment decisions. The principles of fundamental analysis were first presented in Graham and Dodd's 'Security Analysis' (Graham and Dodd, 1934). Two basic analytical methods are widely used today: the 'Top down' and the 'Bottom up' approach.

The idea of a 'Up and down' approach is to use all available information, including macroeconomic data, to make an investment decision. In general, fundamental analysts look first at current macroeconomic conditions, because for them the decision to invest depends largely on the stage of the business cycle and which industry is expected to perform well in the predicted economy. Then analysts try to find the best companies in the industry. The stock selection process is based on the premise that the selected company's stock should be superior to its peers in the industry and that the industry should surpass other industries.

The downside is widely accepted and followed on Wall-Street and is well documented in investment books. Investment strategies based on that approach include sector exchange (changes in sector allocation based on economic changes) and investment style (the difference between value and stock growth).

In contrast to the upward trend, the 'Low-high' approach to fundamental analysis does not attempt to predict the state of the economy. It consists mainly of estimating the value of the stock and comparing it with its current market value. If stock is low, it is considered an independent buying candidate in future markets or major economic conditions. Proponents of her case have been working to make the actual transcript of this statement available online. Mainly because academics feel uncomfortable ignoring certain important information available, the downward trend is less focused on textbooks and empirical research and is therefore also known as a real investment method.

Although we know nothing about academic research comparing the authenticity of the down-and-down approach in basic analysis, it seems that the up-and-down approach has produced significant benefits for its followers (Buffet, 1984). Predicting the economy has proven to be a very difficult task that seldom produces a satisfactory investment return. The most common mistake along the way, however, is that investors focus on companies rather than stocks. Investors should be aware that a good company does not necessarily mean a good investment. The stock selection process should always be based on a comparison between the internal value of the stock and its current market value. Investors should therefore determine whether the stock has a lower or higher value based on the basics of the business. Only if the price exceeds the value by a high enough security level then should the stock be purchased.

3.2 Common shares

Preferred stocks are less risky than conventional stocks (Loviscek, 2017). These are the main reasons why stock options are often referred to as "mixed" financial instruments that have a similar character between common stocks and bonds (Wise et al., 2003).

Ordinary stock represents equity, ownership position, in a company.

• Payments in regular stock are benefits:

- Budget budget.

- Stock dividend.

• Contrary to payments made by shareholders, payments to shareholders are uncertain in terms of size and duration.

• Key features of regular stock:

1. Residual claim - shareholders have a company claim for money

flow / property after all obligations to lenders have been met.

2. Limited credit - shareholders may lose their investment, but it will no longer exist.

3. Voting rights - Shareholders have the right to vote for the board of directors and other matters.

3.2.1 Stock Market

The dramatic rise in stock prices in the 1990's and the subsequent crash that began in 2000 are evidence of a strong correlation between the stock market in all countries. Recent documents document the links between the US and global stock markets (Eun and Shim, 1989) and (Susmel and Engle,1994). The integration of European financial markets is likely to result in a stronger correlation between equity prices in various European countries. This process could also lead to a combination of economic activity across Europe if development in the stock market influences real dynamics, such as investment and consumption. As a result, shock from another European country may affect other economies in the stock market, in addition to the normal foreign trade route. Moreover, as discussed in the literature, due to the potential impact of the stock market on macroeconomic activity, equity price movements may be an important determinant of monetary policy (Rigobon and Sack, 2003).

The relationship between the stock price and the real economy has been investigated and confirmed in a US case (Barrel et al.,1999) and (Morck et al., 1990). This study successfully analyzed the direct and indirect effects of US stock market movements on real consumption and investment. Little work has been done, however, on international exploration (Edison and Sløk , 2001). Edison und Sløk pointed out that a 10 percent increase in stock market figures excluding sectors such as technology, media, and communications led to a 2.5 percent increase in investment in the United Kingdom and a 0.2 percent increase in the Netherlands. In Germany and France, the effect is negative and insignificant. Whether these results can be applied using national account data and a comprehensive sharing index remains an open question, a project that aims to address.

3.2.2 Financial Capital Market

The business is part of an economic system that consists of two key sectors - savings homes and business firms that invest these funds. The financial market helps to connect investors and investors by pooling funds between them. In doing so you are doing what is known as the task of sharing. Allocate or direct investment earnings into their most productive investment opportunity. When the task is done properly, two results are as follows:

• The level of compensation offered to households will be higher

• Rare resources are allocated to those companies with the highest productivity in the economy.

There are two main ways in which money can be made available: through banks or financial markets. Families can invest their remaining money in banks, which can afford to lend these companies to business firms. Alternatively, families can purchase shares and loans offered by the business using financial markets. The budget process is called financial intervention. Banks and financial markets are competing partners in the financial system, and they give families the choice where they want to invest their money. The financial market is a market for the creation and exchange of financial assets. Financial markets exist wherever financial transactions take place. Financial services can be a way of creating financial assets such as initial issuance of shares and company liabilities or the purchase and sale of existing financial assets such as equity shares, liabilities and bonds.

3.2.3 Marketable Securities

Securities for sale are investments for the purpose of generating income or making a profit. Bonds are considered marketable on a day-to-day basis and may be sold at short notice. Purchase securities for sale may be cum div / int or ex-div / int Purchase cum div / int means that the amount the consumer pays on collateral includes the high cost of collateral and investment revenue, which has accumulated. until the day of purchase. Buy ex-div / int. means that the mortgage buyer will not be entitled to the investment income that will be collected from the date of acquisition to the next day of the revenue deadline. Even if the buyer becomes the owner of the collateral from the acquisition date to the next income deadline, he is not the owner of the time-related revenue. The current mortgage holder retains ownership of the investment income from the date of purchase until the next due date. However, the current owner is excluded from the future revenue right.

This means that the amount paid by the consumer would be reduced by the income. The big question that is often asked is ─When should the dividend of money be recorded as income

from the investor‖? Should it be the date on which the shares were announced, the date of the record, the date of the ex-dividend, or the date on which the shares were received? Meigs and Meigs (1981), Karim and Islam (1998), Lopes and Rodrigues (2007) state that investors record dividends as revenue on the day a dividend is announced. Meigs and Meigs (1981) argued that additional stock dividends acquired or stock shares were not revenue to the mortgage holder, and only a memorandum was included to record the increase in the number of shares held. The base cost per shares decreases due to the large number of shares covering the investment after receiving additional —free shares from the stock dividend or dividend of stocks. Bonds that are for sale, whether they are available for sale, trade securities or securities that are delayed in maturity, are not purchased for permanent storage. The selling point in them is that they are for sale. Therefore, at some point, securities should be sold. Bond sales can be cum.div./int. or ex-div / int. If the collateral is sold at a cum div / int., It means that the price the seller receives includes the investment income, accumulated up to the date of the sale. This means that the seller reimburses both the amount of collateral and the amount of collateral we have generated up to the date of the sale. But if the collateral is sold ex.div / int., It means that the seller will receive an income that will accumulate from the date of the sale until the next deadline. Although the seller is different from the mortgagee, he still has the right to earn a living. Even if the seller loses the patent from the date of the sale, he or she still owns the copyright. Therefore, the total selling price will be the seller's earnings and the potential interest, the right of the seller to retain.

3.3 Valuation Models

Several models have been developed to determine the actual number of companies. In this chapter three of the measurement methods used by companies will be discussed along with various models of these methods.

3.3.1   Dividend discount model

Miller and Modigliani have developed a dividend discount model for the purpose of obtaining the right amount of stock (companies) by reducing the share they are expected to

pay to their shareholders (Al-Abduljader and Al-Muraikhi, 2011). The firm value estimated by the budget discount model is based not only on the required investor rate of return and company shares, but also on the future growth of those benefits. The main problem of comparing companies with a budget discount model is to measure the growth of future shares (Dedi and Giraudon, 2013).

3.3.2 The general model

The basic measurement model most commonly used is the standard discount model (Foerster and Sapp, 2005), which states that the present value of all expected benefits equals the current value of the stock (Fuller and Hsia, 1984).

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+r)^t}$$

Where
P_0 = the current stock price
D_t = expected dividend in period t
r = the appropriate discount rate

(Fuller and Hsia, 1984)

The fact that the rebate discount model requires a fixed or long-term profit margin is the reason why the model is less effective (Fuller and Hsia, 1984). For that reason, several model versions have been developed based on differing assumptions about future growth (Damodaran, 2012).

3.3.3 Gordon growth model

In 1957, Durand noted that the company's value could be measured by a model containing a dividend that grows at an ever-increasing rate. Gordon used this view when making a model known as Gordon's growth model (Platt, Demirkan, and Platt, 2010).

$$P_0 = \frac{D_0(1+g)}{r-g}$$

Where

D_0 = the dividend paid in the most recent 12 months

g = the constant, perpetual dividend growth rate

(Fuller and Hsia, 1984)

However, the benefits do not always exist in the real world and make the model vulnerable. According to (Fuller and Hsia, 1984) the model certainly does not give a good first guess.

3.3.4 Two-stage dividend discount model

Malkiel (1963) presents a two-stage growth model in which the first phase allows for a period of unstable growth followed by a period of stable growth, which is expected to remain so for a long time. According to the two-phase discount model, the stock value is the current value of benefits between the non-standard category and the current value of the terminal:

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

$$" \quad k_{e,st} - g_n$$

Where

DPS_t = Expected dividends per share in year t

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

P_n = Price at the end of year n

g = Extraordinary growth rate for the first n years

g_n = Growth rate forever after year n

There are two main obstacles to the two-phase models. The first problem is to determine how long the extraordinary growth period should be. As time goes on, the value of the investment will be higher as the growth rate is expected to drop to a stable level after this period. The second problem is that the model takes the growth rate to change from high growth at first to low, stable overnight while it is very reasonable to assume that growth gradually decreases over time from a high growth rate to a stable growth rate (Damodaran, 2012). The model is best suited for patented firms in high-yield products in the next few years or other firms that grow significantly and expect to maintain that growth rate over time, after which high value sources will continue to thrive. Growth is expected to disappear (Damodaran, 2012).

3.3.5   H-model

Fuller and Hsia developed another two-stage growth model in 1984 and named it the H model (Fuller and Hsia, 1984). The main difference between Malkiel's two-phase and H-model models is that in the H model the growth rate starts at a high level but decreases steadily over time to achieve a stable growth rate in a stable environment. However, in the Malaria model, the growth rate varies from high to low overnight growth (Al-Abduljader and Al-Muraikhi, 2011).

$$P_0 = \frac{D_0(1+g_n)}{r-g_n} + \frac{D_0 H(g_a-g_n)}{r-g_n}$$

Where

P_0 = Value of the firm now per share

D_t = Dividends per share in year t
r = Cost of equity
g_a = Growth rate initially
g_n = Growth rate at end of 2H years, applies forever after that

(Fuller and Hsia, 1984)

According to (Damodaran, 2012) the main drawback of the H-model is that it takes the pay scale to be consistent in both phases while the growth rate decreases. This is inconsistent with the rate of pay in the real world, which tends to rise as the growth rate declines, and this assertion makes the model unsuitable for any company currently paying low or no profits. However, the model may be suited to shares that pay dividends and grow rapidly over time, but are expected to decline steadily over time as firms grow.

3.3.6   Three-stage dividend discount model

Molodovsky, May and Chottiner (1965) published a three-phase dividend discount model in 1965, which included features of a two-phase model and an H-model.

$$P_0= \sum_{t=1}^{t=n1} \frac{EPS_0 \times (1+g_a)^t \times \Pi_a}{(1+k_{e,hg})^t} + \sum_{t=n1+1}^{t=n2} \frac{DPS_t}{(1+k_{e,t})^t} + \frac{EPS_{n2}(1+g_n) \times \Pi_n}{(k_{e,st}-g_n)(1+r)^n}$$

Where

EPS_t = Earnings per share in year t

DPS_t = Dividends per share in year t

g_a = Growth rate in high-growth phase (lasts n1 periods)

g_n = Growth rate in stable phase

Π_a = Payout ratio in high-growth phase

Π_n = Payout ratio in stable growth phase

k_e = Cost of equity in high growth (hg), transition (t), and stable growth (st)

(Damodaran, 2012, p. 341)

The model takes stock to grow at a constant rate in the first period, declining equally into a stable growth rate during the second period, which is then expected to continue indefinitely. The model allows for the calculation of all future benefits but requires a significant amount

of input instead, such as the first and second period, a stable growth rate during the third phase and a reasonable discount rate (Fuller and Hsia, 1984).

The flexibility of the model makes it useful to estimate the number of firms that not only expect their growth rate to change over time but also their pay and risk policies (Damodaran, 2012).

3.3.7 Discounted free cash flow model

Aside from the number of different models of share discounts, there is a strong consensus among experts that all types of models have a negative impact on the growing numbers of companies that do not pay what they can pay for shares. Therefore, the approach does not apply to information companies that pay dividends and other non-pay dividends (Beneda, 2003). These limits have led to the development of an alternative measurement system, which reduces cash flow free rather than profits. Free cash flow is defined as "the proceeds from the firm's financial institutions after all necessary investments" (Francis, Olsson and Oswald, 2000).

This approach assumes that free cash flows provide a more accurate measure of fixed value in the short term than profits because firms are not obliged to pay what they can afford to share shares (Francis et al., 2000). Firms can also invest in this free cash flow, by paying off their debts or by using new business opportunities. Both of these actions are likely to increase the market value of firms (Hackel, Livnat and Rai, 1994).

Discounted free cash flow models are designed to estimate enterprise value or an equity value of a firm by discounting future free cash flow generated by the firm with the appropriate cost of capital (Dedi and Giraudon, 2013). Three types of discounted free cash flow models will be discussed here and all of them, like many other valuation models, estimate a firm's value by splitting the forecasting of the firm's financial performance into two periods (Jennergren, 2008).

The first period is often referred to as the explicit forecast period and contains detailed forecasts of a company's free cash flow, often for the next 10-15 years. The free cash flow

is usually derived from forecasted income statements and balance sheets (Jennergren, 2008). The variables derived from the forecasted financial statements to form the free cash flow are different between model types, as can be seen later on.

The second period, often referred to as the post-horizon period, consists of calculations of free cash flow after the forecasted period, often called continuing value or terminal value (Jennergren, 2008). One way of finding terminal value of a firm is to estimate the liquidation value assuming that firms will be liquidated at the end of the explicit forecast period (Damodaran, 2012). More typically the terminal value is derived from the free cash flow at the end of the explicit forecast period by applying the Gordon formula (Jennergren, 2008). The idea behind this approach is that firms cannot maintain high growth forever so they are "developing in a steady state, as it moves into the post-horizon period" (Jennegren, 2008)

Terminal value of firm$_n$ = Free cash flow to firm (cost of capital $n+1$ –gn)

Terminal value of equity$_n$ = Free cash flow to equity$_{n+1}$ (Cost of equity$_{n+1}$- gn)

(Damodaran, 2012)

Free cash flow to firm model TVFCFF = $\sum_{t=1} \dfrac{FCF}{(1+r_{wacc})}$ + ECMSF - DF – PSF

FCFt = (SALESt - OPEXPt - DEPEXPt)(1-t) + DEPEXPt - ΔWCt + CAPEXPt

Where
VFCFF = market value of equity at time F;
PSt = market value of preferred stock at time t;
rwacc = weighted average cost of capital;
ECMSt = excess cash and marketable securities at time t;
Dt = market value of debt at time t;
Salest = sales revenue for year t;
OPEXPt = operating expenses for year t;
DEPEXPt = depreciation expense for year t;

ΔWCt = change in working capital in year t;

CAPEXPt = capital expenditures in year t;

t = corporate tax rate

<div align="right">(Francis et al., 2000, p. 49)</div>

The free cash flow in a company is designed to measure the value of a firm's business by first obtaining the current value of the operations (Beneda, 2003; Dedi and Giraudon, 2013). The current value of jobs is equal to all the free cash flow the company expects to produce, minus the estimated cost of capital. The value of an intangible asset is then added to the present value of the operations to determine the company's business value (Dedi and Giraudon, 2013).

3.3.8 Current value of operations, enterprise value and equity value

The first step in finding the current number of jobs with free cash flow in a solid model is to get free cash flow from a clear prediction period. (Beneda, 2003) demonstrated how free cash flow can be obtained from a predictable financial statement in the form of free cash flow in a solid model:

Free cash flow to firm = EBIT (1-t) + depreciation and amortization - increase in operating working capital - capital expenditures

<div align="center">(Beneda, 2003)</div>

The next step is to measure the free flow of money from the post-equatorial period. When we consider a company's "worry flow" under the estimate, the value from the post-equity period or the final value is calculated by using Gordon's formula:

$$\text{Terminal value of firmn} = \text{Free cash flow to firm (cost of capital n+1 –gn)}$$

<div align="center">(Damodaran, 2012)</div>

The current value of the services is then calculated by discounting the free entry and exit of funds available both times with a limited amount of capital expenditure (Beneda, 2003). Finally, a company's business value is acquired by adding value to non-performing assets, such as market securities and long-term investments (Beneda, 2003).

<div align="center">31</div>

Free cash flow in a solid model can also be used to estimate the factory equity value by subtracting the market value of interest-bearing debt and other non-equity claims on the entity's value. Finally, dividing the equity amount by the number of remaining shares gives the price per company shareholder (Dedi and Giraudon, 2013).

3.3.9 Free cash flow to equity model

$$\text{Market value of equity} = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1+k_{e,hg})^t} + \frac{P_n}{(1+k_{e,hg})^n}$$

Where

FCFE = Free cash flow to equity in year t

Pn = Price at the end of the extraordinary growth period

 Ke = Cost of equity in high growth period

(Damodaran, 2012)

Free cash flow to equity model varies from free cash flow to solid model in three ways. First of all, it is designed to measure the company's equity value directly from the business value, such as free cash flow to a solid model. Second, it measures the company's equity ratio by reducing the future free cash flow discount earned on equity costs, in contrast to the free cash flows in the solid model, which reduces future free cash flows at the estimated cost of capital (Dedi and Giraudon, 2013).

The third difference is how the free future cash flow generated by the company is estimated. In free cash flow on a solid model, the (Beneda formula, 2003) is used to obtain free cash flow from a fixed period but it is not the appropriate formula when using free cash flow in the equity model. The appropriate formula is shown in Damodaran's book (2012):

Free cash flow to equity = net income - (capital expenditures - depreciation) - (change in noncash working capital) + (new debt issued – debt repayments)

(Damodaran, 2012)

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The Gordon formula, used to estimate future free cash flow after the explicit period, is also slightly different when estimating equity value of a firm:

$$\text{Terminal value of equity}_n = \frac{\text{Cash flow to equity}_{n+1}}{(\text{Cost of equity}_{n+1} - g_n)}$$

(Damodaran, 2012, p. 306)

3.3.10 Adjusted present value model

The adjusted current value is another model designed to measure a company's business value. The idea is to inform the firm as if its capital structure only incorporates equity and separately informs the negative financial consequences (Luehrman, 1997). Adding these two pieces together provides the business value of a company.

The first step in the APV model is similar to other types of discounted cash flow models; estimating the free cash flow of a company's expectations. Free cash flow from the predictive period is estimated by the (Beneda formula, 2003) such as free cash flow to the solid model:

Free cash flow to firm = EBIT (1-t) + depreciation and amortization - increase in operating working capital - capital expenditures

(Beneda, 2003)

The free cash flow from the post-horizon period is estimated according to Damodaran's (2012) formula:

Terminal value of firmn =   Free cash flow to firm (cost of capital n+1 –gn)

(Damodaran, 2012)

Free cash flows are reduced by the cost of opportunity, i.e., returning investors expect to earn by investing in other assets that reflect the company's risk under test and are only funded equally (Luehrman, 1997). This differs from free cash flow to a solid model where the discount rate, the maximum cost of capital, is fixed for the company's financial structure and should automatically handle adverse financial consequences, without requiring any additional subsequent additions (Luehrman, 1997). According to (Luehrman, 1997), using the estimated cost of capital to reduce the expected free cash flow, as with free cash flow in a solid model, is a major drawback because it is only suitable for simple and highly stable. Buildings (Luehrman, 1997) . However, since the structure of the firm's finances is usually a relatively limited cost of financing, in fact, things need to be adjusted significantly, per project and each season. The probability of making a mistake in calculating the cost of a company with a limited amount of cash increases as its capital structure; tax status or fundraising strategies become more complex (Luehrman, 1997).

Finally, the amount of financial adverse effects, such as interest rates, is calculated as the current value of the financial impairment from the predictable period and the post-equity period reduced by the appropriate discount rate. Other potential financial consequences to be mentioned are the costs of financial stress, grants, fencing, eviction costs and other costs (Luehrman, 1997).

3.3.11 Relative valuation approach

The method of measuring assets, based on whether the same assets have market value using multiplication, is called a related measurement (Sharma and Prashar, 2013). Such a method is often used by financial analysts and investment banks (DeAngelo, 1990). Related related duplication is the most common method in statistical measurement and plays its role in estimating initial public offerings, limited purchasing transactions, seasonal equity offers, and other consolidation and acquisition activities (Bhojraj and Lee, 2002).

Although market dynamics do not include, like many other broad methods, the clear prediction time, still depends on the same measurement principles. In theory, the market dynamics approach encompasses all available information about future cash flows and risks. "Multiplication, therefore, is often used as part of a complete equation, because it expresses

the essence of those values. Measurement "or measurement results from broad measurement methods (Liu, Nissim and Thomas, 2002).

<u>The process of relative valuation</u>

When measuring a target company in the form of a related measure the first step is to build a list of comparable companies. Companies with business profiles and financial profiles such as the target company operate as a good comparison. Therefore, comparisons can be selected based on factors such as industry, storage and customer markets, products and services, location, size, return on investment, growth pattern and profitability (Sharma and Prashar, 2013). The general rule is, however, to select the same firms operating in the same industry (Minjina, 2009). Intensive research has studied the relationship between the accuracy of the measurement method associated with other selection factors. Alford (1992) assessed the accuracy of the estimated value when comparing firms were selected on the basis of industry, risk and wage growth. He found that selecting comparative companies based on industry provides high accuracy. He also found that risk and wage growth do not work well individually but when used together it provides the same accuracy as a sector factor. Cheng and McNamara (2000) found that the best definition of comparable firms was based on industry membership combined with revenue returns. They also say that a good rule of thumb is to use at least six comparable firms to estimate industry duplication and that the accuracy of measurement increases as the number of firms in the targeted industry increases.

After creating a list of comparable companies that share business profiles and financial data like a target company, the next thing to do is to get important financial information to companies. This information may be based on historical information or expected performance in the future. Financial information is then used to determine important and repetitive measurements of trading (Sharma and Prashar, 2013). Then, multiplication is selected as the approximate value and the median value is based on a set of comparable firms (Cheng and McNamara, 2000). Overall, the target company's value is predicted by multiplying the estimated value by the company's actual accounting numbers (Cheng and McNamara, 2000).

<u>Multiples</u>

Multiplication equals can be divided into income multiplication, multiplication of revenue, double book value and sector-specific multiplication. Multiplication of profits reflects the ratio between the price paid for an asset and the profit to be produced by the asset (Sharma and Prashar, 2013). They are always an important indicator of measuring the fair market value of a business or security interest (Maxson, 1993).

$$\text{Price-earnings multiple} = \frac{\text{Market price per share}}{\text{Earnings per share}}$$

$$\text{PEG ratio} = \frac{\text{Price-earnings multiple}}{\text{Expected growth rate}}$$

$$\text{Ent.pr. to EBITDA} = \frac{\text{Market value of equity - Market value of debt - Cash}}{\text{EBITDA}}$$

(Damodaran, 2012)

Revenue multiplication reflects the ratio between business value and earnings (Sharma and Prashar, 2013). When measuring businesses the rate can be adjusted as the value of sales, while for equity investors the rate is the selling price (Damodaran, 2012). Revenue multiplication is not significantly affected by accounting options and as a result, it is much easier to compare companies in different sectors than to compare earnings or book inflation (Sharma and Prashar, 2013). Another advantage of revenue duplication is that it is possible to compare companies in the sector created by small companies, where most or all of them lose money (Damodaran, 2012).

$$\text{Price-to-sales ratio} = \frac{\text{Market value of equity}}{\text{Revenues}}$$

$$\text{Value-to-sales} = \frac{\text{Market value of equity} + \text{Market value of debt} - \text{Cash}}{\text{Revenues}}$$

$$(\text{Damodaran, 2012, p. 542-571})$$

The revaluation of the book of account provides an estimate of the value of an entity that is determined by accounting rules, taking into account the actual amount paid for the goods and calculating changes made from the purchase, such as depreciation. An accounting value for an entity's business value is usually far from the same as the market capitalization for the same entity (Sharma and Prashar, 2013).

$$\text{Price-to-book ratio} = \frac{\text{Price per share}}{\text{Book value of equity per share}}$$

$$\text{Price-to-book ratio} = \frac{\text{Market value of equity}}{\text{Book value of equity}}$$

$$\text{Ent.pr. value-to-inv. capital} = \frac{\text{MV of equity} + \text{MV of debt} - \text{Cash}}{\text{BV of equity} + \text{BV of debt} - \text{Cash}}$$

$$(\text{Damodaran, 2012, p. 511-541})$$

In order to measure whether stocks are over-or-limited, investors often look at the price index. However, if the purpose is to inform the business, it may be helpful to look at the value of the business in relation to the book value of all investments (Damodaran, 2012).

Multi-sector duplicates can only be calculated in certain categories as opposed to revenue, book value and revenue multiplication that can be calculated by firms in any sector and in all markets. Using specific sector-specific duplication can be helpful in estimating low-profit firms or insignificant revenue and book prices, as was the case when dot-com companies first appeared on the market. Analysts have estimated the firms by "dividing the market value of each company by the number of hits produced by each firm's website". Similarly, social

media companies such as Linkedin and Facebook have been rated about the average value per user (Damodaran, 2012,).

However, in spite of its usefulness, duplicate-specific duplication is dangerous in two ways. First, the whole sector may end up being less important or less realistic compared to the rest of the market as duplication can be calculated in other sectors or the whole market. Second, "it is very difficult to reconcile sector-specific and basic repetition, which is an important ingredient in efficient use of duplicates" (Damodaran, 2012).

$$\text{Value per subscriber} = \frac{\text{Market value of equity} + \text{Market value of debt - Cash}}{\text{Number of subscribers}}$$

$$\text{Value per unit product} = \frac{\text{MV of equity} + \text{MV of debt - Cash}}{\text{Number of units produced (or capicity)}}$$

(Damodaran, 2012, p. 571-580)

3.4 Modern Portfolio Theory

The modern portfolio of Modern Portfolio Theory (MPT) is based on the vision of the Markowitz 'Portfolio Selection, first introduced in 1952, and William Sharpe's contribution to the price adjustment introduced in 1964, later known as Capital Asset. Price Model (CAPM) (Veneeya, 2006). In short, MPT is an investment framework for the selection and construction of investment portfolios based on increasing the expected return on portfolio and at the same time minimizing investment risk (Fabozzi, Gupta & Markowitz, 2002). Overall, the risk component of MPT can be measured, using various statistical formats, and reduced with the sense of diversion intended to selectively select a weighted investment group that reflects lower risk characteristics than the investment of each asset or asset class. . Separation, in fact, is the basic concept of MPT and relies solely on the common wisdom

of "not putting all your eggs in one basket" (Fabozzi, Gupta, & Markowitz, 2002). It is instructive to note here that the theory of choosing a portfolio of Markowitz is common belief. (Fabozzi, Gupta and Markowitz 2002) define popular belief as one that defines a standard or norm that investors should follow in building a portfolio. The Capital Asset Pricing Model (CAPM), on the other hand, is considered a 'constructive theory' - looking at how investors behave differently than they should. Together, they provide a theoretical framework for identifying and measuring investment risk and building relationships between profit and expected risks. It remains to be seen whether MPT relies on the theory of price verification (Fabozzi, Gupta and Markowitz, 2002). This analysis assumes that MPT is actually statistically independent, in the sense of maintaining the title of a separate analysis. Similarly, for the purpose of this writing, the focus is on Markowitz portfolio options. In this regard, these contributions will continue to be called MPT collections - and refer to analysis of the definition of variance ('mean' used to exchange medium or expected return, and 'variance' used to indicate risk). Markowitz has shown that under certain circumstances, investor portfolio selection can be reduced to measure two key factors: (1) the expected return on portfolio, and (2) risk or variability of the portfolio (Royal Swedish Academy of Sciences, 1990). Because of the potential for a wide range of risks, investment risk in a portfolio, measured in its various forms, depends on the acquisition of assets and the 'equity' of stocks (McClure, 2010). In other words, (Markowitz, 1952) argues that portfolio selection should be based on price risk indicators, rather than simply combining protected portfolios with attractive rewards.

These key principles of MPT are discussed below:

The MPT framework involves a lot of thinking about markets and investors. Some of these ideas are obvious, while others are obvious. Markowitz builds its portfolio selection contributions to MPT on the following key considerations (Bofah, nd; Wecker, nd; Markowitz, 1952): 1.) Reasonable investors (want to maximize profits while minimizing risk, 2.) Only investors are willing to accept high risk amount if they are compensated with the higher expected return, 3.) Investors receive timely all the details related to their investment decision, interest, 5.) Markets are very efficient, 6.) Markets do not include

transaction costs. or taxes, 7.) It is possible to choose securities whose performance each depends on the other investment in the portfolio. This basic assumption of MPT has been a major challenge. Many of the criticisms brought to this point will be discussed later in this article.

3.4.1 Risk & Return

Risk and Recovery Financial risk can be defined as a deviation from the expected historical recovery over a period of time (Bofah, n.d.; McClure, 2010). However, the theory of choosing a portfolio of Markowitz concludes that "an important factor in asset risk is not the risk of individual assets, but the contribution of each asset to a combined portfolio" (Royal Swedish Academy of Sciences, 1990). a stand-alone basis (an asset is considered an alternative), and (2) a portfolio basis (an asset represents one of several assets). In the context of a portfolio, total collateral risk can be divided into two basic components: systematic risk (also known as market risk or general risk), and random risk (also known as volatile risk) (reduced portfolio risk, 2011). MPT assumes that these two types of risks are common in all portfolios.

Planned order, which is a high level of risk - a risk that affects a large number of assets to some extent (Ross, Westerfield and Jaffe, 2002). Common economic conditions, such as inflation, interest rates, unemployment rates, currency exchange rates or Global Product rates are examples of systematic risks. These types of economic conditions affect almost all securities to some degree. Therefore, system vulnerabilities cannot be eliminated. System risk, on the other hand, is a less risky approach - risk factors that directly affect a single asset or group of assets (Ross, Westerfield and Jaffe, 2002). Includes special risks not linked to other risks and affects only certain securities or assets. For example, a negative change in the announced NetFlix system of pricing led to negative customer responses and errors, resulting in NetFlix lower prices and lower stock prices. However, it did not affect the performance of the entire Dow Jones stock or S&P, or even the entertainment industry and media companies for that matter - other than the potential Blockbuster video of its biggest rival, its value increased dramatically thanks to NetFlix. 'a volatile market share. Other examples of informal risk may include a company debt rating, negative media reports about

a business, or a strike affecting a particular company (Helela, n.d.). Planned risk can be significantly reduced by finding security within the portfolio (McClure, 2010). Since, in fact, reimbursement for various assets is associated at least to some degree, systemic risk cannot be completely eliminated without considering how many types of assets are included in the portfolio (McClure, 2010; Royal Swedish Academy of Sciences, 1990).

3.4.2 Risk/ Return Trade off

The concept of 'Risk and Return trade-off' is related to Markowitz's basic principle that the more risky an investment, the greater the potential profit required. Generally, investors will maintain risky security only if the expected return is high enough to compensate them for taking the risk (Ross, S. Westerfield, R. & Jaffe, J, 2002). Risks represent the possibility that the actual return on investment will be different than expected, which is a measure measured by the standard deviation. Normal high deviation leads to greater risk and higher return required. If investors are willing to take a risk, expect to receive a risk premium. A risk premium is "a return that exceeds the level of risk-free return that the investment is expected to produce". The higher the risk, the more likely it is that investors will pay for the risk. Other risks can be avoided easily and at low cost and, as a result, no reward is expected. Only those risks that are easily avoided are compensated (on average) (Bradford, J. & Miller, T., 2009). A risk recovery tradeoff only indicates the possibility of a higher return on investment - not a guarantee of a higher return. Therefore, risky investments do not always pay more than risk-free investments. This is exactly what makes them dangerous. However, historical analysis shows that the only way for investors to earn higher profits is to make risky investments (Bradford, J. & Miller, T., 2009). In thinking about choosing a Markowitz portfolio, the risk is the same as insecurity - the greater the instability of the portfolio, the greater the risk. Volatility refers to the amount of risk or uncertainty associated with the size of the change in the value of the collateral. These variables are measured by the number of portfolio tools that include: (1) expected calculation of return, (2) variance of expected return; (3) the general deviation from the expected profit, (3) the difference in mortgage portfolio, and (5) the correlation between investments (Wecker, n.d.; Ross, Westerfield & Jaffe, 2002). Each of these risk / instability measures is discussed in the following sections.

3.4.3 Expected Return

In order to predict future returns (expected returns) of security or portfolio, historical performance returns are often checked. Expected return can be defined as part of a possible distribution of a potential return (Expected Return, ng). Expected return calculation is the first step in the Markowitz portfolio selection model. Expected return, often referred to as a standard or intermediate return, can be regarded as a place of historical return in a given period (Bennetiga, 2006). Combined portfolio calculations (two or more) simply include calculating the weight of each expected return (Ross, Westerfield & Jaffe, 2002).

The most obvious variation in the use of the historical performance of a return on prediction of the expected return is the uncertainty of the time frame to be taken as a sample (Fabozzi, Gupta & Markowitz, 2002). If the sampling period covers operations over a five-year period; over a period of ten years; or for a long time? The fact is that there is almost no right answer due to the uncertainty and instability facing the markets. However, it is reasonable to assume that only after a market or security has a long and proven track record of healthy and consistent performance, under different economic and political conditions, can historical market performance be considered an appropriate measure of future market performance (Fabozzi., Gupta and Markowitz, 2002).

3.4.4 Portfolio Return Variance

As discussed earlier, there are various ways to determine the instability (risk) of restorative security. The two most common steps are variability and standard deviation. The difference is a square measure of the deviation of the stock return on its expected return a square difference between the actual return and the average return (Bradford, J. & Miller, T., 2009; Ross, Westerfield & Jaffe, 2002). The concept of standard deviation is discussed in the next section. In the context of a portfolio, diversity measures the flexibility of an asset or group of assets. Large numbers of variables show significant variability. Similar to the expected return formula, the variance of more than two assets is also an extension of the two asset formula. When more assets are held together in a portfolio, depreciating assets are usually charged with increasing portfolio assets, thus reducing risk. Therefore, the total variability

of the asset portfolio remains lower than the simple variance of the variance of each asset (Frantz & Payne, 2009).

Analysts' observations indicate that portfolio diversity is declining as the value of portfolio assets increases (Frantz & Payne, 2009). According to (Frantz & Payne, 2009), increasing the number of portfolio assets significantly enhances its Efficient Frontier (effective distribution of a variety of assets with variable risks). To some extent, restitution of these types of assets is often canceled, suggesting that the return on the variability of the portfolio of these assets will be less than the estimated value of each asset (Frantz and Payne, 2009). Similarly, keeping portfolios containing large amounts of assets allows investors to reduce their risk effectively. In fact, when the value of assets in a portfolio is large enough, total diversity is obtained more from covariance than asset variability (Schneeweis, Crowder, & Kazemi, 2010). The significance of this is that it reinforces the idea that it is more important how assets often move within a portfolio than how each asset differs in value.

Analysts' observations indicate that portfolio diversity is declining as the value of portfolio assets increases (Frantz & Payne, 2009). According to (Frantz & Payne, 2009), increasing the number of portfolio assets significantly enhances its Efficient Frontier (effective distribution of a variety of assets with variable risks). To some extent, refunds for these types of assets are often canceled, suggesting that refunds for different portfolios of these assets will be less than the corresponding estimated value of each asset (Frantz & Payne, 2009). Similarly, keeping portfolios containing large amounts of assets allows investors to reduce their risk effectively. In fact, when the value of assets in a portfolio is large enough, total diversity is obtained more from covariance than asset variability (Schneeweis, Crowder, & Kazemi, 2010). The significance of this is that it reinforces the idea that it is more important how assets often move in a portfolio than each asset changes value.

3.4.5   Standard Deviation

Another common type of instability (danger) is a common safety variant. Markowitz's portfolio selection model makes it possible for investors to make their investment decisions

based on returns and risk spreads. For many investors, the risk involved in buying a mortgage is that they will receive lower interest rates than expected. As a result, it is a deviation from the expected return (center). To put it another way, each bond shows its normal deviation from the scale (McClure, 2010). Normal high deviation translates to high risk and high power deviation. The standard deviation of the return is the square root of the variance (Bradford, J. & Miller, T., 2009). The standard deviation of the expected return requires a calculation of a few items that will help measure the reversal of the return.

3.4.6   Covariance of Return

Standard variability and deviation measure stock variability. However, if estimation of the relationship between the return on one stock and the return on another is required, it is necessary to measure their consolidation or correlation. These two theories measure how closely the random variance is closely related (Ross, Westerfield and Jaffe, 2002). The connection is directed to the next section. Covariance is a statistical measure relating to the relationship between two security benefits. If the returns are well related, their merger will be good; if it is negatively related, the covariance will be negative; and if they are not related, covariance should be zero (Ross, Westerfield & Jaffe, 2002). Markowitz states, It is necessary to avoid investing in securities with high covariances between them (Markowitz, 1952).

3.4.7   Correlation Coefficient of Returns

The coefficient of integration (also called the correction) is the final level of risk / failure measured here. Determines the extent to which the two differences are related. The Correlation coefficient faces some difficulty in analyzing the square deviation units presented by the correlation of the return rate (Ross, Westerfield & Jaffe, 2002).

MPT seeks to analyze the relationship between different currencies. It uses mathematical measures such as aggregation to measure the effect of variability (discussed below) on portfolio performance (Veneeya, 2006). In that case, the correlation coefficient simply divides the covariance by the normal deviation of the collateral bond. If the correlation between the securities is positive, then the variables are positively correlated; if negative, it

means that it is negatively related; and if the interaction is a note, the variables are determined as inconsistencies (Ross, Westerfield & Jaffe, 2002). The level of risk reduction depends on the variety of assets, particularly from the interaction between the invested asset and its weight in the portfolio (Wecker, n.d.). The higher the level of non-performing assets in the portfolio, the greater the risk. Relationships are an important measure of the effect of diversity as they effectively measure the reconciliation of building pairs. Although covariance is meaningful because it influences portfolio risk, portfolio integration coefficients are very useful because they make covariance similar (Gibson, 2004). 'Incomplete' relationships (between + 1.00 and 1.00) usually indicate a decrease in portfolio risks. A pair of portfolios with low coefficient estimates that place a lower risk than stocks with a higher value (Hight, 2010). In any case, these risk factors should be carefully selected because the relationship between assets and risk factors does not always exist (Amu & Millegard, 2009). In addition, relationships can exist even if the element and structure are not in business or industry.

3.4.8 Diversification

The terms 'variability' and 'variability effect' refer to the relationship between exposure to portfolio risk. The fragmentation, which is the basis of the Markowitz portfolio and the MPT portfolio, is a concept of risk reduction that involves the allocation of investments between different financial instruments, industry and other investment categories (Significance of variance, 2009). In simple terms, it is related to the famous saying "do not put all your eggs in one basket." If the basket falls, all the eggs are broken; if placed in more than one basket, the risk of all the eggs breaking will be greatly reduced (Fabozzi, Gupta & Markowitz, 2002). Variability can be achieved by investing in different stocks, different categories of assets (eg bonds, houses, etc.) and / or assets such as gold or oil. The purpose of diversification is to increase returns and reduce risk by investing in different assets that each person can react to differently in the same event. For example, negative news related to the European debt crisis often undermines the stock market. At the same time, similar news reports have had a positive effect on prices of certain items such as gold. Therefore, it is important that portfolio classification strategies not only include different stocks within the same industry and outside the same industry, but should also include different categories of assets, e.g. bonds

and goods. The effect of Diversity refers to the relationship between encounters and positions (Gibson, 1990). If the interaction between goods is incomplete (good, bad), the result is the result of variability. It is an important and effective risk reduction strategy because risk reduction can be achieved without disrupting returns (Hight, 2010). Thus, any 'risk-free' risky investor will differ to some degree. (Markowitz, 1952) argues that diversity cannot eliminate all risk. As discussed earlier, investors face two types of risks: legal risks and informal risks. The latter, unplanned risk is also often referred to as 'diversity' (Frantz & Payne, 2009). This type of risk is part of the statistics that can be reduced or, according to some theologians, removed (Frantz & Payne, 2009). The basics of these types of risks are different events for a particular company. Planned risk (market risk), on the other hand, cannot be eliminated or reduced differently because it is caused by external factors such as inflation, high interest rates, war or inflation, 'planned' affecting the majority of all companies. while a diversified portfolio can improve profits and significantly reduce unplanned risk, it is unlikely that any amount of variability can eliminate all risk - there is more variability. Additionally, no flexibility can eliminate or reduce planned risk, affecting all or most companies and markets at the same time.

3.4.9 Efficient Frontier

The active Frontier, also known as the Markowitz Efficient Frontier, is an important MPT concept. It represents the best combination of security (those that produce a fixed return on a certain level of risk) in the investment portfolio (Efficient Frontier, 2010). Defines the relationship between the expected portfolio return and the risk or volatility of the portfolio. It is often expressed in clear terms such as a curve in the graph by comparing risk and expected return to the portfolio. Positive portfolios organized by this curve represent the highest return on potential investments, at a certain level of risk (McClure, 2010). The 'Efficient Frontier' portfolio represents the best combination of return on investment and investment. The relationship between securities within the portfolio is an important part of Efficient Frontier. For example, the price of some securities in a portfolio goes in the same direction, while the price in some cases goes in different directions. The higher the covariance (the higher the moving average), the more unusual the difference (the lower the risk) in the portfolio. One of the major effects of Markowitz 'Efficient Frontier theory is its

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mention of diversity benefits. The split, as described above, can increase the expected return on portfolio without increasing risk. Markowitz's view suggests that sensible investors are looking for portfolios that produce greater profits than a small amount of risk - Efficient Frontier portfolios.

3.4.10 Theoretical Limitations

While opinions are very important, there are many critics of MPT who say that its basic thinking and modeling of financial markets is not compatible with the real world in many ways. From the main assumptions of MPT mentioned at the beginning of this analysis, it can be argued that none of these assumptions are completely true, and that each of them, to varying degrees, undermines MPT. Often, some major criticisms include:

Investor 'Nonsense' - The idea that investors are sensible and want to maximize profits while minimizing risk. This contradicts the view of market participants who benefit from 'herd behavior' in investment activities. Investors, for example, are always on the lookout for 'hot' sectors, and markets often explode or overflow due to perceived excesses (Morien, nd).

High Risk = High Income - The idea that investors are only willing to accept higher risk if they are compensated with the higher expected return is often contradicted by the investor's actions. In general, investment strategies require investors to take a set amount of risk (e.g. receivables or future) in order to reduce the overall risk without a significant increase in the expected return (McClure, 2010). In addition, investors have certain service functions that can surpass the distribution of payment concerns.

Complete Details - MPT receives timely and complete acceptance by investors of all relevant details in their investment. In fact, global markets include asymmetry of information (one group has higher knowledge), domestic trade, and more experienced investors (Bofah, n.d.). This may explain why stocks, commodities and businesses are often bought under books or market value.

Unlimited Access to Big Money - One of the most important considerations mentioned earlier is that investors have unlimited ability to borrow at low interest rates. In real world markets, every investor has limited credit. In addition, only a unity government can continuously borrow at the level of the treasury-bill-bill (Morien, n.d.).

Active Markets - Markowitz 'reference contributions to MPT are based on the assumption that markets are fully functional (Markowitz, 1952). On the other hand, MPT's reliance on prices puts it at risk of various market conditions such as estimates of public investment decisions. Furthermore, it does not take into account potential market failures such as external (cost or non-transferable benefits), information asymmetry, and public assets (non-competitive and non-competitive) (Morien, n.d.). According to one theory, centuries of 'racing', 'booms', 'bust', 'bubbles', and 'market problems' indicate that markets are far from perfect.

No Taxes or Fees for Performance - Markowitz 'vision donations to MPT do not include tax or operating expenses. In contrast, real investment products are subject to both taxes and operating costs (e.g., merchant payments, administration costs, etc.), and combining these costs may change the overall portfolio option.

Investment Independence - MPT considers it possible to choose securities whose performance is independent of other portfolio investors. However, market history has shown that there are no such tools (McClure, 2010). In times of market turmoil and great uncertainty, for example, seemingly independent investments, in fact, reflect the characteristics of the relationship.

Another verbal criticism, but equally, criticism: criticism: it was not in historical data, MPT only seeks to maximize the benefits adjusted to risk while ignoring natural, personal, strategic or social factors.

Instrinsic value and market value

Finding the instrinsic value represents a sound guide for making decisions an investment process, which logically states that an investor should buy or sell shares. American investor W. Buffet defines it as a discounted amount, that is issued to the company while it is on the market. He says yes, it is important to remember that the intrinsic value is not a direct number indicating the actual value of collateral, but only a limited check of the actual value made by selection measurement methods. This amount is subject to variations and changes in interest rates as well future income estimates (Cunningham, 1998).

Intrinsic value is an important indicator used by fundamentalists as they try to do so buy shares of companies at a lower price and sell them at a lower price, they can get benefits based on price differences. Investors believe that all stocks has a certain internal value, and should be based on the accumulated benefits per share, we assume that the market and internal values will differ in the short term, and in the long run will be different he can. In other words, it represents the real value of stocks, while the market value is the same it is reflected in public opinion: often the market value varies greatly from what is inside, to being high or low stock prices. If the internal value exceeds the market value of the stock (V0> P0), then it means that the share is underestimated, and investors have a good chance of buying it. On conversely, if internal value is lower than market value (V0 <P0), stocks are considered that they are very valuable and that investors should sell them. Therefore, the internal value is determined as the present value of all investments in the investor, that is, dividends, reduced risk, adjusted interest rate. The intrinsic value of the stock can be stated in the following formula:

$$V0 = \frac{E(D) + E(P)}{1 + k}$$

V0 = Intrinsic value

E(D)= Expected dividend yield

E(P)= Stock price at the end of the year

k= Required rate of return on stock

4 Practical Part

This part of thesis describes selected stock valuation techniques for chosen companies. The annual reports of the companies are used for the purpose of calculation of various valuation techniques. The annual reports were taken from Morningstar financial advisory service and it is supported by 10-K comprehensive reports from US Securities and Exchange Commission.

4.1 Analysis of Profitability

Dupont System

In the DuPont analysis, ROE is provided by three-element disaggregation and divided into components that can deeply explain the influence of changes in various factors on this indicator. These elements include: Profit Margin, Total Asset Turnover and Financial Leverage. The first part is related to measuring company's profitability to sales, the second component studies the efficiency, while the third one shows the extent of leverage. Reilly and Brown (2011) claim a formula of ROE calculation under the DuPont terms:

Formula 10 ROE in DuPont model

$ROE = Profit\ Margin * Total\ Asset\ Turnover * Financial\ Leverage$

Profit margin

Profit margin is one of the commonly used profitability ratios to gauge the degree to which a company or a business activity makes money. It represents what percentage of sales has turned into profits. Simply put, the percentage figure indicates how many cents of profit the business has generated for each dollar of sale. The higher the profit margin of a company, the more financial healthy it is. Therefore, profit margin is defined by the formula below:

Formula 11 Profit margin

$$Profit\ margin = \frac{Net\ income - Preferred\ dividends}{Net\ sales}$$

Figure 1 Profit Margin
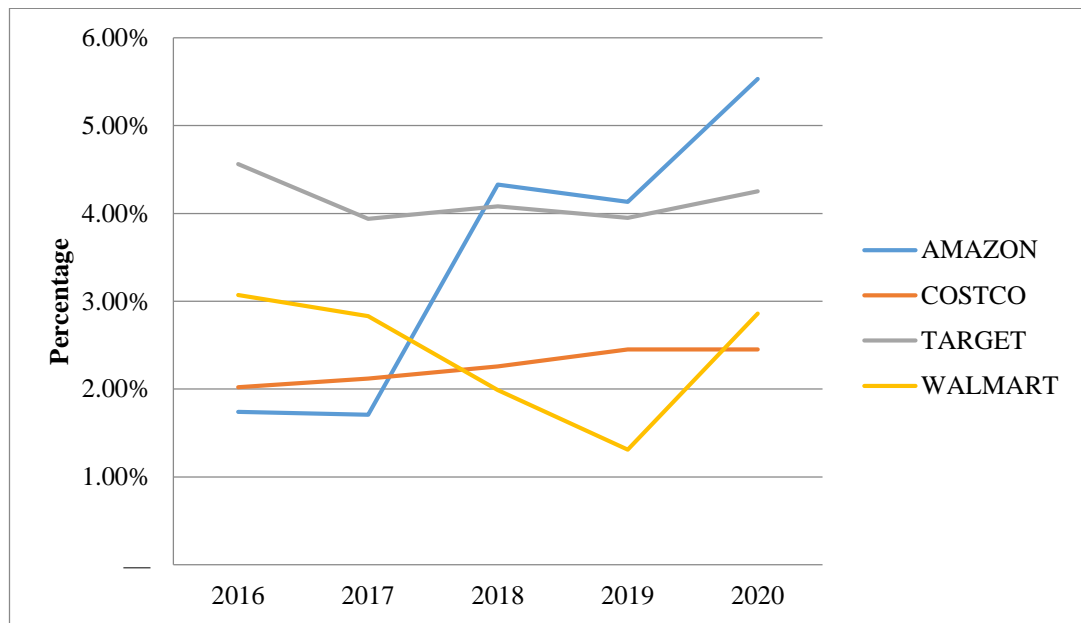
Own calculations based on data from Morningstar (see Appendix)

From the graph, we can summarize that Costco and Target had relatively stable Profit Margin, compare to the other companies. Walmart company experienced declines in 2017 to 2020 due lower net incomes these years. Therefore, Profit Margins of Amazon showed a positive trend in growth of values, which increased by 4% approximately over the 5 year period. Whereas Costco profit margin is almost stable in all the years. The company doesn't have the major change in the profit. The result shows that profit margin of Walmart was fluctuating up and down. From 2016 to 2020, there was a continuous increase and decrease in the company's profit margin.

As per analysis, we can say that examining profit margin of all selected members, Amazon financial performance seems to be the most attractive. Because the profit margin of the company increases from 2016 to 2020. Whereas other companies profit margin was decreases. So Amazon is better compare to other selected company's.

Total Asset Turnover

The asset turnover ratio measures the value of a company's sales or revenues relative to the value of its assets. The asset turnover ratio can be used as an indicator of the efficiency with which a company is using its assets to generate revenue.

The higher the asset turnover ratio, the more efficient a company is at generating revenue from its assets. Conversely, if a company has a low asset turnover ratio, it indicates it is not efficiently using its assets to generate sales.

Formula 12 Total Asset Turnover

$$\text{Total Asset Turnover} = \frac{Net\ sales}{Total\ Assets}$$

Figure 2 Total Asset Turnover
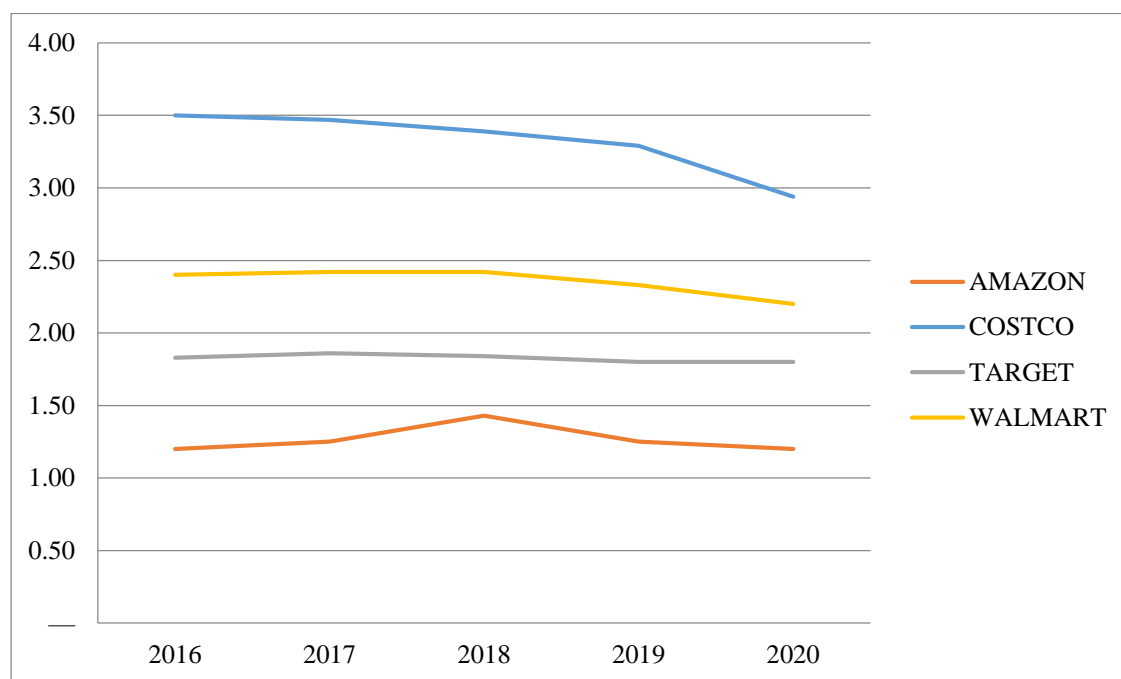
Own calculations based on data from Morningstar (see Appendix)

From the above figure it was represent that Amazon TAT ratio is almost similar in the period of 5 years. There was no major change in the total asset of the company.

As it can be seen from the graph above, Costco TAT ratio is superior to values of other members of FANG. According to the line in 2016 the TAT WAS 3.50 and it was decreases in the year 2020 by 1%. Whereas the Target companies total asset turnover ratio is almost same in the 5 year period and it was between 1.80 to 1.86 from 5 years. And the another company's TAT was also same for 5 year period there was no such change in 5 year period. So it was concluded that there was no major change in the total assets turnover in the 5 year period of time.

Financial Leverage

Financial leverage is represented by equity multiplier that shows what is the percentage of firm's assets financed by shareholder's capital. The higher the financial leverage ratio, the higher amount of debt is used for asset financing. Conversely, the lower equity multiplier, the lower debt is required to fund assets.

Formula 13 Financial Leverage

$$\text{Financial Leverage} = \frac{Total\ debt}{Total\ assets} * 100$$

Figure 3 Financial Leverage

Own calculations based on data from Morningstar (see Appendix)

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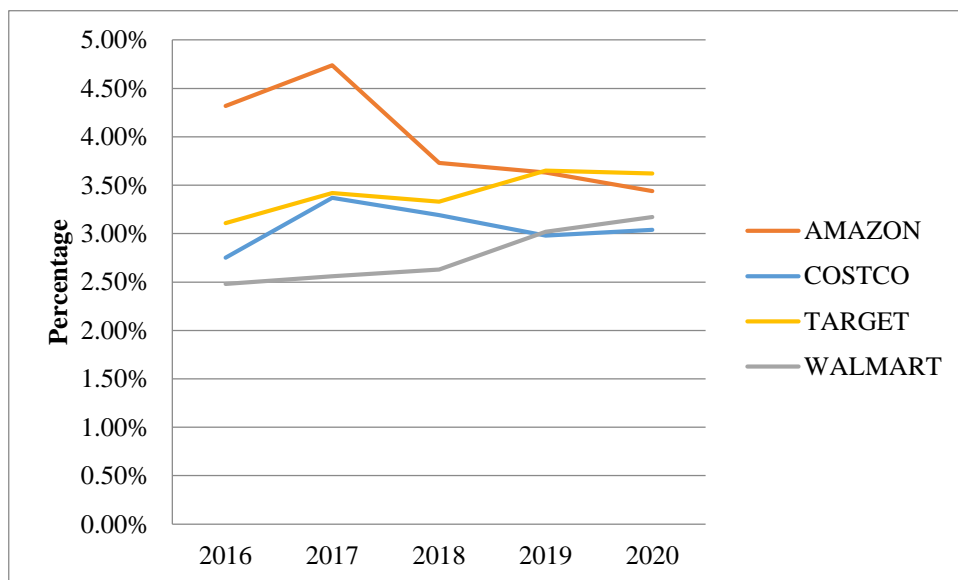
So from the above graph it was examine that financial leverage of Amazon was 4.32 in 2016, 4.74 in 2017 and 3.44 in 2020 so it indicates that from 2016 to 2020 it was decrease to 1. Whereas the another company Costo financial leverage was 2.75 and it increases in 2020 to 3.04. So the company have slightly change in there performance it means the company's performance is becoming better in 2020 than 2016.

Similarly another companies performance also becoming better in 5 years. There performance increased from 2016 to 2020. There was not the major change in performance but it increases from the previous year. So all the companies are performing better but Amazon performance decline from 2016 to 2020.

To have clear understanding about financial leverage, we can use another indicator of debt-to-Equity ratio that identifies sources of financing in the company. There is a strong correlation between equity multiplier and debt-to-Equity ratio. As financial leverage increases, the debt /equity indicator increases as well. A summary of companies values is presented in the below mentioned table 2:

Table 2 Debt-to-Equity

YEAR	AMAZON	COSTCO	TARGET	WALMART
2016	3.33%	1.99%	2.49%	1.57%
2017	3.74%	2.47%	2.79%	1.65%
2018	2.74%	2.25%	2.93%	1.85%
2019	2.63%	2.17%	2.79%	2.06%
2020	2.44%	2.93%	2.80%	1.87%

Own calculations based on data from Morningstar (see Appendix)

As well as equity multiplier, Debt-to-Equity indicators shows quite similar results. An overall condition of selected companies equity and debt are presented in the Figure 4:

Figure 4 Debt vs Equity
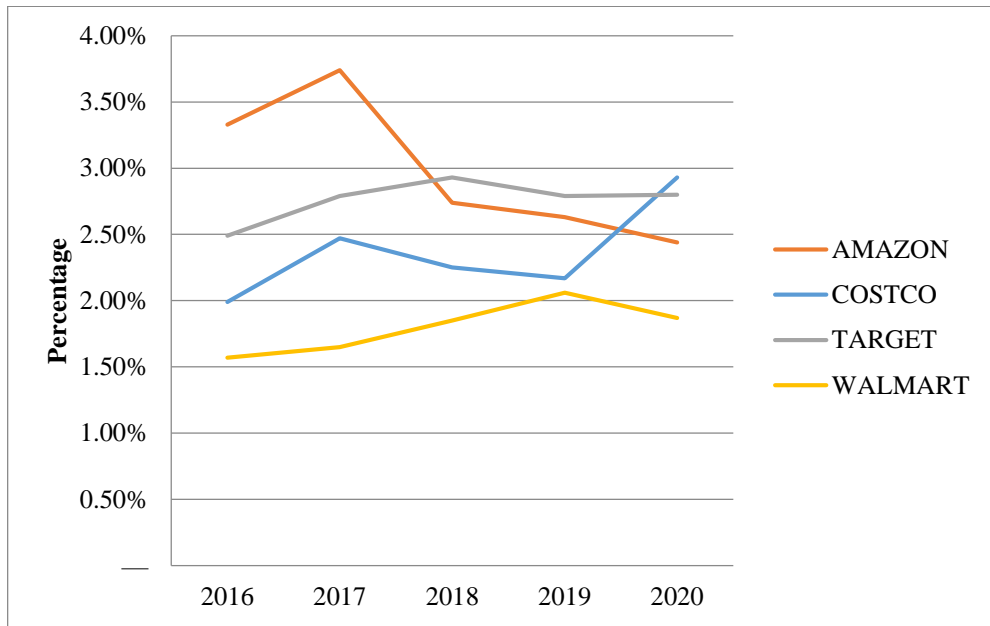
Own calculations based on data from Morningstar (see Appendix)

The debt-to-equity (D/E) ratio is used to evaluate the company's financial leverage and is calculated by dividing a company's total liabilities by its shareholder equity. It is a measure of the degree to which a company is financing its operations through debt versus wholly owned funds.

From the graph, it has been observed that Amazon has the highest debt to equity ratio, while Walmart has the lowest debt to equity ratio. Amazon has highest debt to equity ratio of 3.74% in the year 2017 and Walmart has the highest debt to equity ratio of 2.06% in the year 2019. The ratio for Amazon is lowest in the year 2020 which is 2.44% and the ratio for Walmart is lowest in the year 2016 which is 1.57%

Return on Stockholder's fund

After examining all three components of ROE indicator, we are required to multiply them between each other. The result of this procedure are displayed in the figure below (see Appendix):

Figure 5 Return on Equity
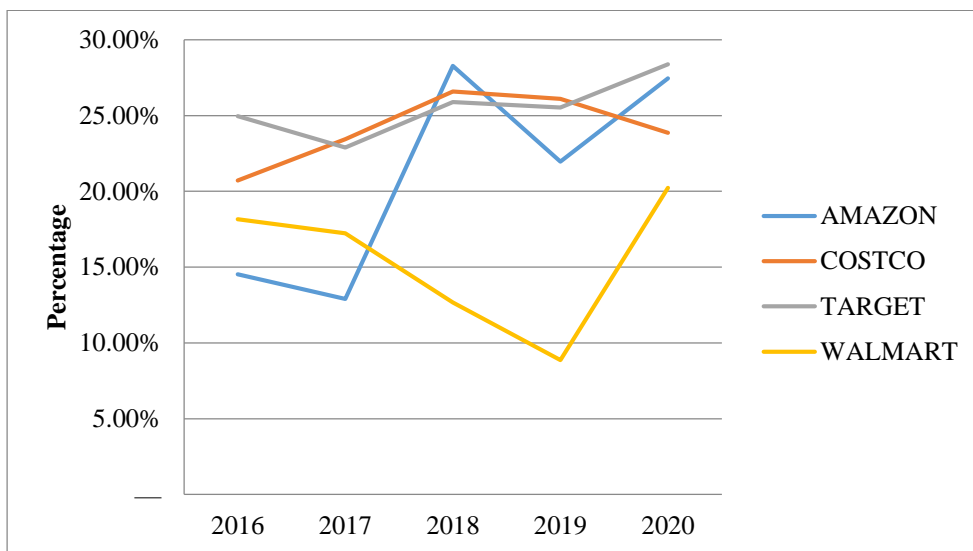
Own calculations based on data from Morningstar (see Appendix)

From the figure we can summarize that ROE of target was less sensitive. From 2016 to 2020, the company had stable values. In 2020, there was a some increase in return on equity. There was not a major change in the company's return on equity. Starting from 2016, Amazon's ROE was fluctuating up and down. From 2016 to 2020, there was a continuous increase and decrease in the companies ROE. In 2017, the indicator slightly decreased, however in the next year the value doubled.

ROE of Costco in 2016 was 20.71% where as it increase in 2017 to 23.44% and also remain same in another two years and then it falls to 23.87% in 2020. The result shows that ROE of Walmart was fluctuating up and down. From 2016 to 2020, there was a continuous increase and decrease in the companies ROE. In 2019, the indicator was decreased and however in the next year the value doubled.

We can say that examining ROE of all selected companies, Amazon and Target financial performance seems to be the most attractive. However, indicators of other firms have not gone so far, considering the previous year of period.

Earnings per share

Table 3 Earnings per share in USD

YEAR	AMAZON	COSTCO	TARGET	WALMART
2016	4.90	5.33	5.31	4.57
2017	6.15	6.08	4.69	4.38
2018	20.14	7.09	5.29	3.28
2019	23.01	8.26	5.51	2.26
2020	41.83	9.02	6.36	5.19

Own calculations based on data from Morningstar (see Appendix)

Figure 6 Earnings per share In USD
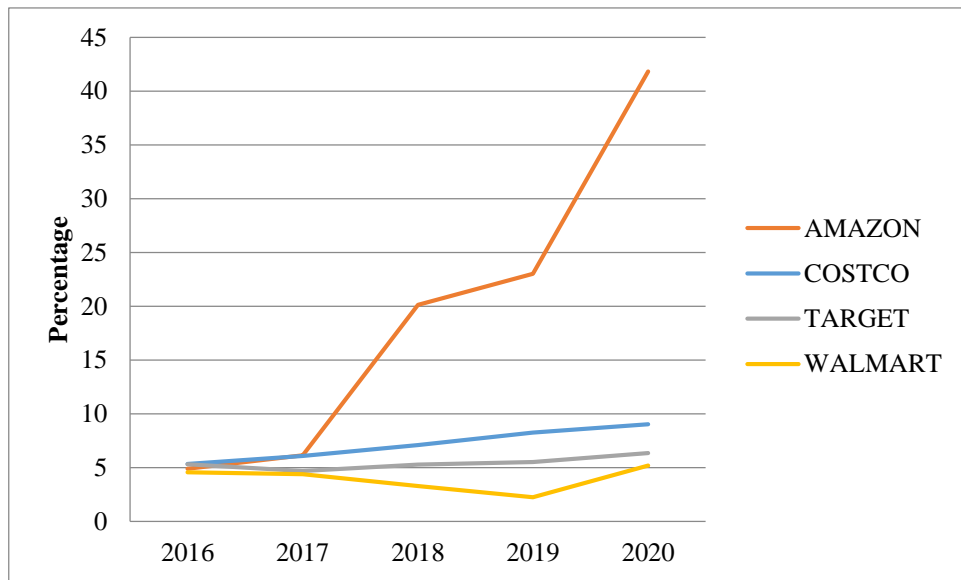
Own calculations based on data from Morningstar (see Appendix)

From the given table, it is clearly seen that Amazon went from lower EPS to extremely high values (such as 41.83 in 2020) compared to other enterprises. Costco showed a gradual growth, while Target and Walmart's EPS have not had high fluctuation, ranging from 3.20 to 6.40. Although, Target and Walmart's indicator is not that volatile as others', in the last year it showed the lower result of firm's performance.

4.2 Application of valuation models

It is required to discount present value of FCF by appropriate rate in order to calculate Free Cash Flow Models for selected companies. While the Weighted Average Cost of Capital indicates the firm value's interest rate. The equity approach includes the use of cost of equity. Initially, the cost of equity is calculated for each selected company respectively as it is the component of cost of capital and it is also used in calculation of WACC. All the indicators are taken from the year 2020.

The elements of cost of equity are based on opportunity cost and it includes risk-free rate, beta coefficient and expected rate of return. The Risk-free rate of return is based on recent yield of US 10-year Treasury Bond, whose value is 1.92%. Systematic risk, indicated by beta coefficient, is taken from Yahoo! Finance data, calculated in the previous 5-year period of returns monthly. The expected rate of return is calculated by using CAPM Model for SP500 portfolio. In this difffrent risk factors considered which are Business Risk,Liquidity Risk, Exchange Risk and Political Risk. Thus, summarizing the required data, discounting rates for FCFE are calculated using CAPM Model by adding a multiplied value of beta and expected rate of return to risk-free rate, which are showed in the Table 4:

Table 4 Cost of Equity summary

	AMAZON	COSTCO	TARGET	WALMART
Risk-free rate	1.92%	1.92%	1.92%	1.92%
Beta (β)	1.15	0.7	0.87	0.38
Expected rate of return on market portfolio (Rm)	11.51%	11.51%	11.51%	11.51%
Cost of Equity	**12.95%**	**8.63%**	**10.26%**	**5.56%**

Own calculations based on data from US Department of the Treasury, Yahoo! Finance, S&P 500 Global

Calculations of Cost of Equity:

Amazon: $1.92 + 1.15 * (11.51 - 1.92) = 12.95\%$

Costco: $1.92 + 0.7 * (11.51 - 1.92) = 8.63\%$

Target: 1.92 + 0.87 ∗ (11.51 - 1.92) = 10.26%

Walmart: 1.92 + 0.38 ∗ (11.51 - 1.92) = 5.56%

From the table 4, it can be seen that Walmart has the lowest required rate of return among all selected companies as its stock prices less volatile than market (β<1), while Amazon's cost of equity is the highest among other companies which in turn indicates that market values of shares are more volatile that market itself (β>1).

Elements of WACC must be examined in order to calculate discount factors of firm valuation model. Here, the elements of WACC include – cost of equity, which was previously calculated so market value of equity, debt and its cost are mentioned below.

The cost of debt is calculated by using weighted average effective interest rate on debt method. In weighted average effective rate on debt method, the interest rates are multiplied with debt amount. After that, the sum of all the interest rates and debt amount multiplication is calculated. The sum of all the interest rates and debt amount is multiplied with 100 and it is divided by total debt amount with a view to obtain the value of weighted average effective interest rate which us nothing but the cost of debt. The calculation for cost of debt is mentioned in table 5,6,7 and 8 where the values for debt are displayed in million USD while interest rates are expressed in percentages.

Table 5 Cost of Debt summary of Amazon

Interest rate	Debt amount	interest rate*debt amount
2.66%	1250	33.25
5.11%	5000	255.5
4.33%	16000	692.8
2.77%	10000	277
3.00%	338	10.14
2.90%	586	16.994
2.10%	28434	597.114
	61608	**1882.798**

Own calculations based on data from US Securities and Exchange Commission, Morningstar (see Appendix)

Table 6 Cost of Debt summary of Costco

Interest rate	Debt amount	Interest rate*debt amount
2.30%	800	18.4
2.75%	1000	27.5
3%	1000	30
1.38%	1250	17.25
1.60%	1750	28
1.75%	1000	17.5
4.91%	1052	51.6532
	7852	190.3032

Own calculations based on data from US Securities and Exchange Commission, Morningstar (see Appendix)

Table 7 Cost of Debt summary of Target

Interest rate	Debt amount	Interest rate*debt amount
3.70%	10643	393.791
3.68%	1854	68.2272
	12497	462.0182

Own calculations based on data from US Securities and Exchange Commission, Morningstar (see Appendix)

Table 8 Cost of Debt summary of Walmart

Interest rate	Debt amount	Interest rate*debt amount
3.90%	35216	1373.424
0.50%	750	3.75
3.30%	3034	100.122
5%	3682	198.828
0.30%	1624	4.872
1.90%	224	4.256
6.80%	4338	294.984
	48868	1980.236

Own calculations based on data from US Securities and Exchange Commission, Morningstar (see Appendix)

Calculation of Cost of Debt:

Amazon: (100*1882.80)/61608 = 3.06%

Costco: (100*190.30)/7852 = 2.42%

Target: (100*462.02)/12497 = 3.70%

Walmart: (100*1980.24)/48868 = 4.05%

These results indicates that Costco pays the lowest 2.42% on its debts, while Walmart's cost of debt is 4.05% which is the highest among other selected companies.

Another element of WACC is market value of equity. It is determined by multiplication of current share price and number of outstanding shares The current share price is represented by US dollars, the no. of outstandung shares are determined by units, market capitalization is expressed in billions USD. The data required for calculating market capitalization of companies are displayed in the Table 9 (current prices of stocks are taken from Yahoo! Finance data as on 26th of October, 2021, numbers of shares outstanding are extracted from balance sheets):

Table 9 Market Value of Equity summary

	AMAZON	**COSTCO**	**TARGET**	**WALMART**
Price of stock	$3,525.15	$517.17	$260.02	$147.76
No. of shares	507147620	441823811	488039053	2788497816
MV of equity	1787771432643.00	228498020334.87	126899914561.06	412028437292.16

Own calculations based on data from US Securities and Exchange Commission, Morningstar (see Appendix)

Calculation of MV of equity:

Amazon: 3515.25*507147620 = 1787771.43 million USD

Costco: 517.17*441823811 = 228498.02 million USD

Target: 260.02*488039053 = 126899.91 million USD

Walmart: 147.76*2788497816 = 412028.44 million USD

Market capitalization of Amazon is the highest among members and exceeds 1787 billion USD, while Target has the lowest value with 126 billion USD compared to others.

After defining all constituents of cost of capital, including MVs of equity and debt, Costs of

equity and debt were defined, WACC is calculated, based on summary of gathered information in the table below (MV of equity and debt are expressed in million USD, Costs of equity and debt are represented in percentage):

Table 10 Weighted Average Cost of Capital summary

	AMAZON	COSTCO	TARGET	WALMART
MV of Equity (in million)	$1,787,771.43	$228,498.02	$126,899.91	$412,028.44
MV of Debt	67,058	8,744	14,641	58,802
V(Equity + Debt)	1,854,829	237,242	141,541	470,830
Cost of equity	12.95%	8.63%	10.26%	5.56%
Cost of Debt	3.06%	2.42%	3.70%	4.05%
WACC	12.57%	8.38%	9.48%	5.27%

Own calculations based on data from US Securities and Exchange Commission, Morningstar (see Appendix)

Calculation of Weighted Average Cost of Capital:

$$Amazon = \frac{1,787,771.43}{1,854,829} \times 12.95 + \frac{67,058}{1,854,829} \times 3.06$$

$$Costco = \frac{228,498.02}{237,242} \times 8.63 + \frac{8,744}{237,242} \times 2.42$$

$$Target = \frac{126,899.91}{141,541} \times 10.26 + \frac{14,641}{141,541} \times 3.70$$

$$Walmart = \frac{412,028.44}{470,830} \times 5.56 + \frac{58,802}{470,830} \times 4.05$$

Therefore, expected return to stockholders is higher in Amazon's value, amounting for 12.57%, while the lowest opportunity cost of taking the risk of investing into a firm is seen in Walmart value with 5.27% of WACC.

4.2.1 FCFF valuation

After required assumptions for FCFF model were formed, the following step is of valuation which is used to forecast future free cash flows of selected companies. Free cash flows calculations were provided for covered period from 2016 to 2020 (see Appendix), however to project FCF, the last year, which is 2020, is needed to be estimated. In the table below,

components of FCFF approach are estimated for each (values are expressed in millions USD):

Table 11 FCFF base year (2020)

	AMAZON	COSTCO	TARGET	WALMART
Net income	21,331	4,059	3,281	15,201
Net noncash charges	31,252	2,604	2,956	10,381
Changes in operating assets and liabilities	13,481	2,198	862	(327)
Net cash provided by operating activities	**66,064**	**8,861**	**7,099**	**25,255**
Cash paid for interest on debt and finance leases, net of tax	1,347	94	384	1,863
Purchases of property and equipment	(40,140)	(2,810)	(3,027)	(10,705)
Proceeds from property and equipment sales and incentives	5,096	-	63	321
Property and equipment acquired under finance leases	(11,588)	-	(379)	-
Free cash flow to the firm (FCFF)	**20,779**	**6,145**	**4,140**	**16,734**

Own calculations based on data from Morningstar (see Appendix)

FCFF values are positive which indicates that firms have left cash after all expenses deducted. The year 2020 is considered as a base year for future projections.

FCFF for the next 5-year period and values of terminal year are forecasted in the Table 16 (values are expressed in millions USD):

Table 12 FCFF projections

	AMAZON	COSTCO	TARGET	WALMART
2020	20,779	5,483	8,230	27,503
2021P	22,694	5,783	8,828	28,700
2022P	24,909	6,106	9,382	29,596
2023P	27,477	6,453	9,880	30,156
2024P	30,461	6,826	10,308	30,355
2025P	33,936	7,228	10,654	30,181
Terminal Year	2,999,315	304,961	179,006	521,301

Own calculations based on data from Morningstar (see Appendix)

After future cash flows were calculated, value of FCFFs and terminal value are discounted at chosen rate, based on WACC indicator as calculated previously. Total sum of present values is shown in the following table:

Table 13 Present values of FCFF and TV

	AMAZON	COSTCO	TARGET	WALMART
2021P	20,142	5,335	8,061	27,286
2022P	19,622	5,197	7,824	26,750
2023P	19,212	5,066	7,524	25,913
2024P	18,903	4,944	7,169	24,798
2025P	18,692	4,830	6,766	23,441
PV OF TV	1,651,995	203,775	113,683	404,872
SUM OF PV	**1,748,566**	**229,148**	**151,028**	**533,059**

Own calculations based on data from Morningstar (see Appendix)

Considering all necessary indicators that are required in identifying the intrinsic value, it can be found by dividing sum of FCFE and TV present values by number of outstanding stock (all values are expressed in US dollars, number of shared is represented by units).

Table 14 Intrinsic value from FCFF

	AMAZON	COSTCO	TARGET	WALMART
Number Of Shares	507147620	441823811	488039053	2788497816
Sum Of PVs	1,748,566	229,148	151,028	533,059
Intrinsic Value	**$3,315.62**	**$498.85**	**$279.46**	**$170.08**
Market Value	$3,488.98	$503.81	$253.33	$149.27
Investment Decision	**Sell/ Not to buy**	**Sell/ Not to buy**	**Buy/Hold**	**Buy/Hold**

Own calculations based on data from Morningstar (see Appendix)

According to estimates through FCFF approach, Target, and Walmart stocks are undervalued towards current market price, fair price of Amazon and Costco's securities is overvalued compared to market value. Investment recommendation to buy or hold a certain stock can be applied for Target and Walmart while Amazon and Costco's shares should not be bought or sold in case of their possession.

4.2.2 FCFE valuation

The process of FCFE valuation is similar to the previous procedure, however it differs in variables included in the model, which were described in methodological part. Firstly, the last year of forecasting period is examined. FCFE elements are determined in the Table 19 (data is expressed in millions USD):

Table 15 FCFE base year (2020)

	AMAZON	COSTCO	TARGET	WALMART
Net income	21,331	4,059	3,281	15,201
Net noncash charges	31,252	2,604	2,956	10,381
Changes in operating assets and liabilities	13,481	2,198	862	(327)
Net cash provided by operating activities	**66,064**	**8,861**	**7,099**	**25,255**
Cash paid for interest on debt and finance leases, net of tax			(3,027)	
Purchases of property and equipment	(40,140)	(2,810)	63	(10,705)
Proceeds from property and equipment sales and incentives	5,096	3992	1,739	321
Property and equipment acquired under finance leases	(10,642)	-3200	(2,069)	-
Net change in short-term borrowings	619			(4,656)
Proceeds from issuance of long-term debt	10,525			5,492
Repayments of long-term debt	(1,553)			(1,907)
Premium paid to extinguish debt	-			-
Free cash flow to the equity (FCFE)	**29,969**	**6,843**	**3,805**	**13,800**

Own calculations based on data from Morningstar (see Appendix)

FCFE values and terminal value are estimated for the following 5-year period at chosen growth rates, considering base year of 2020. The results from FCF forecast are shown in the table (values are in millions USD):

Table 16 FCFE projections

	AMAZON	COSTCO	TARGET	WALMART
2020	29,969	5,317	7,983	20,319
2021P	35,668	5,778	9,209	21,785
2022P	41,751	6,242	10,355	22,995
2023P	48,053	6,704	11,343	23,891
2024P	54,363	7,158	12,094	24,424
2025P	60,437	7,598	12,544	24,564
Terminal value	3,568,312	326,528	199,396	498,115

Own calculations based on data from Morningstar (see Appendix)

The subsequent step is to discount obtained values of free cash flows to previously calculated cost of equity. The result of discounting is mentioned in the Table 21:

Table 17 Present value of FCFE and TV

	AMAZON	COSTCO	TARGET	WALMART
2021P	31,549	5,319	8,354	20,643
2022P	32,665	5,291	8,521	20,647
2023P	33,254	5,232	8,467	20,327
2024P	33,277	5,143	8,189	19,691
2025P	32,723	5,026	7,705	18,766
PV of TV	1,932,030	216,013	122,473	380,531
Sum of PV	**2,095,499**	**242,026**	**163,708**	**480,605**

Own calculations based on data from Morningstar (see Appendix)

By summarizing all data needed for fair value calculation, sum of present values is divided by number of shares:

Table 18 Intrinsic value from FCFE

	AMAZON	COSTCO	TARGET	WALMART
Number Of Shares	507147620	441823811	488039053	2788497816
Sum Of PVs	2,095,499	242,026	**163,708**	**480,605**
Intrinsic Value	**$4,131.93**	**$547.79**	**$335.44**	**$172.35**
Market Value	$3,488.98	$517.17	$260.02	$147.76
Investment Decision	**Buy/ Hold**	**Buy/ Hold**	**Buy/ Hold**	**Buy/ Hold**

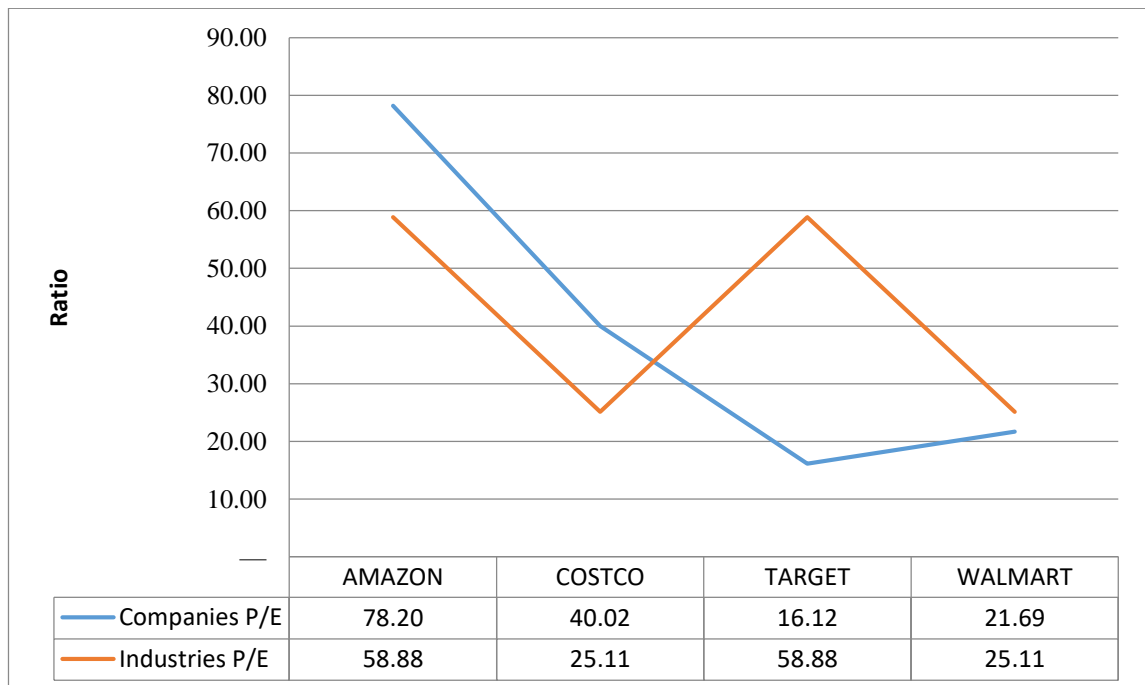*Own calculations based on data from Morningstar (see Appendix)*

Valuation using FCFE model brought significantly lower results for some firms, thus investment recommendation for Amazon and Costco has changed when using FCFF from Sell/Not to buy to Buy/ Hold to sell. Therefore, a detailed description of outcome from FCFF and FCFE models and discussion of obtained results will be provided in the result and discussion part.

4.2.3 Relative valuation

This part is devoted to applying of relative valuation methods on selected stocks: P/E, P/B and P/S multiples, which were previously described in literature review. Each ratio is compared to sub industry's average, collected by A. Damodaran.

The first ratio that is aimed to examine is earnings multiplier. Price of stock is determined as of 31st of December, 2020, Earnings per Share are extracted from income statements of 2020. Summary of P/E results is shown below:

Figure 7 P/E ratio

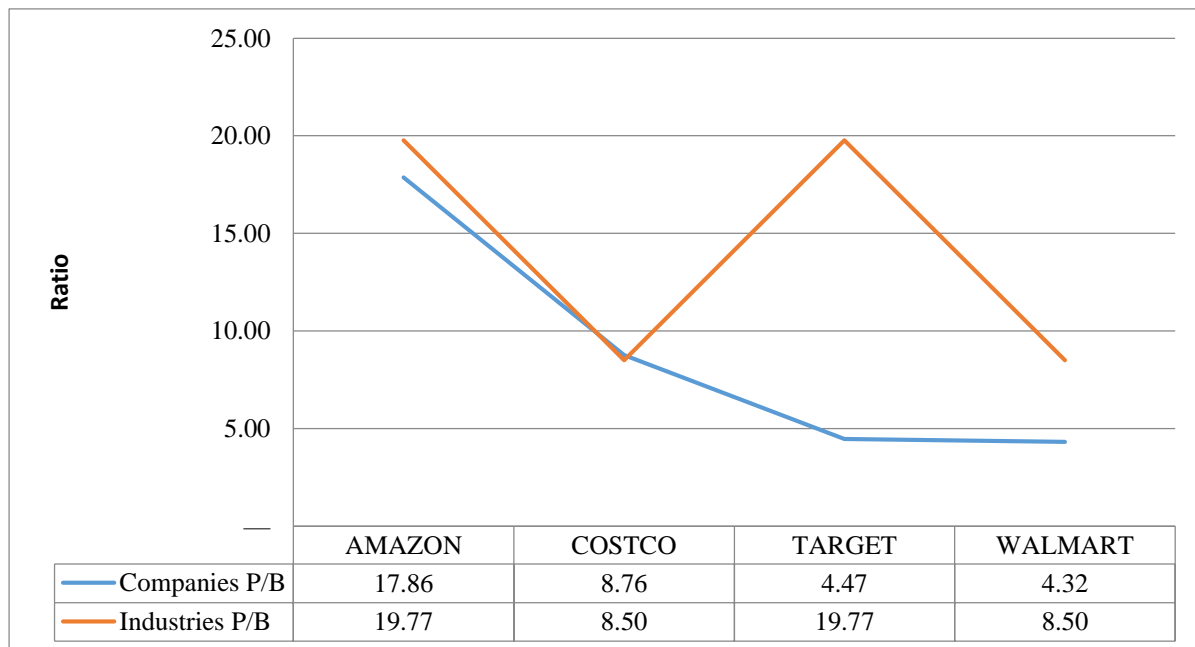|	AMAZON	COSTCO	TARGET	WALMART
Companies P/E	78.20	40.02	16.12	21.69
Industries P/E	58.88	25.11	58.88	25.11

Own calculations based on data from Yahoo!! Finance, Morningstar (see Appendix)

The P/E ratio shows what the market is willing to pay today for a stock based on its past or future earnings. Amazon has the highest P/E ratio (78.20) among the other companies, which explains that investors have higher expectations in future growth of income. However, compared to industry, the outcome for Amazon is higher than group's average hence I suggest to Sell the stock. As for Costco, P/E indicator is above 40 but compared with the sector P/E that is lower than company's P/E, thus it is also recommended to sell the shares. The lowest value was obtained for Target, meaning that potential investor pays 16.12 USD for every dollar that company earns. The ratio is much lower than sector's average so the stock can be purchased or hold in the case of possession. Walmart's P/E value is slightly higher than Target's thus these stocks can also be bought.

Another multiplier, which is Price-to-Book ratio is calculated by dividing current market value of share by Book value (difference between assets and liabilities) per stock. The outcome of calculation is shown in the following figure:

Figure 8 P/B ratio

	AMAZON	COSTCO	TARGET	WALMART
Companies P/B	17.86	8.76	4.47	4.32
Industries P/B	19.77	8.50	19.77	8.50

Own calculations based on data from Yahoo!! Finance, Morningstar (see Appendix)

Indicator of Amazon shows high results in P/B (17.86), however it is still lower than sector's average (19.77). As for other stocks such as Target and Walmart, their P/Bs indicate values (4.47 and 4.32 which is also lower than sector's average (19.77 and 8.50).

Costco P/B ratio implies that stocks are slightly overvalued compared to industrial average as company's P/B is slightly higher than sector's average. However Walmart seems to be preferable, due to lower P/B value.

Figure 9 P/S ratio

	AMAZON	COSTCO	TARGET	WALMART
Companies P/S	4.32	0.98	0.69	0.62
Industries P/S	3.78	1.63	3.78	1.63

Own calculations based on data from Yahoo!! Finance, Morningstar (see Appendix)

Price-to-Sales indicates how market price of stock in relation to sales generated per share. P/S multiplier of Amazon exceed ratio of the sectoral averages. Moreover, the value is the highest among other companies, thus it recommended selling or not buying this stock. As for Costco, Target and Walmart P/S ratios of these firms are lower than average in the industry thus stocks are recommended to be purchased.

5 Results and Discussion

In FCFF valuation, value of firm was obtained for each selected company. Intrinsic value of Target's share is 279.46 USD, which is higher by 10.31%, meaning that this stock is worth than its market price thus it is recommended to buy or hold it. Fair price of Walmart stocks was established as 170.08 USD per share. Considering that it was traded as of 31.03.2021 at 149.27 USD, the real value is slightly higher by 13.94%, investor are advised to purchase these shares. Amazon's true price was identified as 3315.62 USD per stock, while recent market value was 3488.98 thus this security is overvalued by 4.96% and investors should sell it or give up on buying it. According to firm valuation method, Costco's stocks are overvalued by approximately 0.99% , accounting for 498.85 USD of intrinsic price per share. Such significant difference can be explained by lower net income gained in the base year (2020), compared to net earnings generated by other selected companies and relatively small number of common stocks issued.

FCFE procedure was similar to previous approach, however when calculating values, debt repayments were subtracted additionally. True value of Amazon was calculated as 4131.93 USD, which is higher by 18.43% than market price. It explains that the stock should be bought or not sold. Costco's share was valued at 547.79 USD, which is lower by 5.92% as compare to current market value. The results are also different compared to FCFF approach with 9.8% increase in value as Costco had lower debt repayment in previous years (e.g., 7852 million in 2020). The underlying price of Amazon was also estimated higher at 4131.93 USD, which is more than current value by 18.42% where the current value indicates the price at which the stock is traded. As well as in the case of Target, the company had second highest repayment for lease obligations after Amazon as compare to other selected companies. The intrinsic value of Walmart obtained from FCFF and FCFE was similar as there were lack of debt repayments for this company.

In relative valuation, various multiples were examined. Based on P/E ratio, Target and Walmart   are recommended to be purchased as their ratios are below the sectorial average. However, by contrast, considering P/B indicator, Walmart's securities look more attractive

to investors rather than Costco's share. Another multiplier P/S showed that Costco, Target and Walmart's stocks are recommended for buying as their values are below average in the sectors, while Amazon's share are assumed to be overvalued thus investor should sell them or give up on purchasing.

6 Conclusion

This diploma thesis was devoted on the application of certain absolute and relative valuation techniques on Amazon, Costco, Target and Walmart stocks. Therefore, it was decided that Free Cash Flow to Firm and Equity models are used as absolute valuation methods and multiples are utilized in relative valuation.

In the last stage of top-down approach, profitability analysis was performed by implementing DuPont model, where it was discovered that Target had the highest return on equity in 2020. Last but not least, selected stocks were evaluated by methods described in theoretical part.

In the first part of valuation part, application of absolute methods using Discounted Cash Flow models. For estimating intrinsic value from Free Cash Flow to Firm and Equity procedures, crucial input determinants were calculated. Firstly, two-stage growth model was selected with 5-year of forecast horizon (from 2021 to 2025) in the first stage. Discount rate are identified through Cost of Equity and Weighted Average Cost of Capital calculations, needed for analyzing fair values of share using FCFE and FCFF methods, respectively. Considering input determinant of DCF models, we can answer on the main question of this work:

-How different are the results received from various valuation approaches of selected companies used in this work?

Compared to Firm's value, equity value of a company tends to be lower due to deduction of debt repayments. Costco's intrinsic value using firm and equity valuation differs by 9.81%. The outcome of FCFE fair value for Amazon is increased by 19.75% in relation to FCFF as repayments for lease financial were significant in the previous years that affected projections of future Free Cash Flows. Target's entity and equity values are distinct between each other by approximately 20.03%. Walmart's fair prices from two different DCF approaches are

similar as there was lack of repayments hence it was only affected by changes in discounting rate.

Moreover, emphasizing on multiples valuation, Target and Walmart's selected ratios were above industry's average thus these securities are recommended to be purchased, considering any of multiple ratios. It is recommended to sell Amazon stock, if P/S ratio is used as valuation metrics.

To sum up, the chosen topic has a lot of potential to be developed as in-depth analysis can be performed for each company. Thus, this work does not reflect full potential of top-down approach of fundamental analysis due to thesis requirements in volume limitations of work, but it just shows a profound step to broad stock valuation procedure. It would be interesting to provide the results of such comprehensive in-depth analysis of selected stocks and compare them with author's findings.

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8 Appendix

This thesis includes evaluation of various variables which are necessary for valuation of models and some indicators required for profitability analysis. The calculations for the purpose of analysis are performed in Microsoft Excel software. The document includes 10 sheets which are mentioned below:

- **ROE** – Calculation of return on equity under DuPont analysis
- **Debt-to-Equity** – Calculation of Debt-to-Equity ratio
- **EPS** – Calculation of Earnings per share
- **WACC** – calculation of Weighted Average Cost of Capital
- **FCFF** – calculation of interest tax shield, projected FCFF, terminal value and intrinsic value of stocks
- **FCFF** – Calculation of projected FCFE, terminal value and intrinsic value of stocks
- **Price-to-Earnings** – Calculation of P/E ratio for base year (2020) and of projection of the indicator in the upcoming 5 years
- **Price-to-Book value** – Calculation of P/B ratio for base year (2020) and of projection of the indicator in the upcoming 5 years
- **Price-to-Sales** – Calculation of P/S ratio for base year (2020) and of projection of the indicator in the upcoming 5 years

The supplemented material is attached to the work in the form of Excel files and can be found in "Thesis appendices" section on Final Thesis page in the university Information System (UIS).