Saku Ilvesniemi

Value investing in the context of the business cycle

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Author: Saku Ilvesniemi
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ABSTRACT :

Value investing is a popular investment strategy that involves identifying stocks with high fundamental ratios, such as high book value or cash flow to price, and purchasing them for less than their perceived worth. This strategy has been found to offer higher average returns than growth stocks or market indices. Financial ratios, such as P/E and P/B, are commonly used to evaluate potential value stocks. Benjamin Graham, author of "Security Analysis" and "The Intelligent Investor", is considered the father of value investing, and his work continues to influence the strategy today. The strategy has also evolved over time and has discovered new strategies in search of better returns.

However, in the last decade, studies have shown that returns of value stocks in relation to growth stocks have been declining. The aim of this study is to sufficiently review literature related to value investing and find the most effective ways to investigate the value premium. Empirical research is carried out in the thesis based on the previous literature and the aim is to find whether the value premium still exist using financial the ratios of CF/P, D/P, P/B, and EBITDA/EV.

Different market situations also bring an interesting perspective to the topic. Recent years have offered plenty of different situations and conflicts around the world that have affected financial markets and economics. For example, the COVID-19 pandemic brought major impacts to the financial markets. Even though value investing has yielded great profits over the years, it is not self-evident that it works as well in different economic situations.

The research takes place in the US stock market. The data contains monthly prices, financial statements, and key figures of listed companies from the US stock market. The data collected for this research cover the period from 29. December 2000 to 31. December 2020. For this period, the results of the study show a risk-adjusted value premium in three out of four value portfolios. The value premium is examined for corresponding growth portfolios and the market index that is described by the S&P 500 price index.

When studying the value premium in different economic situations, results from the bull market period demonstrated an increase in the value premium for the CF/P and EBITDA/EV portfolios. During the period of declining market, on the other hand, the value premium of value portfolios of CF/P and D/P decreased. At the same, the market downturn also showed conflicting results and clear statistically significant conclusions about its effects could not be drawn based on this study.

KEYWORDS: Value investing, value premium, business cycle, growth investing, US stock market, S&P 500 premium, business cycle, growth investing, US stock market, S&P 500

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TIIVISTELMÄ:

Arvosijoittaminen on suosittu sijoitusstrategia, joka perustuu alihinnoiteltujen osakkeiden tunnistamiseen suhteessa niiden nykyhetken fundamentteihin, kuten kirjanpitoarvoon tai kassavirtaan. Arvo-osakkeiden on todettu tarjoavan historiallisesti korkeampia keskimääräisiä tuottoja kuin kasvuosakkeet tai markkinaindeksit. Arvo-osakkeita etsittäessä voidaan käyttää apuna taloudellisia tunnuslukuja kuten P/E- ja P/B-lukuja. Arvosijoittamisen oppi-isänä pidetään Benjamin Grahamia, joka on kirjoittanut kirjat "Security Analysis" ja "The Intelligent Investor". Näitä kirjoja voidaan pitää edelleen merkittävinä teoksina rahoitusmaailmassa. Arvosijoittaminen strategiana on kuitenkin kehittynyt myös ajan myötä ja se on löytänyt uusia lähestymistapoja parempien tuottojen löytämiseksi.

Viime vuosikymmenellä arvo-osakkeiden tuottojen on todettu laskeneen suhteessa kasvuosakkeisiin. Tämän tutkielman tavoitteena on käydä perusteellisesti läpi arvosijoittamiseen liittyvää kirjallisuutta ja löytää parhaat metodit tutkia arvopreemion olemassaoloa. Tutkimuksissa käytettyjä metodeja hyödyntäen tavoitteena on tutkia, onko arvopreemiota enää havaittavissa sijoitusmarkkinoilla. Tässä tutkielmassa käytetään CF/P, D/P, P/B ja EBITDA/EV-lukuja osakkeiden erottelussa eri portfolioihin.

Erilaiset markkinasuhdanteet tuovat myös mielenkiintoisen lisän tutkielmalle. Viime vuosina erilaiset kriisit ja tapahtumat maailmalla ovat tarjonneet paljon erilaisia markkinatilanteita. Esimerkiksi COVID-19 pandemian aiheuttama laskumarkkina vuonna 2020 toi uudenlaisen taloudellisen tilanteen sijoitusmarkkinoille. Vaikka arvosijoittaminen on tuottanut historiallisesti hyvin, ei ole itsestään selvää, että se toimisi myös erilaisissa markkinatilanteissa yhtä tehokkaasti.

Tutkielma sijoittuu Yhdysvaltojen osakemarkkinoille, josta käytettävä data koostuu listatuiden osakkeiden kuukausittaisista hinnoista, tunnusluvuista sekä tilinpäätöstiedoista. Tutkielmassa käytetty data kattaa aikavälin joulukuusta 2000 joulukuuhun 2020. Tältä ajanjaksolta saatujen tulosten perusteella kolme portfoliota neljästä osoittavat korkeampia riskikorjattuja tuottoja kuin kasvuosakkeet tai markkinaindeksi, joka tässä tutkimuksessa on S&P 500 price indeksi.

Eri markkinasuhdanteisiin sijoittunut tutkimus osoittaa, että kasvumarkkinassa on havaittavissa kasvua arvopreemiossa CF/P ja EBITDA/EV tunnuslukuja hyödyntäen muodostetuissa portfolioissa. Laskumarkkinoille sijoittuneet tulokset sen sijaan osoittivat, että CF/P ja D/P tunnuslukuja hyväksi käyttäen muodostettujen arvoportfolioiden arvopreemio laski. Laskumarkkinoille ajoittunut tutkimus osoittaa kuitenkin ristiriitaisia tuloksia, eikä tilastollisesti merkittäviä johtopäätöksiä kyseiseltä ajanjaksolta voida tehdä.

AVAINSANAT: Value investing, value premium, business cycle, growth investing, US stock market, S&P 500

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Abbreviations

B/M	Book to Market
CAPM	Capital Asset Pricing Model
CF/P	Cash flow to Price
CMA	Conservative Minus Aggressive
D/P	Dividend to Price
EBITDA/EV	Earnings Before Interest, Taxes, Depreciation, and Amortization to Enterprise Value
HML	High Minus Low
P/B	Price to Book
P/E	Price to Earnings
RMW	Robust Minus Weak
SMB	Small Minus Big
S&P	Standard and Poor's
UK	United Kingdom
US	United States

1 Introduction

For centuries, investors have aspired to discover investment strategies that would enable them to optimize their returns. One such strategy is value investing, which involves purchasing stocks for less than their perceived worth, while taking into account the associated risks of the company. Value investing is one of the most studied and well-known strategy in the literature of finance. Apart from last ten years and techno bubble, there has proven to be value premium in the returns of value stocks. It means they have been beating growth stocks for decades. Value portfolios formed from the basis of indicators introduced in this thesis, like P/B, CF/P, D/P, and EBITDA/EV ratios, have been providing the best abnormal returns. These returns are not found only in United States markets but also around the world. However, their performance has been observed to vary over time.

According to the efficient market hypothesis, it shouldn't be possible to outperform the markets with any anomaly or to earn excess earnings with any strategy without higher risk. Based on efficient markets, investors always have full information about the content and risks of all stocks. Several studies of value premium have proven evidence against the hypothesis, and it is also the basic assumption of this research. These studies state how investor behavior and anomalies have been the reason for abnormal returns, and this research follows the same point of view with the researchers. (Basu, 1977; Lakonishok, Shleifer & Vishny, 1994; Fama & French, 1998; Chan & Lakonishok, 2004).

There has been discussion about the reasons for value premium from different researchers over time. The expected excess returns of value shares are demonstrated to be time varying in different economic conditions, but the predictability is close to non-existent. (Gulen, Xing & Zhang, 2011; Peltomäki & Äijö, 2015). The results and conclusions of several studies carried out by researchers are introduced at the literature review of this paper. However, one specific cause for the anomaly has not yet been found to this date. The study aims to clarify these reasons with the help of Fama and French (2015) five-factor model.

One purpose of this thesis is to study the effects of different business cycles in value investing. Recent years have offered plenty of different situations and conflicts around the world that have affected financial markets and economics. For example, the COVID-19 pandemic and most recently the war in Ukraine have brought major impacts to the financial markets. Even though value investing has yielded great profits over the years, it is not self-evident that it works as well in different economic situations. Several studies like Jagannathan & Wang (1996), Campbell & Vuolteenaho (2004) and Zhang (2005) have shown how value and growth stocks behave differently in changed economic situations, especially in recession. Studies have stated how value companies begin to lose their better performance and earnings at the downturns of business cycle while growth companies will become more attractive options for investors. This has considered to be as one of the risk factors of value stocks to explain the value premium by researchers (Jagannathan & Wang, 1996; Liew and Vassalou, 2000; Zhang, 2005; Lee, Strong & Zhu, 2014) and the thesis seeks confirmation for the manifestation of the results.

There are also different views of why value stocks are losing the value premium during the recession, and sometimes the value premium even turns negative. Distress risk and funding liquidity risk are risk factors that are affecting returns of value companies. Cutting capital is more expensive than expanding it so the firm value can be melted by unproductive capital during downturns of economy. (Zhang, 2005; Lee et al., 2014; Cakici & Tan, 2015). This study extends previous literature (Pätäri & Leivo, 2009; Zhang, 2005; Lee et al., 2014) by combining the best methods from previous studies and to bring the methods of previously conducted studies to the present day. Based on this, it is possible to draw conclusions about the value premium in today's investment environment. The research also brings fresh perspective to previous literature (Fama & French, 2020; Blitz & Hanauer, 2021) by examining the different economic cycles of recent years. For example, not many studies have yet been conducted on the bear

market caused by COVID-19, and its effects on value investing have not been extensively studied.

1.1 Hypotheses

This thesis studies how the business cycles affect the value premium. The first goal of the research is to ensure the existence of a value premium in United States stock markets throughout the examined period. It is done using different strategies introduced by previous studies. Studies have found that value strategies have historically generated better returns than growth stocks or markets. Therefore, it can be assumed that this study will reach the same conclusion. The first two hypotheses are as follows:

H1: The risk-adjusted returns of value stock portfolios are higher than for benchmark index throughout the examined period.

H2: The risk-adjusted returns of value stock portfolios are higher than for growth stock portfolios throughout the examined period.

The hypotheses are based on the findings of previous studies by Blitz & Hanauer (2021) and Fama & French (2020). Fama and French find that value stocks in the US market produce higher average returns for the examined period of 1963-2019 than the market portfolio of the listed US stocks. However, the study shows that the value premium is significantly lower in the second half of the period. Blitz and Hanauer (2021) find the same kind of evidence. They state that although value stocks have performed poorly during the last decade, the value premium is still visible in the stock market returns.

The effects of different business cycles on the value premium provide an interesting perspective on the topic. In addition to the research of the existence of a value premium, it is useful to study how the value premium varies in different economic circumstances.

Based on the previous literature, the hypotheses investigating these effects are presented as follows:

H3: The performance of value portfolios relative to growth portfolios are declining in economic downturn.

H4: The performance of value portfolios relative to growth portfolios are better in economic upswings.

Researchers have found that the value premium declines in economic downturns compared to growth stocks. (Koijen, Lustig & Van Nieuwerburgh, 2017; Zhang, 2005). Although the value premium has been noticeable before the downturn, it has turned lower or even negative during the recessions. Growth stocks are found to be less sensitive to downturns, so they perform better in recessions. In the growth cycle, on the other hand, value stocks have shown better success. (Gulen, Xing & Zhang, 2011). The value premium in the US market during the subprime credit crisis has been studied by Lee, Strong & Zhu (2014). They provide results how value stocks were underperforming growth stocks during the subprime credit crisis, that started in early 2007, despite a positive value premium before it. The findings of the study suggest that, for example, the recent COVID-19 pandemic should offer similar results for period studied by this thesis, and thus the hypotheses should be confirmed.

2 Value versus growth

This chapter introduces the fundamentals of value investing and how it has evolved until this day. Chapter also presents the classification of strategies where indicators, that can be used when trying to find value- or growth stocks, are introduced. Later in this study these fundamentals have been utilized in researching the answers to confirm the hypotheses.

2.1 Value investing

Value investing is a strategy where you aspire to find value stocks, which are stocks with high ratios of a fundamental like high book value or cash flow to price. It has been discovered that value stocks have higher average returns than growth stocks. For many years professionals have been arguing why value strategies outperform the market. (Lakonishok, Shleifer & Vishny, 1994). Basically, value investors buy assets for less money than they think the assets are worth considering the risk of the company. (Gabriel, 2008).

Companies are analyzed based on their financial ratios, and low-price relative is trying to be found to historical prices, book assets, earnings, dividends, or other measures of value (Fama & French, 1992). The most used indicators to determine these companies are P/E (price to company earnings), P/B (price to book value of the company) together with dividend yield, and with these indicators it's not hard for investor to find value companies around the world. (Fama & French, 1998).

Benjamin Graham has been considered as the father of this strategy after he released the book "Security Analysis" along with his colleague David Dodd in 1934. Graham continued his work and published another book "The intelligent investor" in 1949 which has sold more than a million copies. These books are still significant pieces in the literature of value investing. According to Gabriel (2008) one of the most famous

investors Warren Buffet once said that “Intelligent investor” is: “The best book on investing ever written”.

Value investing as a strategy has gone a long way until this day and still it’s one of the most used strategies in investing world. It has also evolved into many new and different forms and approaches. Warren Buffet is the front speaker of this strategy but who are the people who follow this strategy? Sebastien Betermier, L. Calvet and P. Sodini (2016) find in their research that value investors are noticeably older, most likely women, have higher financial and real estate wealth and have lower income risk. Many times, investing has started as a growth investor but gradually shifted to value investing as investment horizon shorten and capital value and human capital of investors evolve. When following investments over the life cycle, a phenomenon was found that is called “the value ladder”. Switching progressively from growth to value investment was done despite the situation of economic that time. (Betermier, Calvet & Sodini, 2016).

2.2 Growth investing

According to Betermier et al. (2016) investing has been usually started as a growth investor. Growth investing means trying to find stocks that will grow in the future and generate profits later. Difference between value stocks and growth stocks is that the price of the growth stocks that are already higher in relation to its current yield and book value. Conversely, growth companies are something that investors think will generate earnings, and are expected to increase, at the faster rate than the average company at same industry and the projected earnings growth is already visible in price. (Benada, 2002; Kline & Buchwald, 1996).

According to some researchers like Zhang (2005), growth investing is considered riskier than value investing because the investors decisions are based on the assumption that the company will continue to grow without any problems. Profits from shares will be strongly based on future market expectations of return on shares. Value investors have

their margin of safety as they try to find the stocks that are priced at a discount to their intrinsic value and that is something growth investors don't typically have. (Kline & Buchwald, 1996). However, growth investing has been considered less risky by most researchers because growth stocks are not so sensitive to economic downturns. (Jagannathan & Wang, 1996; Liew & Vassalou, 2000; Zhang, 2005). Still, a comparison of historical prices show that the volatility of growth stock has been higher.

2.3 Classification of strategies

There are many indicators that can be used when trying to find value- or growth stocks. This section introduces the most common ones that have proven to be effective when shares leading to excess earnings are being found. With the help of these indicators, investors have a possibility to recognize value and growth stocks and may have a sense of the risk and return involved with the companies. In the empirical research section of this study, portfolios are formed based on these stretegies.

2.3.1 P/B ratio

According to Shapiro (1991, p. 333) price-to-Book ratio is one of the most used indicators, the same as P/E, for differentiation of value stocks and growth stocks. P/B is a measure of the market value of a share compared to equity per share, or in the other words to book value of the share. P/B ratio indicates how shareholders value the proportion of invested equity in relation to the amount of equity.

For value stocks P/B ratio is normally under one or near one. If P/B ratio is one, it indicates that investors are ready to pay the same amount from the stock as its net asset value is. In that case the future return on equity is the same as investors required return for equity. If the P/B is under one it indicates that stock don't have significant future growth expectations, while growth stocks are normally having P/B over two as it signals

on the expectations of the future growth and improvements in profitability. (Fairfield, 1994).

Fama & French (1992) uses Book-to-Market ratio to explain the relation between average returns and book-to-market equity. In their study they are making it clear how book-to-market effect is much more powerful than the size effect on stocks returns. Later they are classifying firms with high ratios of book-to-market equity as value stocks and there is a strong value premium appearing in the returns of them. (Fama & French, 1998).

Comparing the book value of a company to its market value you get company's B/M ratio which is a measure of company value. It is useful indicator for value investor to find undervalued companies from the financial markets. Doing good profit compared to firm's equity signals on low B/M ratio. Value investors are looking for high book-to-market companies. It means B/M value of over one. When the B/M value is one or above the stock price of a company is traded for less than the worth of company's assets are. (Fama & French, 1995).

2.3.2 D/P ratio

The subject of "can dividends predict stock returns" has been studied for many years and by many analysts. Rozeff (1984) discovers that the ratio of dividend yield to the short–term interest rate eases the explanation of future stock performance and same time rejects the random walk hypothesis of stock prices. Black and Scholes (1974) are stating that if investors require higher returns for holding higher dividend yield stocks, firms will increase their stock prices by changing their dividend policy to restrict the quantity of dividends paid and lower their cost of capital. Companies that are maximizing their value would in this case increase their dividend pay outs because investors require a lower return on high yield stocks. (Black & Scholes, 1974).

Value investor can use dividend yield as indicator differentiating value stocks from growth stocks. High dividend yield is commonly seen in value companies while growth companies are less likely to pay dividend at all. Value investors would like yields on stocks to be above 3% and dividends are also a guarantee of the future cash flow, so companies are assumed to maintain the dividend also in the future. (Kline & Buchwald, 1996).

2.3.3 CF/P ratio

Valuation indicator that has received less attention in academic research but is very useful sorting value and growth companies is cash flow to price ratio. In some studies CF/P ratio has proved to be one of the most important ratios for value investors. (Lakonishok, Shleifer & Vishny, 1994; Chan & Lakonishok, 2004). In the simplest form of the ratio cash flow is measured as earnings and depreciation. (Chan & Lakonishok, 2004).

Low CF/P ratio firms have normally high expected growth rate and those with high CF/P ratio are companies that have low expected growth rate of cash flow. Value investors are looking for high CF/P firms mainly because of the low price of them. (Lakonishok et al., 1994). Comparing cash flow to price indicates how the company is generating cash flow relative to share price and it eliminates the impact of profit organizing when valuing the company. Normally the ratio is used between the companies in same industry because different industries have different type of cash flows, so they are often not comparable. (Chan & Lakonishok, 2004).

2.3.4 EBITDA/EV ratio

Recent studies of value premium have begun to use EBITDA/EV ratio for valuation of companies. (Pätäri & Leivo 2009; Gray & Vogel 2012; Tikkanen & Äijö 2018). EBITDA/EV presents the earnings before interest, taxes, depreciation, and amortization to enterprise value. Gray and Vogel (2012) conducted empirical research about different

valuation measures. Their goal was to form portfolios based on different valuation metrics and compare their investment performance. Their results indicate that the EBITDA/TEV ratio is historically the best valuation measure to sort stocks between the cheapest and most expensive.

Based on the findings of Gray and Vogel (2012) EBITDA/EV is very significant measure today. They show how it can beat many traditional measures favored by researchers like price-to-earnings ratio (P/E) and book-to-market ratio (B/M). Their analysis state how the EBITDA/TEV is not giving only best results of absolute performance, but in addition of risk metrics and three-factor alpha. Authors also conclude their study by stating how using long-term valuations can improve the performance of portfolio.

3 Market efficiency

Behavioral factors are found to be one reason why value stocks perform better than growth stocks. It is important for value investors to understand the nature of efficient markets in order to be able to find productive investments in the future as well. Market efficiency is a measure to refer how the market prices reflect to all the available information which is relevant. When markets are working efficiently all the information is already included in the prices and there shouldn't be any possibilities to beat the market because there are no overvalued or undervalued shares available. Eugene Fama (1970) developed efficient market hypothesis which is relevant until these days. Fama also presented three degrees of information subsets that will be introduced in this chapter.

Maurice Kendall (1953) was the first one that got absorbed on the topic of market efficiency. He states that the movement of stocks on the market are random, and investors cannot accurately predict the price of a stock. Kendall (1953) is rejecting the idea of stock prices being systematic and dependent on historical prices. Several studies of value investing have proven evidence against the efficient market hypothesis showing how behavioral factors and anomalies have been the reason for abnormal returns around the world. (Basu, 1977; Lakonishok et al., 1994; Fama & French, 1998; Chan & Lakonishok, 2004). This chapter explains why the value premium should not be possible to be explained by behavioral factors and is important to understand when comparing the behavioral and risk factors explaining the value premium.

3.1 Three degrees of market efficiency

Fama (1970) is classifying different forms of market efficiency into three categories that are weak form, semi-strong form, and strong form. The forms are classified by how much the stock prices are depending on the information available. All three forms are

mutually dependent. Market must meet weak form condition in order to meet semi-strong form conditions. (Fama, 1970).

1. Weak form markets mean that the stock markets reflect all historical information. If the markets fulfill the conditions of weak form markets technical analysis used by some traders or any other analysis from past are already showing in the current prices and future price changes can only be result of new information.

2. In semi-strong form markets all the information relevant to the pricing of the stock is immediately reflected to the price of the stock. When the markets have semi-strong form terms published information cannot be used to achieve greater than normal returns and fundamental analysis would be pointless. Only private information would be useful to gain profit.

3. The strong form of market efficiency says that all relevant information is immediately reflected in the price of the stock and this information is also included private information that is known only by insiders of the company. As a result of this no one can earn excess earnings at the market even with insider trading.

3.2 Efficient market hypothesis

Fama (1970) collected information for his article how stock prices behaved randomly. He is defining efficient markets as markets where prices are reflecting perfectly with all the information is available and market anomalies should not exist. Fama don't see strong form terms as realistic with real market but regards these terms as a theoretical tool and even today those terms are widely used in different studies.

Michael Jensen (1978) is one of the advocates of efficient market hypothesis. He published an article about anomalous evidence regarding market efficiency. He is dealing with various studies where have been found deviations from market efficiency. However, in his article he states how efficient market hypothesis has been widely tested and found consistent with the results of several markets. Jensen (1978, p. 3) is giving an example of the simple way to express the efficient markets: “A market is efficient with respect to information set θt if it is impossible to make economic profits by trading on the basis of information set θt”. He responds to the criticism by validating how most of the results against market effectiveness comes from the inability of a pricing model to acknowledge risk volatility. (Jensen, 1978).

Burton Malkiel (2003) defines an efficient market as market where it is impossible for an investor to earn more than the average return without greater risk-taking. He published an article “The efficient market hypothesis and its critics” how pricing errors can sometimes occur even if the markets are efficient. He is relying on the evidence that any unusual behavior in the stock market that may occur don’t create a portfolio trading possibility to investors that enables to earn extraordinary risk adjusted returns.

Malkiel (2005) is also comparing performance of actively managed funds to S&P500 index. He discovers that only 10% of the funds won the market in twenty years period (1983-2003). According to him some funds win markets in one period, but it is impossible to know those funds ahead of time and to be sure of certainly making profit above the market index. Transaction costs are also one reason for these results of actively managed funds performance. He is stating in his study it would be wise for private and institutional investor to be content to average return of the market because in the long run it offers the highest return.

Later Fama (1998) found out that there have been found various long-term anomalies in the stock markets between stock prices and their true value. Fama validates this by fact that stock prices on average correlate the true value of firm. In efficient markets

overreactions of prices are as repetitive as price underreactions. Market is working effectively if variations are distributed even in long run. (Fama 1998). From there can draw the conclusion that in the short-term stock prices may differ from their true value but in the long run they will return to their actual value.

Weak- form market efficiency is studied by Maria R. Borges (2010). Research is concentrating on six European stock market between 1993 to 2003. Study gives mixed evidence of efficient market hypothesis as Greece and Portugal are showing becoming more efficient in recent years which could have been expected as they are moving from being emerging markets to developed ones and it supports the argument that market efficiency tends to develop over time. On another hand France and UK are quite opposite as mean reversion was increasing. In addition to a whole time period, the tested data is divided into smaller periods to see if there are any differences between them. (Borges, 2010). This research also shows how there shouldn't appear behavioral based value premium in the developed markets.

4 Valuation of stocks

This chapter deals with valuation of stocks. Investors are presumably trying to find stocks that are underpriced (negative pricing error) in relation to their expected return and risk and avoid stocks which are in same relation overpriced (positive pricing error). As a result of this the stock prices should be directed towards their true valuation levels. (Robert & Hsu, 2008). Different kind of pricing models are used to determine these so-called true valuation levels.

Finding the true valuations of shares is important for value investors when they are forming the value-based portfolio. Value investors can't find stocks that are undervalued to their real prices if they are not aware of the true valuation levels of stocks. This chapter outlines the key models that can be used by value investors for valuation when trying to find undervalued stocks with high ratios of a fundamental like high book value or cash flow to price.

4.1 Gordon growth model

The earliest developed stock pricing methods that value investors can make good use of are the company's dividend pricing models. The most widely used model based on the company's dividends is known as Gordon growth model. It is named after Myron Gordon who published the model along with Eli Shapiro in 1956. (Gordon 1959). The model is heavily based on Williams (1938) who introduced model where the price of the stock is dependent on to its dividends paid. Gordon (1956) made changes to Williams model, so it also considers the expected growth of the dividend.

Gordon growth model is following (1956):

$$P = \frac{D}{k-g} \quad (1)$$

Where:

P= Stock price

D= Value of dividend

k= Required rate of return

g= Expected dividend growth rate

4.2 The capital asset pricing model

The capital asset pricing model, or CAPM how it is usually referred, is a centerpiece of modern financial economics and it was published by Jack Treynor (1962), William Sharpe (1964), John Lintner (1965) and Jan Mossin (1966). (Lu, 2017). The model is giving a precise prediction of the relationship between the risk of an asset and its expected return. According to CAPM, value premium should appear only if the value companies are riskier compared to growth companies. However, this has not been proved by all studies and there have been found profits that the model cannot explain. (Fama & French, 1998).

According to Nikkinen, Rothovius & Sahlström (2002, p. 68-69) there are following assumptions when using the CAPM:

1. There are no transaction fees
2. There are no taxes
3. The market is perfect, so investors are not able to impact prices
4. Investors can lend money at risk-free rate with no limits
5. Investments are liquid and can be divided into enormously small parts
6. There are no limits for short selling
7. All capital assets can be traded
8. Investors have homogeneous expectations, and all invest in the same time period
9. Investment decisions are based on the expected return and standard deviation

Most of the expectations of the CAPM are not seen in real life but it illustrates well the assets returns on the market. However, it is good to point out that the model estimates required and expected returns, not guaranteed returns. (Nikkinen et al., 2002, p. 68-69). The formula for calculating the expected return of investment that is normally used is rooted from Sharpe (1964):

$$E(r_i) = r_f + \beta_i \left[E(r_M) - r_f\right] \quad (2)$$

Where:

$E(r_i)$ = Expected return of investment
r_f = Risk-free rate
β_i = Beta of the investment
E(r_M)= Expected return of the market

4.3 Fama & French factor models

Fama & French (1993) published the three-factor model based on the CAPM which had received criticism from several studies on its problems for explaining stock returns. The three factors of the model are company size factor, value factor and the market premium. Three factor model considers, in addition to CAPM, the book value of the company in relation to its market value and size after realising the importance of company size in predictions for future earnings. Fama & French (1993) are presenting that the three-factor model might be better at explaining the cross-section of average stock returns than CAPM.

After some findings showed that the model was incomplete for expect returns Fama & French (2015) added two more factors to the model. Several studies had shown that the three- factor model miss much of the variation in average returns related to investment

and profitability. As a result, they added investment and profitability factors to the model. (Fama & French, 2015).

Fama & French (2015) are presenting the five- factor model by the following formula:

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + e_{it} \quad (3)$$

Where:

R_{it}= The return at time t of the stock i
R_{ft}= Risk-free rate at time t
$R_{Mt} - R_{Ft}$= The excess market return
a_i= The intercept
SMB_t= The size factor
HML_t= The value factor
RMW_t= The profitability factor
CMA_t= The investment factor
$b_i, s_i, h_i, r_i \; and \; c_i$= Assets sensitivity to each of the factors
e_{it}=The error term at time t

4.4 Jensen's alpha

Michael Jensen (1968) introduced a model that is called Jensen's alpha. Like Fama & French five-factor model it is based on CAPM. Jensen's alpha is measuring the abnormal return between the return that is predicted by the CAPM. When the Jensen's alpha is positive return of the portfolio has exceeded the return that CAPM predicted and higher the ratio goes the better the portfolio or stock has performed. (Jensen, 1968).

The formula of Jensen's alpha can be presented as follows (Jensen, 1968):

$$R_i - R_f = \alpha_i - \beta_i(R_m - R_f) \quad (4)$$

Where:

R_i= The return of stock or portfolio

R_f= The risk-free rate

R_m= The Return of the market

β_i= Systematic risk

4.5 Sharpe ratio

William F. Sharpe (1966) introduced Sharpe ratio that was earlier known as "Reward-to-variability ratio". Sharpe discovers that there is a relationship between return of investment and risk, so he created a measure that is really known in the finance world to calculate the risk-return relation of a portfolio. The measure is comparing expected return with the volatility, so it is a good measure to compare if the return of the stock or portfolio is a result of high risk-taking or good performance.

Sharpe ratio can be presented by the following formula (Sharpe, 1966):

$$S_p = \frac{R_p - R_f}{\sigma_p} \quad (5)$$

Where:

R_p= Portfolio return

R_f= Risk-free rate

σ_p= Standard deviation of the portfolio

The greater ratio of Sharpe indicates that the portfolio has performed better when the risk is taken into account, so the bigger the Sharpe ratio is the better the risk-adjusted performance of the stock or portfolio is. In addition, investors often use Treynor's

measure, and it is really close to Sharpe ratio but there the volatility of the portfolio is replaced by beta of the investment or portfolio. Both ratios are useful for value investors as they have a sense of the risks involved the stocks.

5 Value premium

Value investing is strongly based on undervaluation of stocks. This undervaluation provides good hedge for value investors if the stock price performance does not develop as expected. In the context of value investing the term value premium is often under discussion which refers to a higher risk adjusted returns of value stocks compared to for example growth stocks. There have been many studies on the existence of the value premium throughout history in different markets and time periods around the world but still it is highly controversial topic even today.

According to the efficient market hypothesis it shouldn't be possible to outperform the market and earn excess earnings but different studies such as Basu (1977), Chan & Lakonishok (2004) and Bird & Casavecchia (2007a) are showing convincing evidence for the value premium. However, there is no single way of getting advantage with the help of value premium that works across different time periods or markets. The chosen strategy to approach different markets has to be dependent of the market. (Fama & French, 2012). This chapter examines the manifestation and possible reasons for value premium and how business cycles affect it.

5.1 The manifestation of value premium

S.Basu (1977) was the first one that researched and published a study of the existence of the value premium. In his study he researches the performance of listed companies in the US markets by their P/E ratios between years 1956 to 1971. Basu discovers that low P/E ratio companies are able to produce better returns than market on average even after taxes and transaction costs. The risk of the companies could not explain the differences in returns and the results are showing the risk-adjusted returns of low P/E stocks are higher than high P/E ratio stocks. (Basu, 1977). The study shows that the information of P/E ratio is not fully reflected in stock prices and there are possibilities to

earn excess returns with low P/E ratio companies, so the efficient market hypothesis doesn't always come true at the markets.

Fama & French (1992) find same kind of results with Basu (1977). They use nonfinancial firms at their research in 1963-1990 period and study how the B/M equity, market beta, E/P leverage and company size affects companies' cross-section of average returns on NYSE, AMEX, and NASDAQ stocks. Based on the results of the research Fama & French (1992) show how there is strong relation between the company size and even stronger relation between book-to-market equity to average returns.

High B/M ratio firms seems to generate higher average returns which cannot be justified by the beta factor. The study (1992) is indication of the existence of a value premium, and it suggest that the explanation for the value premium could be compensation from the systematic or market risk of companies and rationality of investors.

Fama & French (1995) continued their work and released later new observations to support their previous research. They are trying to find out how behavior of stock prices in relation to size and book-to-market equity reflects to earnings of the company. They state that low B/M ratio companies are typically more profitable companies with high average returns on capital and high B/M ratio companies relatively distressed. In consequence high B/M stocks have high average return because of stronger earnings growth than market expects. Nevertheless, no direct conclusions can be made regarding the relationship between the company's earnings and the earnings of the stock, but size and B/M ratio are proven to be related to profitability. (Fama & French, 1995).

J. Lakonishok, A. Shleifer and R. Vishny (1994) are trying to find out based on previously published results by Fama & French (1992) why value strategies perform so well. Their opinion is that value strategies produce higher average returns because they are contrarian to other strategies that investors follow. Lakonishok et al. (1994) justify this argument by explaining how investors tend to overreact of stocks that have done badly

and oversell them. After the overreaction these out-of-favor stocks become underpriced value stocks. Investors have also much confidence on past growth rates, even when such growth rates are unlikely to persist in the future.

Lakonishok et al. (1994) come into conclusion that value premium occurs because of the lack of rationality of investors. They don't find any evidence of value stocks being any riskier to explain better average returns, so they throw aside the assumption by Fama & French (1992) that the performance of value strategy is based on higher risk of value companies. The value investors therefore earn higher returns due the suboptimal strategies of others.

C. Capaul, I. Rowley and W. Sharpe (1993) published a research from markets of France, Germany, Switzerland, the United Kingdom, Japan, and United States that justifies the existence of value premium globally and not just in the US. Capaul et al. are dividing stocks from all the markets into two groups of growth and value portfolios by their P/B ratio. Value stocks outperformed growth stock on average in each country absolutely and risk adjusted. Value premium operated on a different extent in every country and in different ways at different times so researchers suggest to investors consider a "tilt" towards value stock should implement the strategy globally rather than within a single country.

Additional evidence of the hypothesis of better returns of value stocks is because of expectational errors made by investors was released in 1997 by Rafael La Porta, Josef Lakonishok, Andrei Shleifer and Robert Vishny. Their study is based on earlier findings of Lakonishok et al. (1994) and they study reactions of stock prices around earnings announcements for value and glamour stocks on a 5-year period after formation of portfolio to determine whether investors systematically make errors in pricing. La Porta et al. (1997) use book-to-market ratio and a two-way classification based on cash-flow-to-price and past growth-in-sales to form portfolios on the basis of two classifications to examine the return differences of value and glamour stocks.

La Porta et al. (1997) comes to the same conclusion as Lakonishok et al. (1994) earlier did. Their article suggest that behavioral factors play an important role based on the evidence of the study to explain the differences in average returns. Value stocks brought in substantially higher earnings then glamour stocks after the time period of earnings announcements. The annual return differential of value and glamour stocks was approximately 15-20 percent over years four and five after portfolio formation and it is inconsistent with the explanation of risk premium is the factor of return differences between value and glamour stocks.

Higher returns of value stocks than growth stocks in markets around the world has also found by the study of Fama & French (1998). Value stocks outperformed growth stocks in twelve to thirteen major markets during the 1975 to 1995 period. Fama & French (1998) uses B/M, E/P, C/P and D/P accounting ratios to sort stocks from thirteen major countries to value and growth portfolios. Value portfolios brought 3,07 percent to 5,16 percent average returns per year higher than average returns of global market portfolio and 5,56 percent to 7,68 percent higher than the average returns on the global growth portfolios. The study shows that the amount of value premium is different in each market but excluding Italian market it is positive in countries around the world and not only in the U.S. markets. The global returns are also not possible to explain with CAPM. (Fama & French, 1998).

Joseph Piotroski (2000) examines value strategy and supports the predictions of behavioral finance models by combining financial information with formation of portfolio to identify financially strong companies from high B/M companies. Previous studies like Fama & French (1992) and Lakonishok (1994) are focusing on the returns of the high B/M investment strategy even though the average returns are relying on the strong performance of a few companies and tolerating the poor performance of weaken companies. Piotroski (2000) uses financial information in his research to differentiate these strong performing companies from weaker ones. He forms value portfolio from

the highest B/M shares and after this value portfolios are again divided into ten pseudo-portfolios based on the F-SCORE developed by Piotroski (2000).

Piotroski's (2000) F-SCORE is using nine fundamental signals of companies to measure the score from three areas of the firm's financial condition that are: profitability, financial leverage, and liquidity as well as operating efficiency. Each of these indicators gets value of one or zero based on the signal's implication. The highest scoring group consist of the highest scoring B/M stocks that are assumed to be financially healthiest at the time of portfolio formation. According to research, a traditional B/M strategy can be improved at least by 7,5% annually by selecting only high-performing stocks from the list of high B/M companies based on the scale of F-score. Piotroski (2000) concludes the study by stating that companies with higher levels of financial distress don't lead to higher returns of shares but on the contrary higher risk shares have made less profit that is inconsistent with the research of Fama & French (1992). On this basis the research results also show that while value stocks have on average had a higher probability of financial distress among high B/M companies the healthiest firms appeared to generate the best returns. (Piotroski, 2000).

Piotroski and So (2012) focuses on their study which follows the study of Piotroski (2000) on value-growth anomaly and find evidence for behavioral factors explaining the value premium. Study separates financially strong and weak firms using F-score as a criterion and examines whether the value premium is a result of compensation for risk or mispricing. They find results of return spread of value and growth stock to be 22%. The study suggests that the spread is a result of transitory pricing errors of stocks. (Piotroski & So, 2012).

Tikkanen and Äijö (2018) examine if the Piotroski's F-score can be used to improve value investment strategies in European markets. At their study they focus on how the screening method improves portfolios formed from financial ratios of B/M, E/M, D/M and EBITDA/EV. They also used several methods to ensure that higher risk or the size of

the companies in the portfolios are not explaining the achieved returns. The results of their research show convincing evidence of how Piotroski's F-score improved value premium.

Chan & Lakonishok (2004) conduct a research of variety of indicators to form value portfolios to earn higher returns than traditional strategies. As in many other studies they do not form portfolios of individual ratios whose returns could have been used as a benchmark for earnings. Based on the results of the study they conclude that using more than one ratio in the value strategy helps to improve returns and their portfolios are not so sensitive to changes of the state of the market in their research. Also, higher returns are not the result of higher risk according to Chan & Lakonishok (2004).

Bird & Casavecchia (2007a) published a study of value premium from 15 different countries around Europe at the period of 1989 to 2004. The study is evaluating the use of market sentiment and financial health to make value and growth strategies more effective in Europe. Like Capaul et al. (1993) earlier stated value stocks perform better than growth stocks in different markets. Bird & Casavecchia (2007b) use several accounting ratios as financial health indicator and stock's recent market performance as a market sentiment indicator and sales-to-price ratio is chosen as a valuation method. Traditional strategies are trying to improve by taking into account the momentum factor and consumers' confidence in the economy.

Bird & Casavecchia (2007a) discover that the value strategy generated best excess returns when the holding period is three years when growth stocks yielded most when the holding period is less than one year so longer holding periods will increase the returns of value portfolios. They state based on their findings that different performance between value and growth portfolios is not because of different risk levels and their analysis suggested that better performing portfolios actually have the lower total risk. They conclude their study by consistent findings with La porta et al. (1997) and

Lakonishok et al. (1994) of behavioral-based models which are explaining the differences by underreaction of information on stocks.

Profitability measured by gross profits-to-assets is examined by Novy-Marx (2013). Stating that identifying value stocks by gross profitability is an excellent indicator when company's gross profitability can predict relative performance of a share and has the same power as book-to-market ratio has predicting the cross section of average returns. Profitable companies generate significantly higher returns compared to unprofitable companies despite higher valuation ratios. (Novy-Marx, 2013). Relatively new investment strategy is called quality investing which follows this investment style. There investors focus on buying only first-class companies at a reasonable price and wait for the profitability to grow the business and almost all quality measures are negatively correlated with traditional value strategy. (Novy-Marx, 2014). Most of the times there is a reason why value companies are cheap at stock markets, but quality companies are more stable and strong because of their better competitive advantage and lower debt rates. (Novy-Marx, 2014).

Profitability increasing performance of value stocks makes it even harder to explain value premium with risk-based explanation. Novy-Marx (2013) also finds out that profitability strategy can be used as insurance for value because they are negatively correlated. Volatility of portfolio can be reduced by adding profitability on top of a value strategy so value investor can gain the gross profitability premium without additional risk and traditional value strategies can be outperformed with a strategy that avoids holding shares that are cheap but more unprofitable and avoids selling shares that expensive but more profitable. (Novy-Marx, 2013).

Fama and French (2020) investigate the manifestation of the value premium and its possible change until 2019. They use book to market ratio to define value portfolios for the examined period of their research that covered the years 1963-2019. In the second half of the July 1963-June 2019 period, value premiums, which authors define as value

portfolio returns in excess of market portfolio returns, are on average substantially lower. However, due to the considerable volatility of monthly premiums, Fama and French are unable to reject the hypothesis that predicted premiums in both halves of the sample are the same. They find that for the whole examined period, value stocks in the United States produced greater average returns than the market portfolio of all listed US stocks and show evidence of value premium that is statistically reliable but declining.

David Blitz and Matthias Hanauer (2021) focused their research on the same issues as Fama and French (2020). The starting point for the study was to find out whether the value premium had disappeared from the market during the past decade. Blitz and Hanauer demonstrate that HML, the academic value component, has not only experienced setbacks in recent years, but has been struggling for decades. Their study state that when adopting a value investing strategy that is a little more advanced than the typical HML method, existential worries about the value premium vanish. Authors show, even the value strategy has had its setbacks in recent years, it has a strong long-term track record and a value premium, both economically and statistically.

5.2 Value premium and business cycle

Jagannathan and Wang (1996) study public consumption as an explanation of stock market returns by the period of 1963 to 1990 based on the research of Fama & French (1992). Their view is that betas of the assets don't remain constant over time and the relative risk of companies' cash flow is very likely to vary over business cycles and criticized the CAPM assumptions because leverage of companies in poor shape may increase relative to other companies causing their stock betas to rise. Findings of the study are that stocks with prone to vary betas with the business cycle are less stable over the business cycles and have higher unconditional expected returns. Based on that, the economic downturn has a greater impact on value portfolios than growth portfolios so they can be riskier and a reason for value premium.

Liew and Vassalou (2000) discover same kind of evidence on their research as Jagannathan et al. (1996). They investigate in their study if the profitability of HML (high minus low), SMB (small minus big), and WML (winners minus losers) can be linked to future economic (GDP) growth for ten developed markets by period of 1978-1996. The results of the study show how HML and SMB are related to future growth in the economy. (Liew & Vassalou, 2000). Research is aiming primarily to determine whether certain strategies can be linked to future GDP growth but there are noticeable results between upswings in the economy and value-based strategies. Value premium is depending on economic cycles and value premium should be lower during economic downturns than in upswings and the results are consistent with the Jagannathan & Wang (1996) findings.

Lu Zhang (2005) study value premium and why do value stocks have higher expected returns than growth stocks. Zhang states how expectations of growths stocks are based on uncertain assumptions of future economic conditions so they should be actually riskier than value stocks. In the study Zhang (2005) clarifies how in bad times value companies have more unproductive capital than growth companies and it is more difficult to reduce the capital when returns and dividends covary with economic turn and are less flexible than growth companies in scaling down the impacts of downturns. The other side of coin is that in better times of economic cycle, growth companies invest more with higher adjustment costs to earn advantage than value companies. That's because of expanding capital is less necessary since their unproductive capital has become productive.

The net effect of economic cycles lead, base on the research, to that value companies are riskier on bad times because cutting capital is more expensive than expanding it and the firm value can be melted by unproductive capital so it could be the explanation for value premium. (Zhang, 2005). Xu and Fisher (2006) prove same kind of evidence during the techno bubble when some growths stocks were performing well, and the same time

value stocks suffered. According to Koijen, Lustig & Van Nieuwerburgh (2017) higher risk of value portfolios during economic downturn is often observed in the early stages of recession when there are weak expectation of dividends and general economic growth in the near future. This happens because value companies' dividends and cash flow tend to reduce more compared to growth stocks in downturns. However, the risk is reduced by extending the period of holding time.

Campbell & Vuolteenaho (2004) study how cash flow risk explains the value premium and size anomaly better than CAPM by the period of 1929-2001 in US markets. They use two-beta model in their study that divides the beta of a stock into two components which are reflecting news of the future cash flows and discount rates of the market better than stock's overall beta with the market. Study shows how value stocks have much higher cash-flow betas than growth stocks and that lead investors to demand higher expected returns which could be the reason for value premium.

The impact of economic cycles on the value premium is noticeable as the cash flows of growth stocks are more sensitive to temporary movements in stock prices than value stocks which are more sensitive to permanent movements. This is because the high betas of growth stocks with the discount rate shocks of market and high betas of value stocks with the cash flow shocks of the market that are determine by the cash-flow fundamentals of growth and value firms according to Campbell & Vuolteenaho (2004).

In the research of Gulen, Xing and Zhang (2011) different variations of the expected value premium are found by discovering that when conditional volatilities are high the expected excess returns of value shares are much higher than growth shares to aggregate economic conditions, so it can be considered to be time varying. Gulen et al. (2011) are testing if the changes in value premium can be predicted but the results are showing that the predictability is close to nonexistent. Although, value shares expected excess returns seems to be most sensitive and spike upward in the high volatility state

when growth shares least sensitive to worsening economic cycles. These findings are very consistent with the earlier findings of Jagannathan & Wang (1996).

Peltomäki and Äijö (2015) find same kind of evidence as Gulen et al. (2011) from the returns to momentum, size and value anomalies, and volatility risk. Their research is studying the time varying nature of the relationships during different market cycles. Peltomäki & Äijö (2015) show how value returns can be negatively exposed to volatility risk in different major market cycles, and they state how returns to the value strategy were sensitive and negatively related to market uncertainty increases during the financial crisis. That is consistent with the findings of Lee, Strong & Zhu (2014). Study also suggest how momentum strategy may be more defensive strategy in severe financial crises than value strategy is to volatility risk. (Peltomäki & Äijö, 2015).

Cakici and Tan (2014) investigate value and momentum factors in 23 different stock markets. They show how typically returns of value stocks are lower in times of poor funding liquidity and recessions while returns of momentum appears to be less sensitive at those times. The study provides three different risk exposures that are funding liquidity risk, macroeconomic risk and stock market liquidity risk and value returns are higher compared to momentum only in poor stock market liquidity conditions when the cost of transacting is high in the stock market while value and momentum are negatively correlated in all of the countries in the study. (Cakici & Tan, 2014). Based on the study it offers risk-based explanation for value premium in the downturns of economic conditions.

Performance of value strategies have also been tested in Finnish stock market during the 1993-2008 period by Pätäri & Leivo (2009). Smaller market like Finnish stock market shows also convincing evidence of value premium based on composite value measures portfolio criteria and its link to cyclical fluctuations of economy which plays a major role in the performance of the value portfolios. Pätäri & Leivo (2009) divide the used time period to bullish and bearish periods when the 25% rise or fall of the market index ended

or started a new upswing or downturn. Unlike many other studies like Liew & Vassalou (2000), Zhang (2005) or Koijen et al. (2017) they notice that the returns of value stocks are based on that those stocks are losing less value during the economic downturns so the same value strategies that showed the best performance throughout the research period lost the least value when the market decreased. Pätäri & Leivo (2009) also state how the results could not be explained by risk because the risk indicators used show that value stocks are less risky in the research. Different results may be the outcome of their study does not involve financial crisis or because of different holding period of stocks and different definition of economic downturns.

Value premium and the performance of value stocks in the US market during the subprime credit crisis has been studied by Lee, Strong & Zhu (2014). They provide results of value stocks underperforming growth stocks during the subprime credit crisis, that started in early 2007, despite a positive value premium before it. The results of the study provide truly consistent evidence from other studies, how value stocks are vulnerable to losses during economic downturns and are that why riskier than growth stocks. Lee et al. (2014) form portfolios based on firm's B/M equity and use the difference in returns between the top and bottom deciles to compare the value premium before and during the crisis. According to the study the value premium reversed negative during the crisis, so growth stocks outperformed value stocks. Results are also showing how value companies that are more financially constrained underperformed growth stocks due to a decline in the returns of the firms and how the value premium diminishes with less constrained companies. Results show same kind of evidence of distress risk that has earlier found from value companies by Fama & French (1995) and Piotroski (2000).

Negative relation between value premium and the size of a firm is studied by Atanasov & Nitschka (2017). They set forth that value premium in small shares is consistently priced in the international returns when the value premium in bigger stocks is not. Atanasov & Nitschka (2017) use data from US markets by period of 1963-2016 and from international markets by period of 1990-2016 to show how value premium in small

stocks is associated with the news of business cycle and changes in macroeconomic especially risks related to credit market because of lower liquidity and higher discount rates that affect small stocks more on economic shock. Atanasov & Nitschka (2017) state how the size premium and the risk are affecting the average stock returns alongside macroeconomic changes.

Poutachidou and Papadamou (2021) state that the substantial returns observed in the stock market over the past decades can, in part, be attributed to quantitative easing (QE) policies. The authors assert that the decrease in interest rates resulting from QE has prompted investors to seek higher returns beyond bonds, thereby driving an increase in capital allocation towards the stock market. This influx of capital into index funds, ETFs, and direct stock purchases, among other vehicles, has contributed to a rise in aggregate market values. According to Poutachidou and Papadamou as markets have become saturated, investors have increasingly turned to riskier growth stocks in pursuit of returns, leading to significant price appreciation in large-cap growth stocks and a relative outperformance of growth stocks over value stocks in recent years.

6 Data and methodology

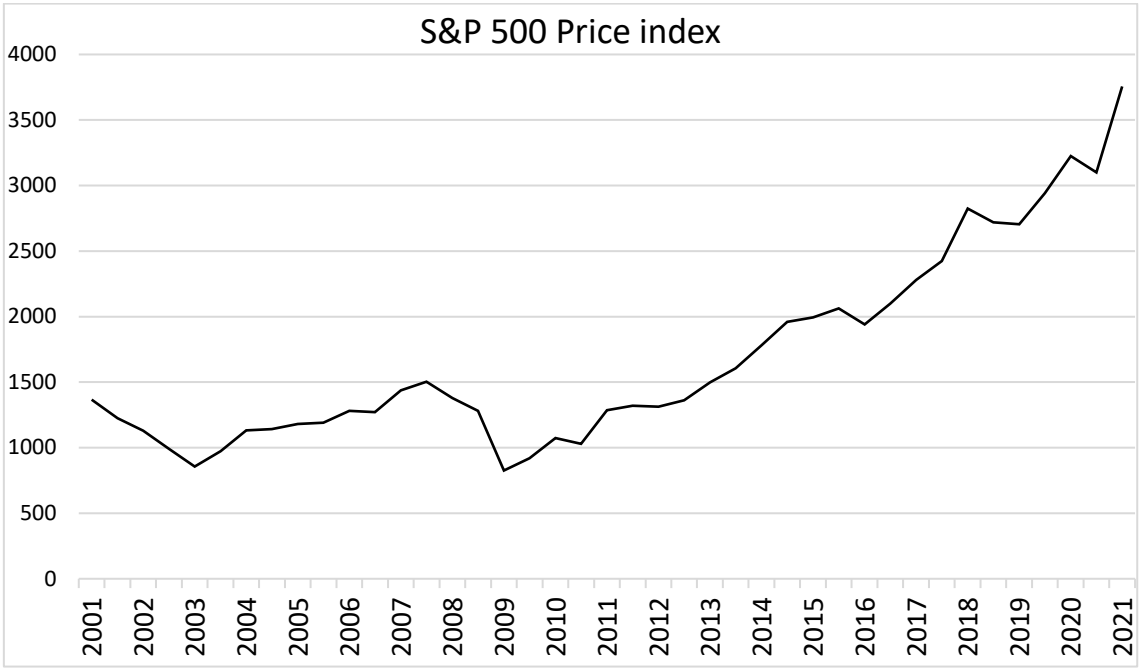
This research examines how value stocks have performed during 2001-2020 period and how different economic conditions affect the performance of values stocks. This chapter introduces the used data and methodologies for empirical research of this thesis and goes through briefly what models and measurements have been applied. The purpose is to explain why the methodology and data are chosen and how the results have been found.

6.1 Data

Selected data is collected from Thomson Reuters DataStream database. The data contains monthly prices, financial statements, and key figures of listed companies from the US stock market in the NYSE, NASDAQ, and NYSE MKT. In the study, the market index is described by the S&P 500 price index that consists 500 leading publicly traded companies in the US. The data collected for this research cover the period from 29. December 2000 to 31. December 2020, which includes large fluctuations in the economic cycle.

20 years of data should be comprehensive period to find results and explain the significance of different value factors. The selected period covers, for example, the financial crisis in 2007-2009 and bear market, related to COVID-19 pandemic, which started in 2020. Research periods cover monthly closing prices in local US dollar currency. The data presented in the figure 1 illustrate the economic cycles of the market. Figure 1 reflects how the market has developed during the studied period (2001–2020) and provide a perspective for drawing conclusions.

Figure 1. S&P 500 Price index value 2000-2020.



Data of the research contains observations of 1900 to 2700 companies depending on the year and how their financial statements and monthly prices are available. Companies whose data could not be collected were left out of the study, and results that clearly deviate from the rest of the data have been removed. Also, stocks that delisted during review period are removed from observations.

Table 1 shows the descriptive statistics of different portfolio returns for the whole studied period. The observations of the value and growth portfolio are calculated for 30% of the observations from all stocks of the sample period. Research also use the 1-month US T-bill rate as the risk-free rate following Tikkanen & Äijö (2018) and Fama & French (2012). Table 1 reports the mean, median, standard deviation, kurtosis, skewness, minimum, maximum and number of companies of each value and growth portfolios.

Table 1. Descriptive statistics.

	CF/P	D/P	P/B	EBITDA/EV
Panel A: value portfolios				
Mean	0.014	0.004	0.016	0.015
Median	0.015	0.008	0.016	0.018
Std	0.062	0.045	0.061	0.057
Kurtosis	5.375	11.386	3.846	3.124
Skewness	-0.361	-0.988	-0.047	-0.491
Min	-0.298	-0.299	-0.260	-0.241
Max	0.309	0.192	0.283	0.201
# of companies	898	959	1315	1091
Panel B: growth portfolios				
Mean	0.012	0.010	0.008	0.014
Median	0.014	0.014	0.013	0.013
Std	0.068	0.051	0.056	0.071
Kurtosis	1.423	2.727	1.481	1.155
Skewness	0.077	-0.709	-0.477	-0.062
Min	-0.222	-0-219	-0.211	-0.235
Max	0.272	0.155	0.177	0.244
# of companies	898	959	1315	1091

Panel A reports descriptive statistics of monthly value portfolio returns formed based on high CF/P, D/P, EBITDA/EV and low P/B ratio. Panel B reports descriptive statistics of monthly portfolio returns formed based on low CF/P, D/P, EBITDA/EV and high P/B ratio.
Sample period 29.12.200 – 31.12.2020.

6.2 Methodology

In the comparison of value and growth stocks, different financial ratios are used in this study to form long only portfolios. Chosen key ratios are CF/P, D/P, P/B and EBITDA/EV. The portfolios are formed annually on the basis of individual ratios so that the stocks are ranked based on their financial figures and selected at the beginning of the year for a value or growth portfolio. Portfolios are formed in such a way that 30% of companies are divided into value and 30% into growth portfolios from all of the stocks. After the formation of the portfolios at the beginning of the year, the returns of the portfolios are monitored one year onwards. After the year the portfolios are updated and reformed.

Portfolio returns are also compared to the market index, which in this study is the S&P 500 price index. This comparison of value portfolios to market index and growth

portfolios makes it possible to determine whether hypotheses 1 and 2 can be accepted. Hypotheses 3 and 4 compare each of the portfolios with economic ups and downs. Hypotheses determine how the portfolios thrive in different economic situations. Like Pätäri and Leivo (2009) examine in their paper, this study defines a 25% rise or fall in the market index as periods of economic growth and decline.

To obtain more realistic picture of equity risks and returns, this research utilizes the Sharpe ratio (Sharpe, 1966) of portfolios in the comparison. It makes it possible to examine their statistical risk-adjusted performance and to conclude that higher returns have not been due to higher risk alone. Research uses the 1-month US T-bill rate as the risk-free rate. The statistical significance of the differences of Sharpe ratios are determined in this study, based on the p-values given by two-sample T-test by Snedecor and Cochran (1991) from annualized Sharpe ratios. To avoid issues resulting from negative excess returns in the calculation of Sharpe ratio, this thesis employs the refinement for the denominator of the Sharpe ratio proposed by Israelsen (2005) as follows:

$$S_p = \frac{R_p - R_f}{\sigma_p^{\frac{ER}{|ER|}}} \tag{6}$$

Where:

Rp = the return of the portfolio
Rf = the risk-free rate
ER = the excess return that is equal to $Rp - Rf$
σp = the standard deviation of the monthly excess returns of portfolio p.

To ensure the reliability of the results and to gain a better understanding of the existence of a value premium, this research uses the Fama and French (2015) five-factor model in addition to other measurements. The five-factor model is a very common method used in financial literature and it measures abnormal returns to determine whether portfolio returns can be justified by factors like size, value, profitability, or

investment factor. Following Tikkanen and Äijö (2018), this research uses Newey and West (1987) standard errors in the regression in order to avoid heteroscedasticity and autocorrelation. The Fama and French (2015) five factor model is presented as follows:

$$R_{it} - R_{Ft} = \alpha_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + e_{it} \quad (7)$$

Where:

R_{it}= The return at time t of the stock i

R_{ft}= Risk-free rate at time t

$R_{Mt} - R_{Ft}$= The excess market return

α_i= The intercept

SMB_t= The size factor

HML_t= The value factor

RMW_t= The profitability factor

CMA_t= The investment factor

$b_i, s_i, h_i, r_i \; and \; c_i$= Assets sensitivity to each of the factors

e_{it}=The error term at time t.

7 Results

This chapter presents the results of the study and assesses their reliability and significance in comparison to previous studies. The results were obtained through the use of the methods described in the previous chapter and the chapter evaluates whether the hypotheses established for the study can be confirmed. At the beginning of the chapter, the results obtained for the entire studied period are reviewed and the returns of value and growth portfolios are examined during the entire studied period. After this, the chapter goes into more detail about the effect of economic cycles on the value premium and statistical significance of findings. Tables present the results of each formed portfolio, and the purpose of the chapter is to answer the set hypotheses about the value premium in different market situations. At the end of the chapter there is a summary of the obtained results.

7.1 Full sample value premium

The results of annualized portfolio returns for the full sample period in table 2 show that value portfolios with high CF/P, EBITDA/EV and low P/B outperformed growth portfolios with low CF/P, EBITDA/EV and high P/B over the period under review. High CF/P, P/B and EBITDA/EV portfolios also performed better than market portfolio in a matter of better returns. However, the high D/P ratio value portfolio performed worse than the market portfolio or the low D/P ratio growth portfolio.

Table 2. Annual returns of portfolios.

	CF/P	D/P	P/B	EBITDA/EV
Value	16.75%	4.57%	18.96%	18.55%
Growth	14.59%	11.41%	10.16%	17.04%
Market	6.39%	6.39%	6.39%	6.39%
Risk free	1.35%	1.35%	1.35%	1.35%
Value-Growth	2.16%	-6.84%	8.8%	1.51%
Value-Market	10.36%	-1.82%	12.57%	12.16%

Table 3. Sharpe ratios of full sample period.

	CF/P	D/P	P/B	EBITDA/EV
Value	0.710	0.204	0.832	0.873
Growth	0.558	0.568	0.453	0.634
Market	0.482	0.482	0.482	0.482
Value-Growth	0.152***	-0.364***	0.379***	0.239***
p value	(0.002)	(0.000)	(0.006)	(0.001)
Value-Market	0.228	-0.278***	0.350	0.391**
p value	(0.138)	(0.000)	(0.208)	(0.021)

Table 3 show the annualized Sharpe ratios of each portfolio over full sample period. Sharpe ratios are calculated using monthly returns of portfolios. Table also present the differences in the Sharpe ratios and the p-values of two sample T-test.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively

Portfolio Sharpe ratios bring the risk of the portfolios along with the returns. Sharpe ratios from the entire examined period in table 3 present the same results of value premium where value portfolios with high CF/P, EBITDA/EV and low P/B outperformed growth portfolios with low CF/P, EBITDA/EV and high P/B over the entire review period. The p values indicate the significance of the differences in the portfolio Sharpe. A lower p value means a higher significance level and a higher likelihood that the difference is not due to random chance. The p-values from two sample T-test show how the results are highly statistically significant. The results also report how the growth portfolio with low D/P ratio performed better than value portfolio in a matter of risk and return and the result is statistically significant. These findings from better risk-adjusted returns of the three value portfolios are consistent with the previous studies from full sample period with Fama and French (1998), Bird and Casavecchia (2007a) and Blitz and Hanauer (2021).

Value portfolios formed based on CF/P, P/B and EBITDA/EV have also higher Sharpe than market portfolio. However, only the result of better Sharpe ratio of EBITDA/EV portfolio can be considered statistically significant at the 5% level. Like the growth portfolio, the market portfolio also had a higher Sharpe ratio than the value portfolio based on D/P and the result is statistically significant at the 1% level. The results of value premium over market portfolio are consistent with the latest study of Fama and French (2020).

Based on the results obtained, it can be concluded that three out of the four value portfolios demonstrate superior risk-adjusted returns compared to both the market portfolio and the growth portfolio. These results are statistically significant, thus lending support to the acceptance of hypotheses 1 and 2. However, the results for the growth portfolio D/P are in contrast and thus, the hypotheses cannot be fully accepted without further examination.

Once the Sharpe ratios are found and tested, table 4 examines whether portfolio returns can be explained with the factors of market, size, value, profitability, or investment factor by Fama and French (2015) five-factor model. The annual alpha of the table presents the abnormal returns for each portfolio. The positive annual alphas of value portfolios based on CF/P, P/B and EBITDA/EV imply that the five-factor model cannot fully explain the positive returns and the results are highly significant.

Based on the table, the highest abnormal return can be observed with EBITDA/EV portfolio. In the case of D/P portfolio, it can be seen from the results, that the value portfolio has negative alpha of -3.68% and the growth portfolio has positive alpha of 0.56%. It indicates, in accordance with the previous results, that growth portfolio based on low D/P has produced higher abnormal returns than value portfolio. It is important to note that the alpha of the growth portfolio is not statistically significant. On the other hand, the alpha of EBITDA/EV from the growth portfolios is statistically significant and displays a strong positive value.

Table 4. Loadings of the Fama & French (2015) five factor model in full sample period.

	CF/P	D/P	P/B	EBITDA/EV
Panel A: Value portfolio				
Alpha (annual)	5.32 %***	-3.68 %*	1.93 %***	7.16 %***
	(3.592)	(-1.854)	(4.962)	(6.056)
Market	1.088***	0.744***	0.943***	1.001***
	(35.620)	(18.175)	(23.712)	(41.067)
SMB	0.724***	0.352***	0.787***	0.761***
	(12.973)	(4.698)	(10.837)	(17.088)
HML	0.537***	0.446***	0.351***	0.281***
	(8.772)	(5.432)	(4.410)	(5.754)
RMW	0.187***	0.280***	-0.168*	0.212***
	(2.788)	(3.118)	(-1.923)	(3.970)
CMA	-0.207***	-0.252**	-0.107	-0.094
	(-2.644)	(-2.404)	(-1.048)	(-1.509)
Adj. R-sqr.	91.63 %	71.50 %	85.10 %	93.54 %
Observations	240	240	240	240
Panel B: Growth portfolio				
Alpha (annual)	6.46 %	0.56 %	-0.69 %	7.02 %***
	(1.569)	(0.667)	(-0.895)	(3.612)
Market	0.618***	0.993***	1.005***	1.096***
	(7.280)	(57.767)	(63.597)	(27.362)
SMB	1.000***	0.510***	0.678***	0.876***
	(6.443)	(16.229)	(23.499)	(11.969)
HML	-0.528***	0.134***	-0.305***	-0.194**
	(-3.104)	(3.892)	(-9.639)	(-2.414)
RMW	-0.369**	0.158***	-0.096***	-0.542***
	(-1.981)	(4.209)	(-2.779)	(-6.174)
CMA	0.306	0.082*	0.116***	0.017
	(1.406)	(1.870)	(2.877)	(0.161)
Adj. R-sqr.	46.00 %	96.02 %	97.21 %	88.92 %
Observations	240	240	240	240

Table 4 present the annualized abnormal returns (alpha) and the loadings of Fama & French (2015) five-factor model for each portfolio. Panel A present the results for value portfolios based on CF/P, D/P, PB and EBITDA/EV ratios and panel B the results for growth portfolios.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively

The results indicate that both the market factor and the size (SMB) factor have a significant positive impact on the returns of all portfolios. The value factor (HML) exhibits a statistically significant positive effect on the returns of the value portfolios,

while displaying a negative correlation with the growth portfolios, with the exception of the D/P growth portfolio. The profitability (RMW) factor has a positive impact on the returns of the value portfolios, excluding the P/B portfolio, and these findings are statistically significant. However, the RMW factor of growth portfolio returns show a negative correlation for other portfolios expect the D/P portfolio. The CMA factor also shows differences between value and growth portfolios, as the CMA factor has a negative effect on all value portfolios, but a positive correlation on growth portfolios. All the same, it should be noted that the results are statistically significant only for CF/P and D/P value portfolios and D/P and P/B growth portfolios. In previous studies Fama and French (2006) have also observed the effect of size premium on value stock returns whose results correspond to the regression results obtained in this study.

The adjusted R-square measures the proportion of the total variation in portfolio returns explained by the five-factor model. The adjusted R-squared values suggest that the market and SMB factors explain a large portion of the portfolio returns, with highest R-squared values of 93.5% for EBITDA/EV and 91.6% for CF/P value portfolios. In terms of growth portfolios, the largest R-squared values are 96% for D/P portfolio and 97.2% for P/B portfolio. Based on these values, the five factors of the model by Fama and French fit the data well and has high explanatory power. In terms of the value portfolios, the D/P portfolio exhibits the lowest R-squared measure at 71.5%, while the CF/P growth portfolio has an R-squared value of 46% among the growth portfolios. Regarding these portfolios, the model has not been able to fully explain the returns as comprehensively, especially for the CF/P portfolio.

The results shown in table 4 illustrate how the risk factors of value and growth portfolios vary between each other. The biggest difference is noticeable in their profitability (RMW) and investment (CMA) characteristics. Based on that, it can be conducted that the shares have a different risk tendency. The results indicating a positive relationship between profitability and returns on value stocks align with the findings of previous studies conducted by Piotroski (2000) and Novy-Marx (2013). The data in the table 4

suggests that a positive RMW has positively influenced returns on value stocks, while growth stocks have demonstrated a negative correlation between RMW and returns.

7.2 Value premium in different market conditions

Table 5. Sharpe ratios from different market conditions.

	CF/P	D/P	P/B	EBITDA/EV
Panel A: bull market				
Value	1.519	0.896	1.559	1.680
Growth	0.775	1.376	1.270	1.410
Market	1.439	1.439	1.439	1.439
Value-Growth	0.744***	-0.480***	0.289**	0.270***
p value	(0.000)	(0.000)	(0.012)	(0.001)
Value-Market	0.080	-0.543***	0.120	0.241*
p value	(0.367)	(0.000)	(0.628)	(0.089)
Panel B: bear market				
Value	-0.952	-1.139	-0.800	-0.798
Growth	0.088	-1.080	-1.186	-1.183
Market	-1.406	-1.406	-1.406	-1.406
Value-Growth	-1.050***	-0.059	0.386*	0.385**
p value	(0.000)	(0.887)	(0.087)	(0.014)
Value-Market	0.444**	0.267	0.606**	0.608***
p value	(0.048)	(0.118)	(0.026)	(0.009)

Table 5 show the annualized Sharpe ratios of each portfolio over bull market period (panel A) and bear market period (panel B). Sharpe ratios are calculated using monthly returns of portfolios. Table also present the differences in the Sharpe ratios and the p-values of two sample T-test.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively

Results of Sharpe ratios from different market conditions are reported in table 5. The Sharpe ratios from bull market period show similar results to those of the full sample period. According to the results from bull market period, the value vs growth difference is 0.59 larger in CF/P portfolio and slightly larger (0.03) in EBITDA/EV portfolio compared to results from entire review period. The difference in the D/P portfolio is instead 0.18 greater in favor of growth stocks compared to full sample period. The difference of value premium of Sharpe ratio decreased by 0.1 in P/B portfolio, which cannot be considered

as significant change. All the results of value-growth portfolios are statistically significant.

As in the full studied period, also in the results placed in the bull market period value portfolios based on the CF/P, P/B and EBITDA/EV have higher Sharpe ratio than market portfolio but D/P portfolio has lower Sharpe ratio. However, only results from comparison of D/P and EBITDA/EV can be considered statistically significant. The results of the increased value premium of the CF/P and EBITDA/EV portfolios support the acceptance of hypothesis four (H4). However, the market upswing does not show a significant change in value premium and the change do not apply to all portfolios, so the hypothesis four cannot be fully accepted.

The Sharpe ratios from bear market period show that value portfolios based on P/B and EBITDA/EV still yielded better risk-adjusted returns than growth portfolios. These returns are statistically significant. However, growth portfolios of low CF/P and D/P showed opposite result. A low CF/P growth portfolio resulted 1.05 higher Sharpe ratio than value portfolio that is statistically significant. The different market situation was reflected in the Sharpe ratio of the portfolio of this indicator substantially, as it showed a very different result compared to the entire studied period and the bull market period. However, the value premium of the P/B and EBITDA/EV portfolios increased even though the market fell, so the results can be considered mixed and inconsistent. When comparing value portfolios to market portfolios, all the value portfolios still yielded better risk-adjusted returns than the market portfolio. Of these, the results of the CF/P, P/B and EBITDA/EV portfolios are statistically significant. Although the CF/P portfolios show support for the hypothesis three (H3), the hypothesis cannot be accepted in the absence of consistent findings.

Finally, returns from market upswings and declines are tested with the Fama and French (2015) five-factor model. The purpose is to investigate whether there are changes in different risk loadings due to different market situations in portfolio returns. The

regression results from bull market are reported in table 6 and bear market results in table 7. The five-factor model shows similar result for value portfolios from bull market period as from full sample period. Annual alphas of CF/P, D/P and EBITDA/EV are close to the results of the entire research period. All the same, in the case of the P/B value portfolio, a significantly larger alpha (6.72 percentage points) can be observed during the bull market period. The alphas of the growth portfolios are also close to the results of the entire studied period, apart from the CF/P portfolio, whose alpha is 5.2 percentage points lower. However, this finding is not statistically significant.

As in the whole examined period, also in the rising market situation the market factor and size (SMB) factor have a significant positive correlation on all the portfolio returns. The effect of profitability (RMW) factor is slightly lower on value portfolios during bull market period. Regarding the growth portfolios, it can be observed that the negative correlation of the RMW factor is even greater than in the entire studied period and it is statistically significant for all growth portfolios. As for the CMA factor, it still has a negative loading on the returns of each value portfolio, but at the same time the loading is even more negative than in the full sample period. For growth portfolios, CMA determines only a very small part of the model and is statistically significant only for the P/B portfolio.

Table 6 present that adjusted R-square measure is still high, even for a rising market. EBITDA/EV and CF/P value portfolios still have the highest R-square measure of 92.6% and 89%. Fama and French five-factor model thus still explains a large part of the risk loadings of these portfolios. It can be seen from the table that the same results also apply to growth portfolios and different market condition has not brought a significant change to this. Like in the entire studied period, the D/P value portfolio and CF/P growth portfolio have the lowest adjusted R-square measure of 65.1% and 50% during the market upswings. To sum up, the risk characteristics have not changed substantially due to the different market situation but in the case of value portfolios, profitability has not been such a significant factor in explaining portfolio returns.

Table 6. Loadings of the Fama & French (2015) five factor model in bull market period.

	CF/P	D/P	P/B	EBITDA/EV
Panel A: Value portfolio				
Alpha (annual)	5.28 %***	-2.74 %	8.65 %***	6.71 %***
	(3.139)	(-1.310)	(3.960)	(5.234)
Market	1.108***	0.728***	0.968***	1.031***
	(28.259)	(14.955)	(19.030)	(34.555)
SMB	0.666***	0.261***	0.732***	0.698***
	(9.857)	(3.111)	(8.354)	(13.578)
HML	0.565***	0.378***	0.388***	0.315***
	(8.051)	(4.343)	(4.268)	(5.910)
RMW	0.069	0.130	-0.372***	0.060
	(0.831)	(1.269)	(-3.472)	(0.953)
CMA	-0.450	-0.349***	-0.454***	-0.342***
	(-4.488)	(-2.798)	(-3.482)	(-4.473)
Adj. R-sqr.	88.96 %	65.05 %	81.98 %	92.62 %
Observations	186	186	186	186
Panel B: Growth portfolio				
Alpha (annual)	0.07 %	0.81 %	-0.48 %	6.58 %***
	(0.015)	(0.797)	(-0.596)	(2.929)
Market	0.679***	0.968***	0.980***	1.113***
	(7.038)	(40.760)	(52.427)	(21.279)
SMB	0.911***	0.538***	0.652***	0.895***
	(5.476)	(13.133)	(20.211)	(9.913)
HML	-0.411**	0.144***	-0.337***	-0.155*
	(-2.381)	(3.379)	(-10.088)	(-1.658)
RMW	-0.621***	0.117**	-0.203***	-0.694***
	(-3.057)	(2.341)	(-5.161)	(-6.298)
CMA	-0.027	0.057	0.092*	-0.128
	(-0.108)	(0.940)	(1.931)	(-0.954)
Adj. R-sqr.	50.04 %	93.80 %	96.72 %	85.96 %
Observations	186	186	186	186

Table 6 present the annualized abnormal returns (alpha) and the loadings of Fama & French (2015) five-factor model for each portfolio during bull market period. Panel A present the results for value portfolios based on CF/P, D/P, PB and EBITDA/EV ratios and panel B the results for growth portfolios.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively

Table 7 shows the regression results from economic downturn. There are noticeable changes in the annual alphas, in terms of market decline compared to the entire research period and bull market. The change in alphas can be seen in both value and

growth portfolios. The regression alphas are not statistically significant, but it can be seen how the alphas are lower for value portfolios of CF/P, D/P and EBITDA/EV. Regarding the P/B value portfolio, the alpha is higher than in the whole sample period but lower than in the market's rising period. In terms of growth portfolios, the alphas have also changed from the full sample period, especially the CF/P portfolio, whose alpha has increased from 6.5% to 25.7%. D/P and P/B growth portfolios have alpha on the same level as in the whole review period, but the alpha of EBITDA/EV portfolio has decreased by more than 5 percentage points. Interestingly, different market situation has therefore had mixed effects on the abnormal returns of portfolios although the results are not statistically significant.

The loadings of different risk factors of five-factor model have instead remained almost at the same characteristics. Still, the market factor and SMB factor determine major part of the portfolio returns. In the loadings of profitability factor (RMW) of value portfolios, it can be observed that in the bear market the RMW factor has higher positive values per portfolio compared to the bull market, as well as the entire study period. In growth portfolios, the negative correlation has even turned positive in some portfolios, or the negative value is lower than in previous results. For growth portfolios, however, only for the D/P portfolio the results are statistically significant.

In down market situation, it is noticeable how the investment factor (CMA) of value portfolios has turned into a positive correlation expect in D/P portfolio where the negative correlation is also lower compared to other regression results provided. Lee et al. (2014) stated in their study that value companies underperformed growth stock during subprime crisis because of the lower returns of the firms during crisis. The results of this study show change in RMW factor as well, as it can explain the change in RMW factor in this study as well. Atanaso & Nitscha (2017) found that the size premium and the risk affect the average stock returns in bear market but the results in table 7 don't show similar effects on SMB factor.

Table 7. Loadings of the Fama & French (2015) five factor model in bear market period.

	CF/P	D/P	P/B	EBITDA/EV
Panel A: Value portfolio				
Alpha (annual)	0.91 %	-7.08 %	6.62 %	2.83 %
	(0.239)	(-1.107)	(1.356)	(0.897)
Market	1.086***	0.751***	0.972***	0.993***
	(19.552)	(8.032)	(13.626)	(21.502)
SMB	0.800***	0.440**	0.794***	0.820***
	(7.624)	(2.491)	(5.889)	(9.404)
HML	0.388***	0.510**	0.212	0.155
	(2.960)	(2.311)	(1.260)	(1.426)
RMW	0.231*	0.417*	-0.020	0.345***
	(1.675	(1.797)	(-0.115)	(3.014)
CMA	0.062	-0.277	0.168	0.100
	(0.374)	(-0.990)	(0.785)	(0.723)
Adj. R-sqr.	94.43 %	74.05 %	89.37 %	95.70 %
Observations	54	54	54	54
Panel B: Growth portfolio				
Alpha (annual)	25.71 %	0.41 %	-0.20 %	1.99 %
	(1.833)	(0.238)	(-0.085)	(0.406)
Market	0.751***	1.045***	1.050***	1.098***
	(3.66)	(41.872)	(30.981)	(15.319)
SMB	0.956**	0.443***	0.661***	0.764***
	(2.467)	(9.390)	(10.319)	(5.647)
HML	-0.655	0.107*	-0.244***	-0.218
	(-1.353)	(1.815)	(-3.047)	(-1.287)
RMW	-0.257	0.261***	0.070	-0.197
	(-0.505)	(4.216)	(0.833)	(-1.109)
CMA	0.486	0.104	0.029	-0.044
	(0.792)	(1.398)	(0.284)	(-0.207)
Adj. R-sqr.	40.35 %	98.35 %	97.53 %	91.66 %
Observations	54	54	54	54

Table 7 present the annualized abnormal returns (alpha) and the loadings of Fama & French (2015) five-factor model for each portfolio during bear market period. Panel A present the results for value portfolios based on CF/P, D/P, PB and EBITDA/EV ratios and panel B the results for growth portfolios.

*, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively

Adjusted R-square of the model is also very high in the bear market ranging from 74% to 98.3% in most of the portfolios. Only exception is the CF/P growth portfolio which adjusted R-square is 40.4%. The Fama and French five-factor model can therefore be

said to explain a large part of the portfolios' returns with its risk factors, and the downward trend of the market does not have a big impact on this matter.

7.3 Summary of the results

The results of the study on annualized portfolio returns for the full sample period show that value portfolios with high cash flow to price ratio (CF/P), earnings before interest, taxes, depreciation, and amortization to enterprise value (EBITDA/EV) and low price to book (P/B) outperformed growth portfolios with low CF/P, EBITDA/EV and high P/B over the full period under review. Furthermore, high CF/P, EBITDA/EV and low P/B portfolios also performed better than the market portfolio in terms of returns. On the other hand, the high dividend to price (D/P) ratio value portfolio performed worse than the market portfolio or the low D/P ratio growth portfolio.

In terms of risk-adjusted returns, the portfolio Sharpe ratios present same results on how value portfolios with high CF/P, EBITDA/EV and low P/B also outperformed growth portfolios with low CF/P, EBITDA/EV and high P/B over the entire review period and the results of value premium were found to be highly statistically significant. For these portfolios, hypothesis two (H2) can be accepted. On the other hand, the growth portfolio with low D/P ratio performed better than the value portfolio in terms of risk and return, with the result being statistically significant. Study also found that the value portfolios formed based on CF/P, P/B, and EBITDA/EV had higher Sharpe ratios compared to the market portfolio which support the acceptance of hypothesis one (H1) for those portfolios. However, only the result of a better Sharpe ratio for the EBITDA/EV portfolio could be considered statistically significant at the 5% level. Similarly, the market portfolio and the growth portfolio also had higher Sharpe ratios than the value portfolio based on D/P, and the result was statistically significant at the 1% level.

The table 4 regression examination of the portfolio returns revealed that most of the value portfolios had positive annual alphas, implying that the five-factor model by Fama and French (2015) cannot fully explain the positive returns, and the results were highly significant. The highest abnormal return was observed with the EBITDA/EV portfolio. In the case of the D/P portfolio, the value portfolio had a negative alpha of -3.68% and the growth portfolio had a positive alpha of 0.56%, indicating that the growth portfolio

based on low D/P produced better abnormal returns than the value portfolio, although the growth portfolio alpha was not statistically significant.

The study also found that the market factor and size (SMB) factor had a significant positive impact on all the portfolio returns. Naturally, the value factor (HML) had a statistically significant positive effect for value portfolios and a negative correlation for growth portfolios except for the D/P growth portfolio. The profitability (RMW) factor had a positive impact on the returns of value portfolios, excluding the P/B portfolio, and the findings were statistically significant. However, the RMW factor of the growth portfolio returns showed a negative correlation for other portfolios except for the D/P portfolio. The CMA factor also showed differences between value and growth portfolios, as the CMA factor had a negative effect on all value portfolios but a positive correlation on growth portfolios, with statistically significant results only for the CF/P and D/P value portfolios and the D/P and P/B growth portfolios. The adjusted R-square measures the proportion of the total variation in portfolio returns explained by the five-factor model. The results showed that the market and SMB factors explained a large portion of the portfolio returns, with the highest R-squared values of 93.5% for the EBITDA/EV and 91.6% for CF/P value portfolios in in full sample period.

The study aimed to investigate the value premium across different market conditions. The results from the bull market period showed that the value vs growth Sharpe difference was 0.59 larger in the CF/P portfolio and slightly larger (0.03) in the EBITDA/EV portfolio compared to results from the entire review period. The difference in the D/P portfolio was instead 0.18 greater in favor of growth stocks compared to the full sample period. All the results of value-growth portfolios were statistically significant. The results demonstrating an increase in the value premium for the CF/P and EBITDA/EV portfolios provide support for the acceptance of hypothesis four (H4). However, the absence of a significant change in the value premium during market upswings, as well as the fact that the change does not apply to all portfolios, suggest that hypothesis four cannot be fully accepted.

The results from the bear market period showed that value portfolios based on P/B and EBITDA/EV still yielded better risk-adjusted returns than growth portfolios. However, growth portfolios of low CF/P and D/P showed opposite results. A low CF/P growth portfolio resulted in a 1.05 higher Sharpe ratio than the value portfolio, which was statistically significant. The value premium of the P/B and EBITDA/EV portfolios increased even though the market fell, resulting in mixed and inconsistent results. While the results for the CF/P and D/P portfolios offer support for hypothesis three (H3), the lack of consistent findings across all portfolios prevents the acceptance of the hypothesis.

The results from the bull and bear market periods were further tested with the Fama and French five-factor model. The results indicate that the annual alpha for all value portfolios is positive and statistically significant during both bull and bear market periods. Despite this, the bear market caused a decline in the majority of the alphas for the value portfolios. The results also showed that the market, small minus big (SMB), and high minus low (HML) factors had positive and statistically significant loadings in all value portfolios, indicating that the value premium was driven by these factors in both market conditions. The results show that the risk characteristics of the portfolios remain almost unchanged despite the different market situations, while the effect of profitability (RMW) factor is slightly lower on value portfolios during bull market period. Adjusted R-square remained at a high level even in different market conditions, in accordance with the entire research period. Only the CF/P and D/P portfolios showed support for hypothesis three after all tests for bear market.

8 Conclusions

This study aimed to examine the performance of value investing and to find answers whether the value premium still exists. Answers are found from superior portfolio returns and risk-adjusted returns of value portfolios over a full period under review confirming the findings of Blitz & Hanauer (2021) and Fama & French (2020). The study also investigates the impact of market conditions, such as bull and bear markets, on the value premium and the results of the study are evaluated through the use of the Fama and French (2015) five-factor model.

The results of the study show that value portfolios with high CF/P, EBITDA/EV and low P/B outperformed growth portfolios with low CF/P, EBITDA/EV and high P/B over the full period under review in terms of returns and risk-adjusted returns. High CF/P, EBITDA/EV, and low P/B portfolios also performed better than the market portfolio in terms of risk and return. On the other hand, the high dividend to price (D/P) ratio value portfolio performed worse than the market portfolio or the low D/P ratio growth portfolio.

The results are confirmed with the use of the Sharpe ratios and the regression examination of the portfolio returns, which revealed that most of the value portfolios have positive annual alphas. The assumption of the thesis was that the risk-adjusted returns of different value-based strategies do not have a significant difference compared to each other, as the key figures used have all led to clear excess returns in most markets where they have been studied. That is why it can be considered somewhat surprising how poorly the value portfolios formed using the D/P ratio performed when compared to other ratios.

With regards to market conditions, the results from the bull market period demonstrated an increase in the value premium for the CF/P and EBITDA/EV portfolios, providing support for the acceptance of hypothesis four (H4). However, the results are mixed and inconsistent, as the absence of a significant change in the value premium

during market upswings, as well as the fact that the change do not apply to all portfolios, suggest that hypothesis four cannot be fully accepted. The results from the bear market period also show mixed and inconsistent outcome. Despite the observed decline in the alphas of the value portfolios in the bear market period, the lack of consistent findings across all portfolios prevents the acceptance of hypothesis three (H3). This study did not find similar convincing statistically significant evidence of the decrease in the value premium during the bear market as Gulen et al. (2011) or Lee et al. (2014).

In conclusion, the study provides evidence that the value premium is present in both bull and bear market conditions. Value portfolios based on P/B and EBITDA/EV show consistent results, yielding better risk-adjusted returns than growth portfolios and market index in both market conditions. Research offers the investors and fund managers practical implication that in the long-term value investing is still profitable and the value premium is still noticeable. Different market situations do not directly offer the investor clear profit opportunities but give indication that value investing is still a viable option when looking for excess returns from the market.

The results also indicate that the value premium is driven mainly by the market, SMB, and HML factors of Fama and French five-factor model. Future studies could examine how different factors affect the returns of value stocks and whether it would still be possible to improve returns even more by utilizing them. There are some studies on the effects of company size and profitability on the value premium, and it would be interesting to study this topic further. It would also be interesting to study each recession or market shocks separately and find results whether, for example, the effect of the latest COVID-19 pandemic or the war in Ukraine have brought new trends for value investing.

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