The performance of value and growth stocks in recessions and booms and the combination with momentum

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Diplôme : Master en sciences de gestion, à finalité spécialisée en Banking and Asset Management
Année académique : 2016-2017
URI/URL : http://hdl.handle.net/2268.2/3659

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THE PERFORMANCE OF VALUE AND GROWTH STOCKS IN RECESSIONS AND BOOMS AND THE COMBINATION WITH MOMENTUM

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For a Master's Degree in Management Sciences with a specialization in Banking and Asset Management
Academic year 2016/2017

Acknowledgements

First of all, I would like to thank all the professors that taught me during these years as well as their assistants.

A special thanks goes to Marie Lambert who accepted to be my promoter. She always kept her patience and she was of good advice.

I would also like to thank my two readers, Lionel Artige and Nicolas Moreno, for their availability and their advice when I needed it.

The biggest thank you goes to my wonderful family, beginning with my parents. They never stopped supporting me even when giving up was an option. My brother and my sister also played an important role as they were always there when I needed them.

I couldn't finish these acknowledgments without thanking my friends. Special thanks go to Charline, Cyrielle, Vincent S. and O., Gilles, Valentine, Caro, Lise and most of all, to Marina. This one is for you as it wouldn't have been possible without you.

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1. Introduction

Investors have always wanted to be able to predict the future performance of stocks and to generate high returns. As early as 1934, Graham and Dodd claimed that stocks that appeared to be cheaply priced were the ones to buy as they would later outperform the market. These authors called such cheap stocks value stocks. Expensive stocks on the others side are often called growth or glamour stocks.

The performance of value stocks was, and still is, one of the biggest anomalies to Fama's Efficient Markets Theory. Many academics have been trying to explain this value anomaly. Some believe that the markets overreact to bad news and that investors become too pessimistic in their expectations. This leads some stocks, our value stocks, to be temporarily underpriced. Others on the other hand believe that value stocks are fundamentally riskier than their market beta suggests and that their over performance is pure compensation for the additional risk taken.

Value stocks have been found to outperform both the market and growth stocks. Moreover, academics found that value stocks beat growth stocks in both up and down markets. During the global financial crisis however, value stocks under performed growth stocks and many asked why.

Another anomaly to the Efficient Markets Hypothesis is called momentum. According to Jegadeesh and Titman (1993), past winners portfolios tend to beat past losers portfolios. More recently, some authors have been trying to combine both value and momentum strategies and found some benefits in doing so. The two strategies are usually opposed as value stocks are often past losers and don't meet the criteria of a momentum strategy.

The implementation a momentum or a value investment strategy comes at a cost as they request regular portfolio rebalancing. Such a cost can be unsustainable for a small investor. However, there is a solution. As a matter of fact, investors can put their funds into a mutual fund. This will enable them to benefit from a diversified portfolio at a lower cost. Moreover, mutual funds have been specializing on specific investment styles such as value or growth investing. A particular investor can thus find a mutual fund that matches his investment style.

The aim of this thesis is to study the performance of mutual funds that are focusing on value and growth stocks. By doing so, we would like to see if the conclusions of academics concerning value and growth stocks performance during the global financial crisis are also true in practice. Second, we would like to see if the benefits of combining value or growth investing with momentum are present in mutual funds. Finally, we want to see if the performance of a type a mutual fund can be partly linked to macro economic factors such as the gross domestic product growth or the unemployment rate.

This thesis will be structured as follows: First, we will review basic asset valuation techniques as well as the Capital Asset Pricing Model and the Efficient Markets Theory. This will bring us to talk about market anomalies. These market anomalies will lead us to the literature review where we develop the value and momentum anomalies by reviewing what academics have been writing about both. The case study will follow this literature review. Finally, we will make the link between our research and ethics in finance before drawing our conclusions.

2. Asset valuation, efficient market hypothesis and the CAPM

This chapter will cover a range of topics and illustrate what both researchers and professionals have written about it. It will start by briefly reviewing the most commonly used asset valuation techniques, as they will be useful in future parts of this thesis. This part will be followed by Markowitz's portfolio theory and the way to the CAPM. As the CAPM relies on it, we will then talk about the efficient market hypothesis (EMH) and related market anomalies. Some of these anomalies have become investment strategies/styles. The focus of this thesis will be on two of those anomalies: The over-performance of value stocks and the momentum anomaly.

2.1. Asset valuation techniques

According to Reilly and Brown (2012), there are two types of asset valuation techniques. First, we find absolute valuation models. These models focus on a company's fundamentals and seek to come up with an intrinsic or fair value for a given company's stock and to compare it with the market price. In doing so, an investor tries to find undervalued or overvalued stocks and believes that the price will eventually converge towards its intrinsic value. Second, there are the relative valuation techniques that use multiples in order to compare a company's pricing with the one of similar companies.

2.1.1. Absolute valuation models: discounted cash flow techniques

There is a fundamental difference in finance between two concepts: the price of an asset and its actual value. This major difference tends to be misunderstood or even forgotten sometimes.

The first one is formed on the market and is thus visible to all. This is where some make a mistake as they take a current price as the intrinsic value. Concerning the second one, it is far from being as simple as checking a website to see at what price a stock is being exchanged. In fact, exactly knowing an asset's value is an almost impossible task and two individuals with

the same amount of information are more than likely to come up with different values for a given asset.

Why is that so? Well, first of all, there are multiple techniques that can be used to derive a stock's value and they don't necessarily give the same result. Theoretically, "the valuation of a company is a straight-forward matter accomplished via the DCF method" (Lie & Lie, 2002, p. 1). This discounted cash flows (DCF) method consist of computing a company's future cash flows and to discount them as shown in equation (1):

$$\text{Value}_0 = \sum_{t=1}^{n} \frac{\text{CF}_t}{(1+\text{k})^t} \qquad (1)$$

Where:

- $Value_0$ is the value of a given company today
- CF is the cash flow of a given period
- k is the investor's required rate of return[1]

Professionals often use the DCF methods. Nevertheless, the technique isn't simple as it relies on many assumptions to get the appropriate discount rate as well as the cash flows. Worse, the method isn't appropriate for all stocks as some companies' future cash flows are almost impossible to forecast. One example is biotechnological and health care companies.

Within the DCF methods, we find three major under-types. First, the dividend discount model (DDM) where the cash flows are the future dividends that will be distributed to the shareholders. A second type concerns the operating free cash flows

2.1.2. Valuation by multiples

Some investors and analysts prefer the valuation by multiples over the DCF models. The idea behind this second valuation method is quite simple to understand: companies that are identical (in terms of sales, gross margin, profit margin, the industry they belong to…) should be valuated the same way.

[1] This required rate of return depends on the DCF analysis you are running. For more details see Reilly and Brown (2012).

The first step is to select similar companies. Once those have been found, you just need to compare their multiples to the ones of the companies you want to valuate. The most popular multiples being used are:

- **Price to earnings (PE):** it represents the price per share divided by the earnings per share
- **Price to book value:** it represents the price per share divided by the book value per share of the company.
- **Price to EBIT/EBITDA:** it represents the price per share divided by the earnings before income tax (EBIT) or the earnings before income tax and depreciation and amortization (EBITDA)
- **Price to sales:** it represents the price per share relative to the sales of the company

No matter what multiple you use, there are drawbacks. First, two companies are never exactly the same, meaning that each multiple omits an amount of information that biases the valuation. The price to earnings ratio, for example, will be influenced by the capital structure while the price to EBIT or EBITDA will not. Lie and Lie (2002) compared the performance of 10 valuation ratios. Their main conclusion was that "there is no consensus as to which multiple performs best".

A major problem with the valuation by multiples is that it gives a relative valuation of a company in relation to similar companies. One could come to the conclusion that a given company is undervalued due to the fact that the industry it belongs to is currently highly priced and probably overvalued.

2.1.3. Combination of both DCF and multiples analysis

A common practice is to do both the DCF technique and the multiples analysis. This enables one to have an idea of the fair value of a company (through the DCF) and at the same time to see where "it situates itself" compared to similar companies.

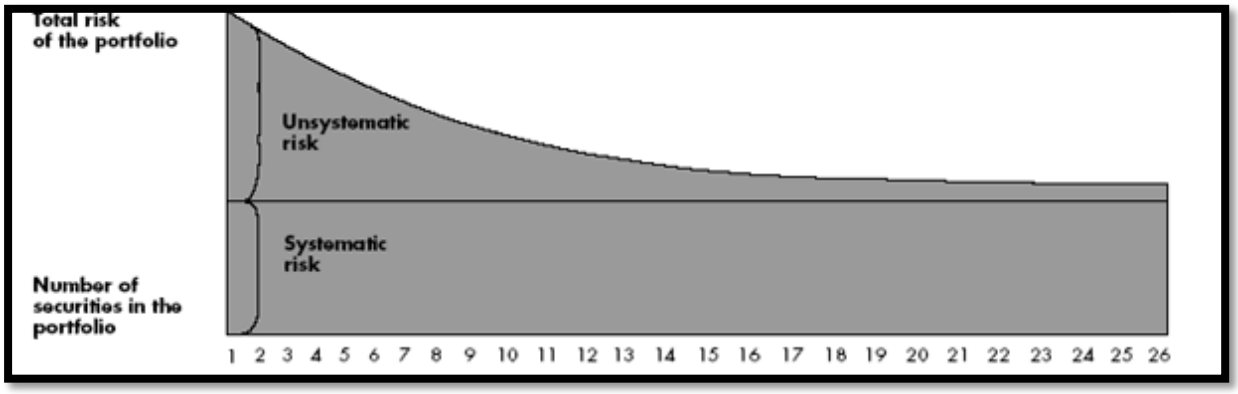
2.2. *Expected rates of returns of stocks: The CAPM*

Every investment comes with an amount of risk, also called uncertainty. This uncertainty concerns the probability of success (or future outcome) of a given project that will lead to a reward.

While calculating an investment or portfolio's performance is a rather easy task, judging how good this performance is, is another story. Markowitz (1952, 1959) suggested considering a portfolio's risk as being the variance of its returns. Under some assumptions[2] he showed that the variance of a portfolio's returns was a meaningful measure of this portfolio's risk. Moreover, his work showed the importance of diversification in order to reduce the total amount of risk.

While diversification is undeniably useful, it has its limits unfortunately as not all risk can be diversified away. The part that cannot be diversified away is called the systematic risk.

Fig. 1



Source: Harvard Business Review website (www.hbr.org)

Every portfolio of assets had now a given risk and a given expected return. Based on one of the assumptions[3] that states that an individual prefers more return for the same amount of risk, this let to the so-called "efficient frontier" that represents all best possible portfolios in terms of risk and related return.

To have a higher expected return, an investor has to bear more risk. The decision on which portfolio an individual prefers to own depends on his risk preferences.

[2] See appendix A

[3] See appendix for the explicit list of assumptions.

Markowitz's portfolio theory included only risk assets. The introduction of a risk-free asset enabled the development of the Capital Asset Pricing Model (CAPM) by Sharpe (1964) and Lintner (1965). This risk free asset has the advantage of being uncorrelated with other assets and to have zero risk (variance of its returns = 0). In other words, its return is certain.

By combining the risk free asset and the Markowitz portfolio, Sharpe (1964) derived the following equation:

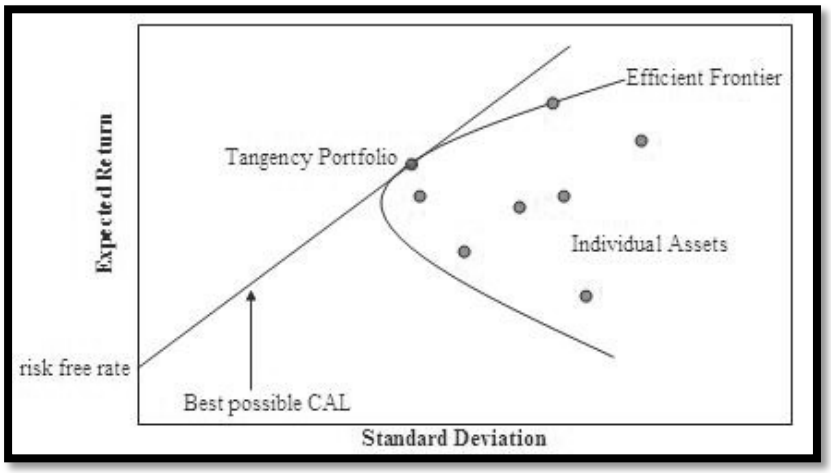
$$E\left(R_{Ptf}\right) = RFR + \sigma_{Ptf}\left[\frac{E(R_M)-RFR}{\sigma_M}\right] \qquad (2)$$

Where:

- $E\left(R_{Ptf}\right)$ is the expected rate of return of a given portfolio
- RFR is the risk free rate of return
- σ_{Ptf} is the variance of the portfolio's returns
- $E(R_M)$ is the expected rate of return of the Markowitz market portfolio
- σ_M is the variance of the returns of the Markowitz market portfolio

This equation represents all possible combinations of the risk free asset with the Markowitz portfolios (those on the efficient frontier). It is called the Capital Allocation Line (CAL) and more specifically the Capital Market Line (CML) when it is tangent to the efficient frontier. In this tangent point, investors receive the highest compensation for the risk taken.

Fig. 2



Source: www.researchgate.net

This Capital Market Theory's (CMT) major drawback is that it is incomplete and unable to explain the link between risk and return. In fact, the CMT only considers the possibility of

combining the risk free asset with a well-diversified portfolio. However, an unsystematic risk is present in individual assets as well as in not fully diversified portfolios.

Specific risky assets each have a unique risk and this risk isn't being compensated for in the CML equation. The Capital Asset Pricing Model (CAPM) extends the CMT in order to calculate expected returns for individual assets. Equation (2) becomes:

$$E(R_i) = RFR + \beta_i\,[E(R_m) - RFR] \qquad (3)$$

Where:

- $E(R_i)$ is the expected rate of return of a given asset i
- $\beta_i = \frac{Cov\,(ri,rm)}{\sigma_m}$. $Cov\,(ri,rm)$ is the covariance of the asset i's returns with the market's returns. σ_m is the variance of the returns of the market. β_i represents the proportion in which a given asset i will fluctuate for a movement of 1 of the market
- $E(R_m)$ is the expected rate of return of the market portfolio. Usually an index such as the S&P500 is being used as a proxy for such a theoretical portfolio
- $[E(R_m) - RFR]$ is called the market premium

The CAPM, despite the criticism it has been facing, is still widely used and taught in finance. It gives a relationship between the systematic risk of an asset and the expected returns an investor should expect by holding this asset. This model relies on the assumption that assets are always correctly priced. This notion is better known as the Efficient Market Hypothesis (EMH) and is further developed here under.

2.3. Efficient Markets Hypothesis (EMH)

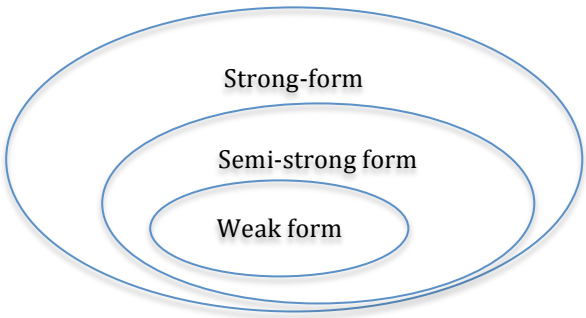
1.1.1. Introduction to EMH

Can anyone pretend he or she can predict the future performance of a given stock based on its past performance? This question had (and still has) people giving both answers as chartist theories were opposed to the theory of random walks. In 1965 Fama answered "no" to the question. As a matter of fact, he believed that past information of stock prices is of no use to predict future performance.

Based on previous academic work, he came up with one of the most famous theories in modern finance: The Efficient Market Hypothesis (EMH). This theory was based on the random walk hypothesis that stated that stock prices changed randomly. However, previous academic work focused on extensive empirical analysis and lacked theory. Fama (1970) "attempted to formalize the theory and to organize the growing empirical evidence" (Reilly & Brown, 2012, p. 141).

So, what is an efficient market? An efficient market is one in which stock prices[4] quickly react and adjust to new information so that they reflect all available information at all times (Fama, 1965).

Fig. 3



Fama decided to categorize the efficient market hypothesis into three forms: the strong form, the semi-strong form and the weak form. As illustrated above, the strong form encompasses the semi-strong form, which itself encompasses the weak form. In fact, if the strong form holds, the two other ones do as well.

The weak form EMH states that current stock prices already reflect all available market information and that past information is of no use to forecast future price movements.

According to the semi-strong form EMH, prices reflect all public information. Moreover, once a new piece of public information is available, prices adjust quickly. Compared to the weak form that only refers to market data, this semi-strong form is wider and includes nonmarket data such as economic announcements, earnings announcements, multiples, …

[4] In the original paper, Fama talks about all assets but as we are focusing on stocks, the term was prefered.

This hypothesis implies that no investor who bases his investment decision on new information, after it went public, should generate above-average risk adjusted returns.

This last sentence is important as it marks the difference between the semi-strong and the strong form EMH. In fact, this strong form EMH asserts that stock prices should fully reflect all information, be it public or private.

2.3.4. EMH and asset valuation?

One might ask if the first part of this chapter where we talked about asset valuation techniques isn't in contradiction with this Efficient Market Hypothesis. In fact, if prices are always right, why would you spend so much time on your DCF analysis to find undervalued stocks?

Reilly and Brown (2012) stress that the EMH does not contradict with the utility of company and industry analysis as there are wide distributions of returns between each. They add that in order to be successful in his analysis, an investor needs to understand the main variables that affect rates of return and to be really good at estimating the variables that influence a company's value. The difference between a good and bad analyst would thus be his understanding of the industry and of a specific company as well as his ability to estimate future values for key variables. Moreover, the quality of his estimations should be more accurate and different from the consensus in order for him to be successful (Reilly & Brown, 2012).

2.3.5. Arguments against EMH: market anomalies

Many researchers all over the world have been testing for market efficiency in different stock exchanges and have come to the conclusion that their functioning deviates from the rules of Fama's EMH. Such deviations are more frequently called market anomalies. Of course, some anomalies might be observed only once and then disappear. Nevertheless for many, they seem to persist as more authors have been proving their existence at different periods.

Anomalies can be classified in different categories. The first one groups so-called calendar anomalies. A second category concerns fundamental anomalies. Finally, a third category concerns technical anomalies (Latif, Arshad, Fatima, & Farooq, 2011).

Each individual anomaly concerns a specific form of the EMH (especially the weak and semi-strong form). Calendar and fundamental types of anomalies for example, mainly address the semi-strong form of the EMH. Technical anomalies, as the name suggests, concern historical price patterns and question the weak form of the EMH.

Among the most common calendar anomalies[5], one is known as the Monday or Weekend effect. As Lakonishok and Maberly (1990) show, stocks tend to have a lower closing price on Monday than the Friday close. Rozeff and Kinney (1976) showed that some firms tend to have high abnormal returns at the turn of the year. This anomaly is usually referred to as the January effect.

Fundamental anomalies are the ones that have drawn most attention. The low price-to-book anomaly states that stocks with low price-to-book ratios achieved higher returns than the ones with high price-to-book ratios (Fama, 1992). It is often called the value effect[6]. Another important anomaly is the so-called size-effect. Banz (1981) showed that stocks of companies with small market capitalizations outperformed the ones of companies with bigger capitalizations.

Finally, technical anomalies concern the patterns traders try to find and exploit in past prices of a stock or an index. They work with moving-average for example, selling stocks when the short period averages fall below the long period average and buying stocks when the opposite happens (Brock, Lakonishok, & LeBaron, 1992). Another well-documented anomaly is called momentum. It states that stocks that have performed well over the last months tend to keep doing so (Jegadeesh & Titman, 1993). The opposite, past losers outperforming past winners, was also shown when the period taken into consideration is longer (De Bondt & Thaler, 1984). This is usually called contrarian.

[5] To have a more complete list of anomalies, see Latif, Arshad, Fatima, & Farooq (2011)

[6] See the following chapter for more details as we focus on this anomaly in this thesis

3. Value, growth and momentum

As mentioned in the previous section, the value-anomaly concerns the tendency of stocks with low price-to-book ratios (or similarly, high book-to-market ratios) to outperform the market and generate higher risk adjusted returns. It is one of the biggest and most consistently observed market anomalies. This section focuses on so-called value and growth stocks and on the reasons of the over performance of value stocks. Moreover, we will focus on the two most recent major crises: the dot.com bubble and the global financial crisis. In doing so, we will explain the relative performance of both investment styles during each crisis. Finally, the momentum anomaly will be explained as well as the benefits of combining it with value or growth investing.

3.1. Value and growth stocks

3.1.1. Value stocks

Value stocks are stocks that are cheaply priced compared to their fundamentals. While the market anomaly we talked about before defines value stocks as the ones having low price to book ratios, other ratios are being used in practice. Moreover, so-called value stocks were already drew attention way before the EMH. Many see Dodd and Graham as the first to consistently look at value stocks as representing a good investment opportunity when considering what stocks to buy. Dodd and Graham (1934) looked at the price to book, price to earnings or price to cash flows to identify such stocks. These definitions are still used in more recent literature.

Why are these ratios so low in the first place? Graham and Dodd (1934) claim that the reason is the poor past performance of these companies and that investors tend to assume this low performance will go on in the future. This behavioral aspect was further developed and confirmed by De Bondt and Thaler (1984) in their well-known paper about market overreaction. A little later, Chan (1988) reached similar conclusions. Moreover, these stocks are characterized by slow growth opportunities in the future.

3.1.2. Growth stocks

Growth stocks on the other hand are the exact opposite, as they appear to be expensive compared to their fundamentals. Expensive means high price to book, price to earnings or price to cash flows.

Higher growth opportunities as well as higher expected earnings in the future justify these high ratios. Investors want to hold such stocks, sometimes called glamour stocks (Campbell, Polk, & Vuolteenaho, 2005), before these expected high results are realized. These high anticipations drive prices up in the first time while fundamentals (earnings, cash flows) haven't changed much. However, Beaver and Morse (1978) note that price-to-earnings ratios don't work too well as a growth predicator for more than two years.

3.1.3. Style investing

Humans love to group all kind of things (food, countries, people, jobs…) into categories. This simplifies their thinking and allows them to process vast information (Barberis & Shleifer, 2003). The same happens with stocks as investors classify them into styles or asset classes. Value and growth are definitely among the favorite investment styles. The growing interest for both value and growth in the 1990s following Fama and French's paper (1993) let managers to even offer specialized indexes.

One of the drawbacks cited by Barberis and Shleifer (2003) is that segmenting the market into styles leads to correlated movements between assets that are fundamentally unrelated. The specialized value and growth funds and indexes also have an influence on prices because of the amounts they invest into the specific assets they are focusing on.

Barberis and Shleifer (2003) also claim that investment styles have their own life cycles. Such cycles can lead to bizarre situations such as in 1998-1999 where value stocks performed poorly despite reporting good earnings compared to growth stocks who performed well. They identify two types of style investors: switchers and fund traders. While the first want to benefit from the momentum of styles, the second try to time their reversal as they are looking for arbitrage opportunities (Barberis & Shleifer, 2003).

Initially, the frontier between value and growth stocks was thus exclusively based on the simple ratios mentioned before. As the two investment styles grew, both definitions have evolved. MSCI for example, uses multiple factors to identify value and growth investment style characteristics to construct their style indexes (MSCI, 2007):

The value investment style is measured based on:

- The book-to-market ratio
- Dividend Yield[7]
- 12 months forward price-to-earnings ratio

The growth investment style is measured based on:

- Long term forward earnings per share growth
- Short term forward earnings per share growth
- Current internal growth rate
- Long term historical earnings per share growth trend
- Long term historical sales per share growth trend

With these additional criteria, MSCI calculates a score for both styles. A specific stock can show both value and growth characteristics, none of both, only value characteristics and finally only growth characteristics[8].

3.2. Value premium

3.2.1. Definition and existence

Many authors, including Athanassakos (2009), Basu (1977) and Fama and French (1992, 1993), have shown the over performance of value stocks over growth stocks at different periods in time. This over performance of value over growth is commonly called the value premium (Chen, Petkova, & Zhang, 2006). In other words, it is the additional performance you earn from holding value stocks rather than growth stocks.

[7] It is the dividend divided by the price

[8] See appendix C for the two-dimensional framework

Based on the semi-strong EMH, buying or selling stocks based on their price to book ratio (or any other ratio) shouldn't enable one to consistently generate future higher than expected returns as prices reflect all available public information at all times (Fama, 1970).

However, in 1977, Basu's results suggested that portfolios of stocks having low price-to-earnings ratios had, on average, earned higher absolute and risk-adjusted returns than portfolios with high price-to-earnings ratios from 1957 to 1971. This paper was a confirmation of the work of Williamson (1971) that questioned the EMH due to similar observed results. Athanassakos (2009) showed the existence of a value premium between 1985 and 2005 as he built portfolios based on both the price-to-book and the price-to-earnings ratios of stocks. Both low ratios generated higher than expected returns and he found that the price-to-earnings ratios yielded better results.

A value premium was found in different markets around the world. It was documented in the US stocks exchanges (Fama, 1992, 1995; Basu, 1977) as well as in Europe (Fama, 1996). Lakonishok, Shleifer and Vishny (1994) found the existence of a value premium in Australia while Chan, Hamao and Lakonishok (1991) proved its existence in Japan. It was even found in the Far East by Chan and Lakonishok (2004).

By drawing so much attention on the value anomaly, it should have faded away or even disappeared. In fact, if the market consensus is aware that value stocks tend to generate higher returns than the CAPM and their beta suggest, more investors would be willing to own such stocks. Such increasing demand would drive prices up and reduce or eliminate the possibility of finding bargains and value stocks wouldn't outperform growth stocks anymore (or at least less).

Following the work of Fama & French (1993), a mutual fund was started by Dimensional Fund advisors. This fund focused on the small stocks as well as on value stocks. Between 1963 and 1991, it would have earned an impressive 0,5% monthly abnormal return on average. However, between 1994 and 2002, it earned a negative monthly abnormal return of 0,2%. Schwert (2002) believes that the attention drawn by Fama & French (1993) on certain anomalies let to their disappearance or at least their attenuation[9].

[9] Other possible explanations will be exposed later.

3.2.2. Explaining the value premium

While the value effect has been widely documented and researched during the last 40 years, the existence of a value premium in the first place still raises questions. Different answers have been suggested. These answers are of two kinds: a behavioral answer and a rational answer (Black, McMillan, 2006).

Behavioral finance quickly developed in the 1980s and linked psychology with market behavior. According to De Bondt and Thaler (1984), individuals tend to overreact to unexpected news or dramatic events. This psychological effect is also present in financial markets and especially for growth and value stocks prices. Growth stocks tend to be overvalued due to too high expectations. Once worse than expected information comes in, the market revises its expectations and prices tend to fall (Basu, 1977). On the other hand, value stocks are temporarily undervalued due to past bad news or negative reports. Investors become excessively negative in their projections until better news comes in and prices go up (Basu, 1977). De Bondt and Thaler (1984) further developed Basu's hypotheses and confirmed them by showing that past losers (over the last 3 to 5 years) earn higher returns than past winners.

As opposed to the behavioral aspect, some financial economists see the value anomaly as a statistical artifact as they claim that the CAPM is misspecified and fails to describe average realized returns. Ball (1978) writes that the price-to-earnings ratio could be one of these unknown and omitted risk factors and that it should be included in the correct equilibrium valuation model. By including them, the anomaly would disappear. Reinganum (1981) has a similar reasoning for both the value anomaly and the size anomaly. Value stocks and small stocks being riskier than the CAPM suggests, they would earn higher returns.

Another strong argument against CAPM is that stocks having past high betas have had no higher average returns than stocks with past low betas (Campbell & Vuolteenaho, 2003). Value stocks have been linked with lower betas than growth stocks on average according to Athanassakos (2009) and De Bondt & Thaler (1984).

3.2.3. Fama French three factor model

Following the increasing literature about the value anomaly as well as the size anomaly, Fama and French (1993) constructed different portfolios in order to observe the difference in returns between small companies and big companies as well as between low book-to-market stocks and high book-to-market stocks.

They confirmed that the CAPM left much of the cross-sectional variations in stock returns unexplained, especially for some types of portfolios/stocks. In fact, the CAPM explained about 90% of common variations in returns for high price-to-book stocks as well as big stocks. However, for low price-to-book stocks or big stocks, it explained less than 80% of the returns for most portfolios.

These results strongly suggested that both anomalies came from omitted risk factors. They added two additional factors to the original CAPM: small-minus-big (SMB) and high-minus-low (HML)[10]. The first one is supposed to "mimic the risk factor in returns related to size" (Fama & French, 1993, p. 9) while the second does exactly the same for the risk factor related to book-to-market.

By adding both the SMB and the HML factors to the initial CAPM, they improved the explanation of the cross-sectional variations in stock returns. However, they noted that while both SMB and HML alone have the power to explain differences in average returns across stocks, the initial market factor is still very useful and needed to explain the average performance of stocks above the risk free rate.

This Fama French three-factor model, which is still widely used today, is presented as follows:

$$R_{it} - RFR_t = \alpha_{it} + \beta_1 (R_{mt} - RFR_t) + \beta_2 SMB_t + \beta_3 HML_t \qquad (4)$$

Note that α_{it} is the intercept of the model and it represents the performance that isn't being explained by the 3 risk factors. β_2 and β_3 are the exposures to the SMB and HML risk factors.

[10] For details about the construction of the small-minus-big and the high-minus-low factors, please see Fama & French (1993) or http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

3.2.4. Drivers and size of the value premium

While the new model does a great job in explaining realized average returns of a given portfolio, it doesn't help predicting the value premium or the size premium. What it does is say that value stocks or small stocks have earned a premium (or not) over a given period and how much a given portfolio's returns can be explained by its exposure to these factors.

The simplest and widely used way to estimate a future premium[11] is of course to use average realized returns. However, as noted by Elton (1999), these average returns are extremely noisy (Black, 1986) and will possibly not converge to expected returns. Therefore, Fama and French (2002) suggest that expected returns estimated from fundamentals are more accurate.

Following that suggestion, Chen, Petkova and Zhang (2006) found that the expected value premium can be decomposed into the dividend-growth component and the dividend-price-ratio component. They found an average value premium of 6% per year between 1941 and 2005. Out of these 6%, 4,4% come from the dividend-growth component while the remaining 1,6% come from the dividend-price-ratio component. In other words, the value premium comes mainly from the higher dividend growth rates of value stocks compared to growth stocks.

The subsample for more recent years (1963-2005) shows a value premium of 6,2% per year on average. 4,0% are explained by the dividend growth component and 2,2% by the dividend-price-ratio component (Chen, Petkova, & Zhang, 2006).

As mentioned before, Schwert (2002) believes the value premium decreased in the 1990s due to Fama and French's (1993) influential work that made the market more efficient. Chen, Petkova and Zhang (2006) also found some evidence supporting this idea. However, they rather suggest that the value premium decreased due to cyclical movements and not because of a permanent downward shift. Chan and Lakonishok (2004) note that the over performance of growth stocks in the late 1990s defies economic logic and was rather driven by extremely high levels of investors optimism about technology, media and telecommunication stocks.

[11] No matter if it is the equity premium, size premium or value premium

3.2.5. Value and growth stocks performance during booms and downturns

Until now we have only been talking about the confirmed existence of the value premium during different periods in time as well as some of its possible drivers. Nevertheless, most of the previously mentioned researchers analyzed longer time periods that usually included both downturns and booms. These researchers almost never separated the periods of booms and downturns. An interesting question would of course be how do value stocks perform in different states of the economy.

Lakonishok, Shleifer and Vishny (1994) studied value and growth strategies between 1968 and 1989. Value outperformed growth 17 times out of the 22 studied years. Their sample included 4 recessions[12]. Value strategies only slightly underperformed growth strategies during one of the 4 recessions. Moreover, they compared the performance of both investment styles during the worst months of the stock market as a whole. Again, the value portfolios outperformed the growth ones[13]. Athanassakos (2009) talks about a strong value premium in both bull and bear markets in his paper and even in recessions and recoveries. Surprisingly, the annual observed value premium during recessions was as important as 28% compared to 3,98% in recoveries. Moreover, it was higher on average during bear markets than during bull markets.

The previous results question Fama and French's (1993) idea that value stocks are riskier than growth stocks. As Lakonishok, Shleifer and Vishny (1994) point out, if value stocks were really riskier they should underperform glamour stocks during some periods, especially during extreme down markets and recessions when the marginal utility of wealth is high. Investors would prefer safer than riskier stocks. As value stocks outperform both in up and down markets, they conclude that they must have "higher up-market betas and lower down-market betas than glamour stocks with respect to economic conditions" (Lakonishok, Shleifer, & Vishny, 1994, p. 1569).

The academics who noted the over performance of value stocks in major downturns all studied periods before the global crisis that started in 2007. For this crisis, growth portfolios outperformed (Bartram & Bodnar, 2009). The obvious question is why this crisis was so different for value stocks? Different answers do exist.

[12] December 1969 to November 1970, November 1973 to 1975, January 1980 to July 1980 and July 1981 to November 1982

[13] Value portfolios lost value, but less than the growth ones did. Outperformance is here refered to as « losing less »

First, as Baiocchi emphasizes (2012), investment styles such as value and growth are tilted towards some sectors. As a matter of fact, sectors such as the financial sector traditionally have low price-to-book ratios and will hardly enter a growth portfolio[14]. On the other hand, the growth investment style is highly influenced by the technology sector as it usually offers innovation and attractive growth opportunities that drive prices and ratios up.

This being said, explaining the difference in the performance of value and growth stocks between the 2000 crisis and the 2007 global crisis seems easier. While the technology stocks crashed in the dot.com bubble, they also pushed the performance of growth portfolios down. As value portfolios weren't as exposed to this sector, they suffered less and outperformed. During the global crisis on the other hand, financials were strongly affect and lost over 70% of their value. Value strategies had thus worse performances than growth strategies did.

A second answer to the initial question can be given thanks to Campbell and Vuolteenaho's (2003) game changer: the decomposition of the traditional CAPM single beta into two betas. They remind us that any given stock can fall (rise) because of two reasons: a reduction (rise) of the expected cash flows or an increased (decreased) discount rate[15]. The same is true for aggregate market moves. However, they stress that the two situations have different implications. First, if expected cash flows decrease, wealth decreases but investment opportunities are unchanged. In the second case, wealth also decreases but future investment opportunities increase (Campbell & Vuolteenaho, 2003). According to them, the CAPM beta needs to be broken into a cash-flow beta and a discount-rate beta. They call the first the bad beta and the second the good beta[16]. This separation of the traditional beta improves the rather low performance of the single CAPM beta.

Value stocks would have higher cash-flows (bad) betas while growth stocks would have a higher discount-rate (good) beta (Campbell & Vuolteenaho, 2003 ; Campbell, Polk, & Vuolteenaho, 2005). Looking back at page 4 and the DCF valuation model, this is immediately clearer. As growth stocks profits are expected to accrue further in the future (Cornell, 1999), a shock on discount rates would affect their value stronger than the one of value stocks. For the same reason, a shock on expected profits, would affect value stocks more as their future profits are expected in the closer future. In conclusion, the required return

[14] This depends of the factors being used to determine value and growth characteristics as seen in section 2.1.3. However, we talk here about the basic one dimension criteria such as the price-to-book ratio.
[15] Remember the DCF formula from section 2.1.1
[16] Good and bad aren't to be understood in absolute terms

of a stock would not be derived by the classical CAPM but rather by a cash-flow news beta and a discount-rate beta. The bad beta earns a higher premium compared to the good beta that earns a lower premium (Campbell, Polk, & Vuolteenaho, 2005).

In Hard Times (2013), Campbell, Giglio and Polk use this two-beta approach to analyze the 2000 and 2007 crises. They claim that the first one was due to increasing discount rates while the second one was due to a decrease in expected profits. According to them, crises can be classified in 3 categories: Hard Times, Pure Sentiment and Others.

Hard times are the most severe crises as they represent a more permanent situation. They are characterized by a decrease in expected profits (=cash-flows shock). Campbell, Giglio & Polk (2013) say that the 1929 crisis as well as the 1937-1939 recessions were due to cash-flows news and so did the 2007 global crisis. This explains the under performance of value stocks during these crises as they have higher cash-flows (bad) betas. Pure sentiment crisis are driven by increasing discount rates. These crises are more temporary situations and a rebound is expected to happen faster. Finally, other crises are composed of most crises between 1955 and 2000. This idea is supported by Fama and French (2002) who believe that the average returns between 1951 and 2000 were mainly due to declining discount rates. Such periods are mainly sentiment driven. Positive cash-flows news are observed during booms and are followed by discount rates shocks. In other words, value stocks over perform both during the boom and the crisis.

The advantage of this two-beta approach is that it also enables us to explain booms. As a matter of fact, booms are also driven by cash-flows news, discount-rate news or sometimes by both. Campbell, Giglio and Polk (2013) claim that the boom of the 1990s was mainly due to decreasing discount rates. This gives us an alternative explanation to Schwert's (2002) believe that the work of Fama and French (1993) influenced the performance of value stocks during this period.

3.3. Momentum

Considered as one of the efficient market theory's biggest counter argument, many researchers started focusing and writing about momentum. As previously mentioned, momentum is the belief that stocks that have been performing well in the past tend to keep doing so.

In their famous paper of the end of the twentieth century, Jegadeesh and Titman (1993) were the first ones to concretely develop a Momentum strategy. They constructed different portfolios of stocks based on their returns during the previous 3 to 12 months. They showed significant evidence that for the studied period, 1965 through 1989, the portfolios constructed based on past positive returns outperformed the ones based on previous losers.

Jegadeesh and Titman's (1993) work was a direct reaction to previous articles that had been praising the exact opposite to momentum, namely contrarian strategies. As a matter of fact, it had been demonstrated by Jegadeesh (1990) as well as Lehmann (1990) that when the time period being looked at for the past performance consideration is shorter (one week to one month), past losers tend to outperform past winners.

This contrarian strategy approach was favored by the common belief that humans overreact to information they receive. Concerning this psychological trait in financial markets, De Bondt and Thaler (1984) suggested that investors also tend to overreact to information. Compared to Jegadeesh (1990) and Lehmann (1990), they took a longer approach and showed that previous losers over the past 3 to 5 years period tend to outperform past winners in the future and up to 5 years after portfolio construction. Momentum was further studied and confirmed by multiple authors. Israel and Moskowitz (2013) showed the existence as well as the robustness of momentum between 1927 and 1965 and from 1990 to 2012. Momentum was even found within given industries (Grinblatt & Moskowitz, 2004).

As noted by Fama and French (1996), their three-factor model fails in explaining Jegadeesh and Titman's (1993) observation of continuation in short-term returns. As a matter of fact, past short-term winners as well as past long-term winners (= growth stocks) tend to load negatively on the HML risk factor. HML rather captures the reversal of returns. However, both momentum and HML (= value) have shown predictive power of future returns.

In 1997, Carhart proposed an upgrade of the Fama French three-factor model by adding a fourth factor, momentum:

$$R_{it} - RFR_t = \alpha_{it} + \beta_1 (R_{mt} - RFR_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 Mom_t \quad (4)$$

[17] In his work, Carhart (1997) called the risk factor « PR1YR » but it is used as « Mom » now.

This four-factor model could explain up to 95% of excess returns of a given portfolio. Many more factors do exist and could most likely help explaining the remaining 5%. However, the cost of implementation would be higher than the additional benefits. Moreover, over 300 factors have been encountered by Harvey, Liu and Zhu (2016) in their survey of the literature on the subject. Only a fraction of those factors were significant, including the three factors of equation (4).

While momentum was consistently found to be existing during the last century, Daniel and Moskowitz (2016) note that momentum strategies experience occasional crashes where the returns are much weaker than the returns of past losers. The biggest difference in returns was observed in July and August 1932 and was as high as 200%. During the global financial crisis, from March to May 2009, the over performance of past losers was of 155%. According to Stivers and Sun (2010), when the market has had a negative return over the last 3 years, the momentum premium decreases. In 1992, Kothari and Shanken had another explanation in line with Stivers and Sun. During downturns, the past winners usually have lower betas than the past losers. This means that when a market rebounds, the lower-beta stocks that are considered as the past winners underperform the past losers with higher market betas. This would explain the negative momentum premiums following longer market downturns.

3.4. The benefits of combining momentum with value or growth

We have been writing about value, growth and momentum strategies separately up to this point. One of the major drawbacks of each of the techniques employed by academics is that they don't take transaction fees into account. By following a strict rule and by rebalancing the portfolios after a fixed period of time, one might miss some additional performance.

Let's take an example. Some stocks that are included in our value portfolio due to their low price-to-book ratio today perform well over the next 12 months. This good performance might be followed by a sell signal if the price-to-book ratio has increased enough to make these stocks be above the "limit" at which they are considered as being value stocks. By rebalancing on a yearly basis and selling these stocks, you would sell assets that the momentum strategy might indicate as being good buys.

Some authors have been focusing on the combination of the two rather opposed strategies: that are value and momentum. As Asness (1997) notes, momentum works for both value and growth stocks but is stronger for growth. Similarly, he claims that value strategies are quite weak for past winners and strong for past losers. Fisher, Shah and Titman (2015) simultaneously incorporate value and momentum. In doing so, they show that better performance is being achieved and that their portfolio has less turnover. While momentum is a fast moving characteristic, value is slower moving. By optimally combining both signals, they reach this reduction in the portfolio turnover.

4. Case study: Mutual Funds Performance during and after the global crisis

4.1. Introduction

As stressed in the literature review, value stocks have a tendency to outperform growth stocks. The existence of such a value premium has been widely studied as well as its variability. Moreover, the link between investment styles and sectors as well as the two-beta approach[18] helped us understand the underperformance of value stocks during the global crisis while they usually outperformed growth stocks in market downturns. Finally, the combination of two rather opposite strategies, value and momentum, was shown as being useful as it reduces transaction costs and resulted in higher performance.

The cost of transaction is an important factor as many researchers don't take it into account when studying an active investment strategy such as value, growth or momentum. Depending on the strategy being used, portfolio rebalancing at every desired period can happen to be very expensive and might even undoe the over performance reached by implementing the strategy.

Particular investors often dispose of a small budget for their investments. This makes the implementation of an investment strategy relatively costly. As a matter of fact, let's imagine one has 2500€ to invest. In order to diversify some risk away, he should buy multiple stocks. Let's imagine he starts with 10 stocks as he invests 250€ in each one of them. Each year and according to his strategy, he rebalances his portfolio in line with his own criteria. Let's say after one year he sells 5 stocks and buys 5 new ones. In total, he will already have 20 orders executed. At a price of 7,5€[19] per transaction, this would represent 150€ of costs for the first year, or 6% of his initial investment. And this investor's portfolio wouldn't even be well diversified.

[18] A cash-flows beta and a discount-rates beta. The first is known as the bad beta while the second is the good beta.

[19] This random number is used. In practice, transaction are different between brokers and depending on what stock exchange you invest into.

A possible way to benefit from more diversification at a lower cost[20] is to invest into a mutual fund. They enable investors to own a part of their portfolio that is managed by a professional manager. These mutual funds have been increasingly popular over the last 30 years. Funds usually focus on specific types of stocks such as value or growth stocks as well as small or big stocks.

In this part, we will try to see if what has been found in the literature can also be observed in practice through the performance of mutual funds. This can be divided into three main questions. First, have mutual funds focusing on value stocks underperformed the ones focusing on growth stocks during the crisis? Second, can the performance of each type of funds be linked to the state of the economy? In other words, can macro indicators be used as proxies for cash-flows and discount rate news. Thirdly, can we observe the benefits of combining momentum with value or growth investing in mutual funds?

4.2. Data

As described here under, multiple sources were used to retrieve the necessary data for this case study.

4.2.1. Mutual Funds Selection and information

As mentioned above, it can be interesting for an investor to invest into a fund to benefit from diversification at a lower price than by doing it himself. He can do so by investing his money into a mutual fund.

The mutual funds that were used for our analysis were selected through Morningstar Premium. Morningstar is the world's leading independent service provider for investors and is specialized in information about funds. One of the key features of Morningstar Premium is that it offers an advanced screening tool that allows you to select funds based on your criteria.

For this thesis, only a couple of filters were used in order to keep a variety of funds and enough of them. First, we wanted to make sure that the fund existed before the beginning of

[20] Depending on your budget. If you have 100.000€ to invest, it might be more interesting to do it yourself as transaction costs will represent a smaller percentage.

the studied period that goes from 2007 to 2016. The first filter was thus based on the fund inception date and we set it to be before 01/01/2007.

The second and third filters concerned the assets these funds invest in. As a matter of fact, funds can invest into a range of assets such as bonds, equities, property and even shares of other funds. As we are focusing on value and growth stocks, we obviously wanted the studied funds to invest mainly into equities. Moreover, our study focuses on US stocks. The two filters used were thus that the fund had to belong to the category called "U.S Equities" on Morningstar Premium and that it invested at least 95% into US stocks.

These criteria returned 1335 funds initially. The funds' names and tickers were then exported and another investor service provider was used: Bloomberg. We used it to retrieve each fund's desired data, namely its net asset value (NAV) for every trading day between January 1st 2007 and December 31st 2016 as well as its dividends payments and capital gains distributions.

However, out of the initial 1335 funds, only 1100 were kept. Some funds had stopped existing between 2007 and 2016 or unexpectedly presented long periods without any available NAV. To avoid their potential influence on the final results, they were left out of this analysis.

Bloomberg also provided the data used as control variables for the final step of the methodology: the panel regressions. These control variables are the fund size that is represented by the assets under management (AUM), the expense ratio and the fund's age. These three variables are believed to decrease a fund's performance. The higher the expense ratio, the bigger the fund or the older it is, the lower its performance will be in comparison to another similar fund that is smaller, younger and has a lower expense ratio.

4.2.2. Four-factor model data

In order to sort the funds as explained in the methodology, several risk factors were necessary. Those were retrieved from the Tuck School of Business' website as Fama and French factors, SMB and HML, are available on it. Moreover, the 4th risk factor, Momentum, was also downloaded from this website.

Concerning the risk free rate, it was retrieved from the webpage of the U.S. Department of the Treasury as we took the 13 weeks (3 months) coupon equivalent rate.

Finally, the S&P500 index was considered as being the market portfolio and benchmark for the mutual funds.

4.2.3. Macroeconomic indicators

In order to run our regression to see the exposure of different performance indicators to macro economic indicators, we had to choose these indicators. First, we decided to download the 10 year T-Bill rate from the U.S Department of the Treasury's website[21].

The second macro economic indicator was the growth domestic product, better known as the GDP. Inflation was then calculated as being the change in the Consumer Price Index (CPI). The fourth indicator was the money aggregate M2 followed by the unemployment rate and the consumer spending. All this data was downloaded from the Federal Bank of St Louis' website[22]

Finally, we downloaded the VIX index information from Capital IQ. This index is often called the fear index as it measures the market's volatility expectations for the coming 30 days.

4.3. Methodology

1.1.1. Funds classification

The first step in order to indirectly compare the performance of value and growth stocks through the one of mutual funds is to determine which ones are value oriented, growth oriented or neither of both (blend funds). Morningstar proposes such a filter in its advanced screening tool. Nevertheless, another mean was preferred for this thesis.

As a matter of fact, a regression of each fund's returns was run with the Carhart four-factor model on a daily basis between 2007 and 2016:

$$R_{it} - RFR_t = \alpha_{it} + \beta_1 (R_{mt} - RFR_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 Mom_t + \varepsilon_t \qquad (5)$$

[21] https://www.treasury.gov
[22] https://fred.stlouisfed.org/

Let's recall that Small-Minus-Big (SMB) represents the premium earned by small capitalizations over larger ones. High-Minus-Low (HML) gives the premium earned by value stocks over growth stocks. Finally, Momentum (Mom) represents the premium earned by past winners over past losers.

The corresponding betas represent the exposures of a given portfolio to such risk factors, and thus they give an idea of the fund's investment style and preferences. These betas were used to classify the 1100 Mutual Funds. Based on β_3, the funds were first divided into three classes:

1. Value Funds: Composed of the 367 funds (1/3 of the total) with the highest positive exposure to the HML factor. These 367 funds all had a significantly positive exposure to HML.
2. Growth Funds: Composed of the 367 funds (1/3 of the total) with the highest negative exposure to the HML factor. These 367 funds all had a significantly negative exposure to HML.
3. Blend Funds: Composed of the 366 (1/3 of the total) remaining funds that didn't enter the value funds or the growth funds category.

For each the value and the growth funds categories, the exposures to momentum were then taken into consideration by looking at β_4. Compared to the previous categorization, this was in a sense imposed, as Morningstar doesn't offer a momentum filter. The 100 funds with the highest positive and significant exposure to the momentum factor were considered as being momentum-oriented funds. The 100 ones with a highest negative and significant exposure were considered as being contrarian-oriented funds. Finally, the ones that didn't have a significant exposure to the momentum factor weren't included when dividing the value and growth categories.

We now have more classes of funds that we can study separately and between which we can compare the performance at different times during the studied period. First we have the three main categories: value, growth and blend. We also have 100 "value + momentum" funds, 100 "value + contrarin" funds as well as "growth + momentum" and "growth + contrarian" funds.

One might say that these exposures have most likely varied over time and he could be right. This is why we also cut the period into two 5-year sub-periods and followed the same methodology to divide the funds. The ideal would of course have been to redo this operation each year but that would have made the panel regressions insignificant.

4.3.4. Performance measurements

Similar to a regular portfolio, a fund's performance can and should be measured in different ways. A fund having a superior raw performance doesn't mean it is better. If this performance was reached incurring a lot of risk, it might not have the best risk adjusted performance. We will measure the performance of each fund via four performance indicators that we calculate quarter by quarter from 2007 to 2016.

The most natural performance to look at is of course the rate of return over a given period. In its simplest form, any investment's rate of return over a given period t is measured as follows:

$$R_{it} = \frac{P_{it} - P_{i(t-1)}}{P_{i(t-1)}} \qquad (6)$$

Where:

- P_{it} = The price at the end of period t.
- $P_{i(t-1)}$ = The price at the previous period.

For our practical case, prices of equation (5) are replaced by a fund's NAV at time t and t-1. More components are to be considered in order to calculate the total performance, as funds are required to distribute dividends and capital gains to shareholders. Both will decrease the NAV. Dividends or capital gains distributions were added to the numerator of equation (6) of a given quarter during which they were paid.

The second performance indicator we calculate is a fund's alpha. Alpha is widely used in the investment world. It is usually attributed to the fund manager's skill as it represents the performance that isn't explained by a particular model. For the purpose of this research, we use the Carhart four-factor model as we did before to classify our funds. The constant of these regressions is considered as being alpha. It was also calculated quarter by quarter. This gave us thus a daily alpha as we worked with daily data. This alpha was then multiplied by the duration of the specific quarter (between 61 and 64 days).

The third performance indicator is the Sharpe ratio and brings us back to the CAPM as it was proposed by Sharpe in 1966. This measure enables one to judge a mutual fund's risk adjusted performance. The risk is considered as being the standard deviation of the funds' returns during a given period. The measure indicates the risk premium earned by unit of risk.

$$S_{it} = \frac{R_{it} - RFR_{(t-1)}}{\sigma_{it}} \qquad (7)$$

The risk free rate of return is the 13 weeks (3 months) T-Bill Rate at the beginning of the quarter.

The fourth and final performance indicator that was calculated is the information ratio. It measures a fund's excess return over a given benchmark (here, the S&P500 index). This excess return is then divided by the tracking error, which is the standard deviation of the difference between the fund and the benchmark over a given period.

$$IR_{it} = \frac{R_{it} - R_{benchmark,t}}{Tracking\ error} \qquad (8)$$

Each of the alpha, the Sharpe ratio and the information ratio has its advantages and disadvantages. As Reilly and Brown (2012) note, none of theses four indicators is better or worse. Moreover, they add that computing them all gives a better and more complete picture of a fund's performance as they each look at performance in a different way.

The four previously described performance indicators were calculated using Stata for each of the fund classes we created before. The results are presented in appendix D.

4.3.5. Panel regressions

Let's come to the final step of this methodology. In fact, our initial goal is to see if what was observed in the literature review, the benefit of combining value (or growth) investing with momentum, can also be seen in mutual funds performance. Moreover, as observed, different stocks perform better in different macro economic states. We are thus going to run fixed effects panel regressions between the performance indicators of a given fund class and macro economic indicators. This was also achieved using Stata and the results can be seen in appendix E.

While the macro economic indicators are of course the same for each fund, some additional variables had to be added. In fact, multiple variables that are particular to each fund are possibly influencing its performance. We decided to use the fund's age, its size (AUM) and its expense ratio.

$$Perf_{it} = Cst + \beta_1 \Delta GDP_t + \beta_1' D\, \Delta GDP_t + \beta_2\, Inflation_t + \beta_2' D\, Inflation_t + \beta_3\, VIX_t + \beta_3'\, D\, VIX_t + \beta_4\, \Delta 10Y\, TBill_t + \beta_4' D\, \Delta 10Y\, TBill_t + \beta_5\, \Delta Spending_t + \beta_5'\, D\, \Delta Spending_t + \beta_6\, \Delta M2_t + \beta_6'\, D\, \Delta M2_t + \beta_7\, \Delta Unemployment_t + \beta_7'\, D\, \Delta Unemployment_t + \beta_8\, Size_{it} + \beta_9 Exp_i + \beta_{10}\, Age_{it} + \varepsilon_i + U_{it} \quad (9)$$

Where:

- Cst is the intercept
- $Perf_{it}$ is the performance indicator of a given fund i during quarter t. This performance indicator will successively be the total return, alpha, the Sharpe ratio and the information ratio
- D is a dummy variable that take the value 1 during the recession[23] and 0 otherwise
- ΔGDP_t is the variation in percentage of the GDP between (t-1) and t
- $Inflation_t$ is the inflation rate for a given quarter t
- VIX_t is the value of the VIX index at the beginning of quarter t
- $\Delta 10Y\, TBill_t$ is the change in the 10 year T-Bill rate from one quarter to the next
- $\Delta Spending_t$ is the percentage change of consumer spending between two quarters
- $\Delta M2_t$ is the percentage change in the money supply aggregate M2
- $\Delta Unemployment_t$ is the change in the unemployment rate between two quarters
- $Size_{it}$ is the size of a given fund i for quarter t measured by its assets under management
- Exp_i is the expense ratio of a given fund i
- Age_{it} is the age of fund i measured as the difference in years between t and the fund's inception date
- ε_i and U_{it} are respectively the individual-specific effect and the idiosyncratic error terms

[23] The beginning and end dates were taken from the National Bureau of Economic Research's website

4.4. Discussion of the results

4.4.1. Value, growth and blend funds performance

During the ten year span we studied, growth funds outperformed both blend and value funds. Despite the crisis, the total cumulated return of growth funds over the period was of 78% on average. Blend funds generated a total return of 91% while value funds fell behind both, returning only 65% between 2007 and 2016.

The explanation is quite simple. As expected, value funds were hit harder during the crises and lost as much as 28,75%[24] during the fourth quarter of 2008 alone. Individuals who would have invested into value funds during the third quarter of 2007 would have lost 47,56% by the end of the recession. In the meantime, growth and blend funds lost 41,02% and 42,91%[25] over the same period.

During this recession, value funds were the biggest losers 4 times during the 7 quarters. By looking at table 6 of appendix D, you will see that growth funds lost more than value funds did during the year of 2009. However, this loss was compensated by the strong performances of the following two years.

Cutting the ten years into two 5 years periods is also really interesting as the first sub period comprises the crisis and the rebound while the second sub period can be considered as the boom. As a matter of fact, the GDP started growing again and unemployment fell after reaching its highest level by hitting the 10% mark in October 2009. As mentioned before, during the first five years, value funds fell behind. However, from 2012 on, they had higher total returns than growth funds 4 times out of 5 years[26]. Blend funds were the best performer of the three categories of funds.

One might note the bad figures during the third quarter of 2011 where value funds were the biggest losers again as they lost 22,07% compared to the 19,21% of growth funds and the 18,08% of blend funds. During this specific quarter, the US Congress almost caused a government shutdown by delaying its budget approval. This let the rating agency Standard and Poor's to lower its outlook and then even the US credit rating for the first time since

[24] See table 1 of appendix D
[25] See table 5 of appendix D
[26] See table 7 of appendix D

1941. There was now a 30% chance that the US would not be able to repay its debt. Only a couple of years after the global crisis, this news generated a new panic on the markets worldwide. But this was solved as the congress agreed to higher the debt ceiling. Markets quickly bounced back and our previous losers, the value funds, were the best performer of the 4th quarter. Such news can be seen as cash-flows news if we think like Campbell and Vuolteenaho (2003). As value stocks have higher cash-flows betas, this would explain the worst performance first and then the bigger rebound as the Congress agreement improved the future outlook.

As mentioned before, we also split the 10-year period into two 5-year sub periods to sort the funds again based on their exposure to the HML and the MOM risk factors. The idea was to make sure that the exposures to these risk factors didn't change dramatically during the 10-year period. This would have influenced our results and thus our analysis. More than 90% of the funds stayed in the same category. This is to be seen by comparing table 1 and table 8 of appendix D as there is little difference between performance indicators based on the 10 years exposures and the performance indicators based on two 5-year sub periods. The biggest changes between categories were observed due to the exposure to momentum rather than value or growth. This is logical as funds usually have an open and articulate preference towards a given investment style. Mutual funds even have this preference in their fund name. This being said, a dramatic change for a significant portion of funds would be pretty surprising.

Speaking about momentum, let's see if the pretended benefits of combining it with value and growth can be observed through the performance of our mutual funds.

4.4.2. Value and growth with momentum

Let's start with the yearly performances of growth funds, especially those either entering our momentum and contrarian definition. In 2007, when momentum was still high, the benefits are visible as the growth + momentum funds largely outperformed all other types of funds we study. On the other hand, when the market bounced back in 2009 and 2010, the growth + contrarian funds had the biggest yearly returns. Except for those three particular years, there is no real conclusion to be drawn as of which combination, if any, is best. In fact, apart from 2014 where growth + momentum earns a higher return, there is no real tendency.

Concerning value funds now, the only year that takes our attention is 2009 where value + contrarian had higher returns. However, here there are even less likely benefits of a combination to be observed[27].

Focusing on quarterly results, some more observations can be made. First, right before the recession, growth + momentum had the leading performance with 6,88%. During the recession, value + contrarian had the worst results out of all the categories 4 times. It seems as if value stocks and past losers kept losing during the recession.

4.4.3. Alphas

Until now, we have only been watching the total performance without putting it into perspective. In other words, some variations were probably observed because of the existence of a value, growth or momentum premium at a given time. By looking at alpha by fund type however, the existence of such premiums will be taken into account and performance will be relative.

Alphas were very small or even negative for most of the fund types and during the 2007-2016 period. Moreover, when we looked at the 1100 funds and ran the initial regression to sort them, we observed that over the 10 years period less than 30% of them had generated an alpha. This has two possible main explanations. First, the four-factor model can really explain portfolio performance thanks to its risk factors and capital markets are efficient. Another explanation would be that the costs of running the fund, the marketing and so on, eat up the extra bit of performance the fund manager was able to generate through skills and stock picking.

In the previous part, we highlighted some trends like reversal after the recession or the good performance of growth + momentum right before the recession when the market was hot. Another specific period we mentioned was the US debt crisis of 2011 and how it affected value funds that quickly jumped back the following quarter. By looking at alpha, all these over performances have disappeared as we can see negative alphas for the previously mentioned periods. In other words, these over performances can be explained through the portfolio expositions to specific risk factors.

[27] See tables 9 and 10 of appendix D

Interestingly, we note the existence of alphas for each type of fund for the quarters before entering the recession. This could be due to easier stock picking as the market performed well or because of a lower portfolio rotation, which generated less costs.

4.4.4. Sharpe ratios

We now observe one of the two risk adjusted measures we used in this thesis: the famous Sharpe ratio. The higher the Sharpe ratio, the better your risk adjusted return as it measures the difference between your excess return and the risk free rate of return before dividing it by the standard deviation of the portfolio's returns. It can thus be high because of a good return or a small standard deviation in the returns of your portfolio or fund. It is typically accepted that a Sharpe ratio above 1 is good. When it is above 2, it is really good and higher than 3 is great.

Let's start with a general comment. As previously mentioned, the three first quarters of 2007 saw positive returns for most types of funds. However, when you look at the Sharpe ratios, they are negative or quite low. Moreover, these ratios seem to get higher with time. While a negative Sharpe ratio during the first quarter of 2007 might seem surprising at first, it is easily explained. As appendix F shows, interest rates were still quite high back in 2007 before the recession. As the crisis hit hard, the Fed started its quantitative easing to boost the economy and that quickly drove interest rates down. By reducing or even erasing[28] interest rates in the Sharpe ratio equation, the numerator grows and the whole ratio is higher.

We already mentioned the high performance of value + contrarian funds during the second and third quarters of 2009. This category of funds didn't just have a higher absolute performance as this performance was also a better risk adjusted one. As a matter of fact, this category also had the highest Sharpe ratios during the second and third quarters of 2009. Following these quarters, between 2010 and 2013 and among all value funds, it had the highest Sharpe ratio 8 other times. However, when compared to growth and blend funds, the observation become useless as the best performer varies a lot.

The performance of value funds in the second 5 years period was higher than both other types of funds 4 times. This sub period was much better for value funds as they outperformed both growth and blend funds. Concerning the risk-adjusted performance, there are mixed

[28] As interest rates dropped to 0 and were even negative.

conclusions. Value funds didn't regularly have higher Sharpe ratios. However, in 2016 value funds[29] had the highest Sharpe ratios out of all categories of funds.

4.4.5. Information ratios

We have arrived to our last risk adjusted performance indicator: the information ratio. Typically, a ratio of 0,5 is considered as being good while 0,75 is very good and 1 is outstanding. As you can see in table 4 of appendix D, most information ratios for our funds are rather low. The main reason is that value and growth funds don't exactly track the S&P500. Their benchmark is rather the S&P500 Value Index or S&P500 Growth index.

We won't focus too much on this ratio as it is somehow biased by the benchmark we picked for our analysis. Let's just highlight that blend funds had the highest information ratio during most quarters during the ten years. This isn't surprising as the benchmark is also a blend portfolio in a sense as it includes both value and growth stocks. The tracking error of the fund with the benchmark is thus smaller and the whole ratio is higher.

4.4.6. Panel regressions[30]

Now that we have discussed the four performance indicators for each category of funds, let's come to the final part of this practical case. Except when we mentioned the US debt crises or when we focused on the months of the recession, we haven't looked at the macro economic context yet. In other words, can some part of the performances be explained by macro economic indicators? Is there a difference in the sensitivity of some type of funds to specific indicators? Were these exposures different during the recession? The following paragraphs will try to answer these questions by focusing on value, growth and blend funds.

The most interesting results come from the regression between the returns of a type of funds and the variables. As can be seen in Appendix E the variation of the 10 year T-Bill rate doesn't seem to have a significant impact on the returns, be it during the recession or the whole period. The GDP on the other hand had a positive and significant impact on all three types of funds, especially on value funds. Moreover, the exposure during the crisis was even

[29] At least one of the three types of values funds : all, momentum or contrarian.
[30] See Appendix E. Note that each of the macro economic indicators is present twice for each regression. When it is followed by « cr_ », it means that we study the specific exposure of a type of funds during the recession to the given factor. « Spend » stands for consumer spending while « yrate » is for the 10 year T-Bill rate.

more important. Value funds had a higher exposure to the GDP variation because it can be seen as a cash-flows news and value stocks are really sensitive to such news.

Inflation was high before the global crisis and then quickly declined[31]. Exactly as stocks did. Once the recession was over, so did inflation. While it alters investors' future returns, inflation can also be seen as a good sign. It seems to have been the case after 2009.

In line with what was said about the variation of the GDP, value stocks are sensitive to cash-flows news and this is also observed through the strong negative correlation to the unemployment rate. It seems as if it was a signal for value stocks investors that the situation is improving and that there are future higher returns to be expected. As a matter of fact, more jobs mean more salaries and thus also more consumer spending which then goes back to businesses. The results suggest that growth funds were particularly sensitive to consumer spending and more during the crisis. For value funds, the exposure to this factor was only significant during the crisis, when the sensitivity was high. Finally, all type of funds had a negative exposure to the value of the VIX index with growth funds leading the group.

Appendix E shows the same type of regression as before but the dependent variable was replaced by the funds' alphas. Let's remind that most funds had negative alphas or alphas close to zero. The regression doesn't have any significant results that particularly draw our attention. The regression with the Sharpe ratios on the other hand provides us with more interesting information. Unsurprisingly, the 10-year T-Bill rate has a negative influence on Sharpe ratios. Everything else being kept equal, increasing interest rates decrease the numerator of the Sharpe ratio and thus its value. The Sharpe ratios of growth and blend funds seem to be particularly sensitive to interest rates. Finally, consumer spending apparently also had a significant influence on Sharpe ratios. Again, value funds had the highest exposure to this factor and it was even higher during the crisis. This observation is in line with the one we made earlier while describing the regression with the funds returns.

Similar to the results of the regression with the funds' alphas, the one with the information ratios doesn't give us a lot of information either. The only significant information seems to be the sensitivity of all types of funds to the VIX index. The money supply also has an explanatory power for the information ratios of value funds.

[31] See appendix F

All in all, the desired effects weren't observed. This is most likely because, by working quarter by quarter, our analysis looked at short-term changes in macro economic indicators while investors most likely see the whole picture and look at long-term perspectives as well as trends. Our analysis doesn't take any of that into account.

Another important thing to mention is that we used variations between quarter as proxies for cash-flows and discount-rate news. This might not be completely true in the sense of Campbell and Vuolteenaho (2003) as they mention about shocks. Shocks should be understood as unexpected news that wasn't predicted by investors.

4.5. Limitations

We have to draw the reader's attention on the fact that the methodology used didn't guarantee that both momentum and either value or growth were used simultaneously. As a matter of fact, a specific fund could have a positive exposure to the HML factor as well as to the Mom factor while it doesn't combine both investment styles for a specific purchase. Let's take an example to illustrate that. A given stock is considered as a value stock today. A fund buys this stock and it performs well over the next 12 months so that it comes out of the value definition. Nevertheless, the fund decides to keep this stock in its portfolio. It will thus have had a positive to HML during the time the stock was considered as a value stock but also a positive exposure to momentum as it performed well and it kept the stock in its portfolio.

5. Ethics and durability

The encyclopedia Britannica defines ethics as follows :

« The branch of philosophy that is concerned with what is morally good and bad, right and wrong. Its central concern is the double task of metha-ethics of analyzing the meaning and nature of the normative moral elements in man's action, thought, and language and of the methods of supporting moral judgments ; and of normative ethics as such, of evaluating these elements and methods by developing criteria for justifying rules and judgments of good and right and presenting, analyzing, and appraising them »

The financial crisis of 2008 had so far reaching consequences on the financial sector and our society that things will probably never be again what they used to be. The loss of confidence in the banking industry, its managers, its products and its methods was so serious that many citizens defined the whole system as immoral and unethical.

The different governments, the banking supervision and the banking industry took important steps to prevent that such a major crisis could take place again. Even universities and higher educational institutions in the field of finance considered it as necessary to include ethics as an integral part in their academic training/curriculum.

In how far does this Research Thesis take part in the ethical dimensions of the given answers to the research question asked ?

First of all is my thesis a scientific research that aims at showing why some type of stocks perform better than others. That means that not the speculative aspect is in the focus but rather the scientific one.

I would also like to stress that the subject of the research was the long-term investments and not the short time investments. As a matter of fact, value investing is a rather long-term approach while momentum is a short-term approach.

Another big part of this thesis is the diversification aspect. This diversification, and thus less risk, can be achieved at a low price by investing into mutual funds. The professional managers that work in these funds have been trained in order to generate the best risk-adjusted return. Moreover, as mentioned before, the financial sector had evolved since the 2007 global crisis. A growing trend in the mutual funds industry is ethical investments. Instead of just buying and holding stocks without caring what the company behind the stock does, more and more professionals have started looking at red lists where they put the stocks they don't want to invest into.

6. Conclusion

Over the last 80 years, many academics have noticed and proven the over performance of so-called value stocks over growth stocks. This over performance is called the value premium and was shown to exist in different countries across continents and across time.

The reason of this over performance still raises questions. Some think that value stocks are cheaply priced because of market over reaction. After a succession of bad news, investors would tend to be overly pessimistic in their expectations and that would drive prices down. Value stocks would thus be out of favor with investors before better than expected news arrives. On the other hand, some believe that the CAPM is misspecified and that value stocks are riskier than their market beta lets imagine. Their high performance would be compensation for the risk.

Another well-known investment strategy is called momentum. It states that past winners tend to outperform past losers. More recently, some authors have been focusing on the combination of value with momentum. These authors claim that such a combination improves results and that risk-adjusted returns are higher.

The drawback of all these strategies is the cost of implementation, as they require frequent portfolio rebalancing. This might generate many costs for a small investor. An alternative for such an investor is to invest into mutual funds. They would benefit from diversification at a lower cost than by doing it themselves.

In this thesis, we tried to answer three main questions. First, did mutual funds focusing on value stocks underperformed during the recent global financial crisis? Second, can we observe some benefits by combining momentum with value and growth? Third, is the performance of specific mutual funds linked to macro economic indicators that might work as discount rate or cash-flows news?

The first question can be answered by yes. As a matter of fact, funds focusing on value stocks have been hit hard during the global financial crisis. They lost as much as 28% in just one quarter and underperformed both the blend and growth funds over the 10 years we studied. Moreover, by splitting this period into two five-years periods, we saw that value funds outperformed all other types of funds during the second five-year

period. This is in line with the literature review as this sub period was driven by an improving economy. Value stocks being more sensitive to cash-flows news, they outperformed.

The benefits of combining value or growth investing with momentum couldn't be significantly observed. We are thus unable to formally answer the second question. This is most likely due to the methodology that was used. As a matter of fact, by sorting the funds based on their exposures to some risk factors, we had no guarantee that the two strategies were being used in combination. To better answer this second question, further research would be needed. The best way would probably be to create our own portfolios and to implement our own strategies.

Finally, can the performance of mutual funds be linked to macro economic factors? We were able to observe some trends for the returns and the Sharpe ratios. However for the alphas and the information ratios, there were no real observations to be made. One possible reason for that is that we worked on a quarterly basis while investors make their expectations and take their investment decisions based on longer views and some trends. Moreover, academics mentioned shocks on discount rates or cash-flows but we only used historical data. In other words, we didn't observe the influence of unexpected announcements on funds performance.

To conclude, we were only able to answer the first of our three questions and the methodology probably wasn't the most appropriate to answer the following two questions.

7. References and appendices

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B. Appendices

Appendix A : Assumptions of the MPT regarding the investor behavior

1. Investors consider each investment alternative as being represented by a probability distribution of expected returns over some holding period.
2. Investors maximize one-period expected utility, and their utility curves demonstrate diminishing marginal utility of wealth.
3. Investors estimate the risk of the portfolio on the basis of the variability of expected returns.
4. Investors base decisions solely on expected return and risk, so their utility curves are a function of expected return and the expected variance (or standard deviation) of returns only.
5. For a given risk level, investors prefer higher returns to lower returns. Similarly, for a given level of expected return, investors prefer less risk to more risk.

Under these assumptions, *a single asset or portfolio of assets is considered to be efficient if no other asset or portfolio of assets offers higher expected return with the same (or lower) risk or lower risk with the same (or higher) expected return.*

(Reilly & Brown, 2012, p. 173)

Appendix B: Assumptions of the Capital Market Theory

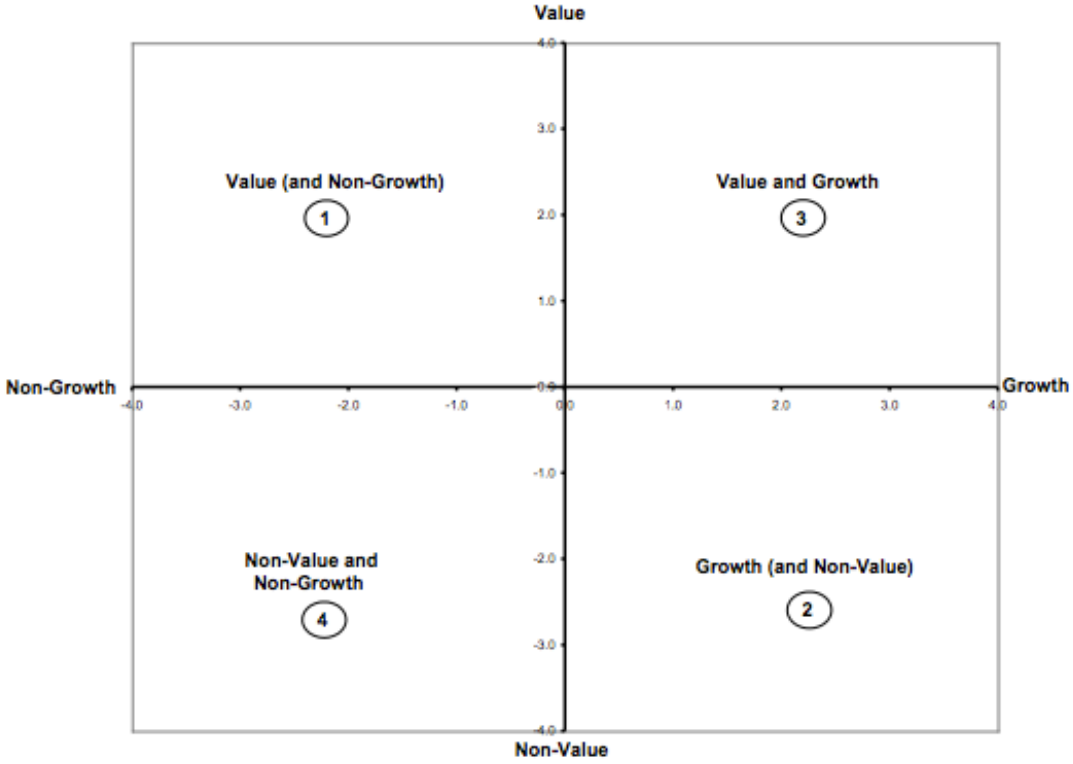
Because capital market theory builds on the Markowitz portfolio model, it requires the same assumptions, along with some additional ones:

1. All investors are Markowitz-efficient in that they seek to invest in tangent points on the efficient frontier. The exact location of the tangent point and, therefore, the specific portfolio selected will depend on the individual investor's risk-return utility function.
2. Investors can borrow or lend any amount of money at the risk-free rate of return (RFR). (Clearly, it is always possible to lend money at the nominal risk-free rate by buying risk-free securities such as government T-bills. It is not always possible to borrow at this level).
3. All investors have homogeneous expectations; that is, they estimate identical probability distributions for future rates of return.
4. All investors have the same one-period time horizon, such as one month or one year. The model will be developed for a single hypothetical period, and its results could be affected by a different assumption since it requires investors to derive risk measures and risk-free assets that are consistent with their investment horizons.
5. All investments are infinitely divisible, so it is possible to buy or sell fractional shares of any asset or portfolio. This assumption allows us to discuss investment alternatives as continuous curves.
6. There are no taxes or transaction costs involved in buying or selling assets. This is a reasonable assumption in many instances. Neither pension funds nor charitable foundations have to pay taxes, and the transaction costs for most financial institutions are negligible on most financial instruments.
7. There is no inflation or any change in interest rates, or inflation is fully anticipated. This is a reasonable initial assumption, and it can be modified.
8. Capital markets are in equilibrium. This means that we begin with all investments properly priced in line with their risk levels.

Some of these assumptions may seem unrealistic, but keep in mind two things. First, as mentioned, relaxing them would have only a minor effect on the model and would not change its main implications or conclusions. Second, a theory should never be judged on the basis of its assumptions but rather on how well it explains and helps us predict behavior in the real world. If this theory and the model it implies help us explain the rates of return on a wide variety of risky assets, it is useful, even if some of its assumptions are unrealistic.

(Reilly & Brown, 2012, p. 196)

Appendix C : MSCI Value and Growth style Space



Source :
https://www.msci.com/eqb/methodology/meth_docs/MSCI_Dec07_GIMIVGMethod.pdf

Appendix D : Performance indicators

Table1: Returns

	Growth				Value		
	ALL	Mom	Contr	blend	ALL	Mom	Contr
Q12007	4,43%	4,17%	4,70%	3,75%	4,47%	4,90%	4,08%
Q22007	8,51%	8,59%	8,22%	7,70%	6,72%	6,95%	6,65%
Q32007	4,18%	6,88%	3,71%	1,35%	-2,32%	-1,20%	-2,58%
Q42007	-6,85%	-3,94%	-9,69%	-9,12%	-14,91%	-11,32%	-17,78%
Q12008	-9,51%	-10,17%	-9,38%	-7,37%	-6,18%	-6,21%	-5,96%
Q22008	1,23%	2,24%	0,51%	-1,97%	-2,98%	-1,03%	-5,98%
Q32008	-13,19%	-15,45%	-12,32%	-8,80%	-4,47%	-5,90%	-4,06%
Q42008	-26,80%	-25,04%	-28,81%	-25,52%	-28,75%	-24,85%	-30,72%
Q12009	-6,44%	-6,71%	-5,26%	-12,11%	-15,56%	-14,43%	-17,29%
Q22009	16,19%	12,81%	18,69%	15,89%	17,79%	15,09%	21,06%
Q32009	15,44%	14,98%	16,15%	16,00%	17,90%	16,19%	19,82%
Q42009	10,66%	10,68%	10,95%	9,30%	8,45%	8,66%	7,60%
Q12010	5,64%	5,41%	5,96%	5,93%	7,50%	6,38%	8,09%
Q22010	-10,35%	-11,42%	-9,10%	-10,79%	-10,63%	-10,44%	-11,59%
Q32010	14,17%	14,02%	14,64%	12,78%	12,60%	12,47%	12,48%
Q42010	13,36%	13,40%	13,02%	11,90%	13,25%	13,52%	11,81%
Q12011	7,22%	6,94%	8,03%	7,03%	7,33%	7,00%	7,14%
Q22011	1,54%	1,76%	2,91%	0,66%	0,02%	0,36%	-0,45%
Q32011	-19,21%	-18,19%	-19,84%	-18,08%	-22,07%	-22,36%	-21,81%
Q42011	14,03%	13,18%	13,11%	14,97%	17,89%	17,61%	17,76%
Q12012	14,76%	15,04%	14,56%	12,33%	11,88%	12,10%	12,00%
Q22012	-5,31%	-5,29%	-4,95%	-3,69%	-4,04%	-4,50%	-4,33%
Q32012	6,67%	6,92%	6,14%	6,95%	6,64%	6,68%	6,81%
Q42012	-2,10%	-2,98%	-3,44%	-0,15%	2,24%	2,15%	2,53%
Q12013	8,13%	5,22%	9,29%	9,93%	11,08%	11,24%	10,97%
Q22013	5,53%	7,25%	4,71%	4,89%	5,43%	5,77%	5,21%
Q32013	9,70%	11,46%	8,44%	7,72%	8,29%	9,37%	7,40%
Q42013	4,25%	3,88%	4,89%	6,24%	3,74%	1,16%	3,57%
Q12014	2,15%	-2,16%	3,04%	5,00%	4,91%	6,74%	2,90%
Q22014	4,64%	7,51%	2,87%	4,83%	4,08%	3,95%	4,42%
Q32014	0,07%	2,56%	-1,31%	-0,19%	-3,38%	-3,42%	-2,56%
Q42014	-0,89%	0,89%	-2,63%	1,60%	1,51%	-2,86%	3,00%
Q12015	6,29%	6,28%	6,07%	4,01%	4,55%	5,35%	3,73%
Q22015	2,83%	2,86%	2,65%	2,08%	1,27%	1,38%	1,62%
Q32015	-7,49%	-7,02%	-8,97%	-7,68%	-9,00%	-8,18%	-9,86%
Q42015	-2,93%	-2,69%	-4,34%	0,14%	-1,74%	-1,73%	-1,00%
Q12016	1,16%	1,00%	0,99%	3,45%	4,23%	3,33%	4,84%
Q22016	2,02%	1,34%	2,58%	3,19%	3,83%	3,90%	3,33%
Q32016	6,20%	6,46%	5,59%	5,64%	6,67%	6,09%	6,84%
Q42016	-3,06%	-4,76%	-4,68%	2,68%	7,42%	7,31%	8,34%

Table 2: Alphas

	Growth				Value		
	ALL	Mom	Contr	Blend	ALL	Mom	Contr
Q12007	0,82%	0,78%	0,85%	0,73%	0,79%	0,81%	0,77%
Q22007	0,79%	0,81%	0,74%	0,71%	0,70%	0,72%	0,68%
Q32007	0,50%	0,69%	0,40%	0,50%	0,55%	0,53%	0,81%
Q42007	-0,14%	-0,22%	-0,04%	-0,23%	-0,57%	-0,47%	-0,49%
Q12008	0,24%	0,19%	0,21%	0,29%	0,34%	0,40%	0,33%
Q22008	0,37%	0,25%	0,44%	0,27%	0,35%	0,32%	0,31%
Q32008	-0,44%	-0,51%	-0,49%	-0,20%	-0,22%	-0,46%	-0,25%
Q42008	-1,20%	-1,15%	-1,36%	-0,94%	-0,87%	-0,51%	-1,06%
Q12009	0,19%	0,14%	0,33%	-0,26%	-0,32%	-0,07%	-0,54%
Q22009	-0,67%	-0,51%	-1,33%	-0,19%	-0,31%	-0,45%	-0,23%
Q32009	-0,01%	0,26%	-0,22%	-0,04%	-0,12%	-0,34%	0,00%
Q42009	0,02%	0,00%	0,06%	-0,08%	-0,07%	0,15%	-0,23%
Q12010	0,02%	0,03%	0,00%	0,00%	0,05%	-0,11%	0,14%
Q22010	-0,21%	-0,30%	-0,09%	-0,09%	-0,04%	0,07%	-0,13%
Q32010	-0,08%	-0,14%	0,04%	0,00%	0,02%	-0,10%	0,03%
Q42010	0,03%	0,03%	0,01%	-0,03%	-0,05%	-0,05%	-0,12%
Q12011	0,01%	-0,10%	0,13%	0,09%	0,12%	-0,07%	0,14%
Q22011	-0,02%	-0,11%	0,10%	0,00%	0,07%	0,17%	0,00%
Q32011	-0,43%	-0,46%	-0,42%	-0,28%	-0,32%	-0,31%	-0,36%
Q42011	-0,35%	-0,37%	-0,44%	-0,21%	-0,20%	-0,24%	-0,15%
Q12012	0,14%	0,19%	0,17%	-0,01%	-0,06%	-0,15%	-0,05%
Q22012	-0,33%	-0,40%	-0,26%	-0,15%	-0,17%	-0,34%	-0,16%
Q32012	0,06%	0,07%	0,03%	0,04%	0,04%	0,14%	0,00%
Q42012	-0,28%	-0,47%	-0,35%	-0,14%	-0,05%	0,02%	0,01%
Q12013	-0,11%	-0,43%	0,10%	0,10%	0,20%	0,30%	0,20%
Q22013	0,04%	0,30%	-0,02%	-0,08%	-0,11%	-0,12%	-0,13%
Q32013	0,19%	0,37%	0,20%	0,03%	0,10%	0,27%	0,03%
Q42013	-0,55%	0,00%	-0,77%	-0,43%	-0,73%	-1,01%	-0,70%
Q12014	-0,12%	-0,46%	0,05%	0,05%	0,12%	0,32%	0,06%
Q22014	0,25%	0,65%	0,11%	0,01%	0,05%	0,01%	0,07%
Q32014	0,04%	0,43%	-0,31%	0,02%	-0,01%	-0,07%	-0,04%
Q42014	-1,53%	-1,53%	-1,65%	-0,72%	-1,07%	-1,84%	-0,72%
Q12015	0,16%	0,16%	0,15%	0,09%	0,19%	0,26%	0,17%
Q22015	0,03%	0,04%	0,03%	-0,02%	-0,13%	-0,17%	-0,05%
Q32015	-0,19%	-0,15%	-0,30%	-0,09%	-0,13%	-0,12%	-0,19%
Q42015	-1,40%	-1,46%	-1,60%	-0,91%	-1,15%	-1,13%	-1,05%
Q12016	-0,23%	-0,24%	-0,31%	-0,05%	-0,02%	-0,09%	-0,05%
Q22016	-0,16%	-0,22%	-0,12%	-0,03%	-0,03%	-0,01%	-0,10%
Q32016	-0,01%	0,11%	-0,15%	-0,01%	-0,12%	-0,04%	-0,12%
Q42016	-0,71%	-0,83%	-1,05%	-0,46%	-0,39%	-0,21%	-0,39%

Table 3: Sharpe ratios

	Growth				Value		
	ALL	Mom	Contr	blend	ALL	Mom	Contr
Q12007	0,5012	0,4780	0,4910	0,6541	0,3568	0,3745	0,3457
Q22007	0,3412	0,3645	0,3910	0,4561	0,3487	0,3127	0,2831
Q32007	0,4205	0,1915	0,5211	-0,1915	-0,4169	-0,4845	-0,4589
Q42007	-0,1408	-0,1205	-0,1400	-0,3982	-0,3570	-0,3690	-0,3451
Q12008	0,0400	0,0359	0,3740	0,2450	0,3680	0,3740	0,3555
Q22008	0,6420	0,6820	0,6014	0,3891	0,4801	0,4710	0,4723
Q32008	-0,4732	-0,4812	-0,4825	0,0020	0,0520	0,0510	0,0490
Q42008	-0,4500	-0,4320	-0,4247	-0,1200	-0,5710	-0,5680	-0,5890
Q12009	0,5800	0,5670	0,5440	0,0013	-0,2640	-0,2560	-0,2470
Q22009	0,0120	0,0130	0,0152	-0,3400	0,3420	0,3468	0,3347
Q32009	0,5780	0,5970	0,5620	0,6710	0,6910	0,7010	0,7020
Q42009	0,8912	0,8746	0,9010	0,5610	0,4322	0,4221	0,4230
Q12010	0,4982	0,4781	0,4783	0,6540	0,6210	0,6230	0,6111
Q22010	0,1320	0,1450	0,1413	0,4230	0,3410	0,3529	0,3548
Q32010	0,4670	0,4720	0,5010	0,6890	0,4120	0,4720	0,3840
Q42010	0,6780	0,5910	0,6810	0,4710	0,3718	0,3614	0,3314
Q12011	0,2310	0,2100	0,2000	0,3640	0,4710	0,4720	0,4270
Q22011	0,1560	0,1230	0,1475	0,4130	0,0180	0,1240	0,0914
Q32011	-0,1240	-0,1400	-0,1820	-0,0810	-0,2571	-0,2647	-0,2415
Q42011	0,5871	0,5486	0,5714	0,6540	0,4521	0,4471	0,4100
Q12012	0,1472	0,1590	0,1480	0,2100	-0,0100	-0,0120	-0,0020
Q22012	-0,4100	-0,3650	-0,3410	-0,1260	-0,2850	-0,2785	-0,2715
Q32012	0,3420	0,3514	0,2799	0,4560	0,3574	0,3641	0,3691
Q42012	-0,2480	-0,2630	-0,2010	0,3400	0,5500	0,5410	0,5610
Q12013	-0,2610	-0,2410	-0,2650	-0,0140	0,3450	0,3650	0,3215
Q22013	0,3890	0,3820	0,3470	0,5100	0,4500	0,4210	0,4050
Q32013	0,4850	0,4750	0,4910	0,5510	0,4216	0,4136	0,4012
Q42013	-0,6100	-0,6230	-0,6410	-0,3560	-0,6870	-0,6740	-0,6310
Q12014	0,1450	0,1670	0,1740	0,4670	0,6840	0,6010	0,5480
Q22014	-0,0150	-0,0140	-0,8444	0,1631	-0,6789	-0,7214	-0,6151
Q32014	-0,2100	-0,2450	-0,2310	-0,0150	-0,5600	-0,5700	-0,4900
Q42014	-0,3879	-0,3777	-0,4100	0,1415	-0,1622	-0,3731	-0,1402
Q12015	0,6741	0,6940	0,6500	0,5510	0,5700	0,5710	0,5647
Q22015	0,5410	0,5710	0,5340	0,6140	0,4310	0,4120	0,4210
Q32015	-0,3100	-0,2710	-0,3240	-0,1450	-0,4800	-0,4710	-0,4210
Q42015	-0,9420	-0,9170	-0,9230	-0,6840	-0,4810	-0,4710	-0,4910
Q12016	0,4100	0,3600	0,3840	0,7890	0,5120	0,5310	0,5410
Q22016	-0,0120	-0,0030	-0,0400	0,5400	0,3841	0,3710	0,3520
Q32016	0,6840	0,6610	0,6700	0,5710	0,5710	0,5910	0,5810
Q42016	-0,9510	-0,9410	-0,9340	-0,4210	0,5120	0,5002	0,5461

Table 4: Information ratios

	Growth				Value		
	ALL	Mom +	Contr	Blend	ALL	Mom	Contr
Q12007	-0,10	-0,15	-0,20	-0,54	-0,20	-0,21	-0,30
Q22007	0,53	0,54	0,44	0,26	0,80	0,90	0,45
Q32007	-0,31	0,60	-0,36	-1,03	-1,62	-1,34	-1,76
Q42007	-1,37	-1,18	-1,39	-2,16	-2,44	-2,08	-2,48
Q12008	-1,50	-1,43	-1,49	-2,00	-1,65	-1,73	-1,57
Q22008	-0,35	0,50	0,03	-1,27	-1,26	-0,45	-2,25
Q32008	-2,15	-2,47	-1,89	-1,51	-0,90	-1,13	-0,80
Q42008	-2,90	-2,70	-2,71	-2,50	-1,73	-1,60	-3,20
Q12009	-1,30	-1,32	-1,10	-2,10	-1,90	-1,84	-1,70
Q22009	2,45	2,00	1,89	2,25	2,30	2,10	2,60
Q32009	2,94	2,91	2,92	3,03	2,93	2,74	3,16
Q42009	1,96	1,97	1,90	2,30	1,29	1,35	1,00
Q12010	1,75	1,81	1,72	1,90	1,45	1,22	1,50
Q22010	-1,83	-1,92	-1,65	-1,97	-1,67	-1,63	-1,61
Q32010	2,37	2,36	2,47	2,22	1,83	1,79	1,90
Q42010	2,05	1,94	1,93	1,80	1,75	1,80	1,90
Q12011	1,33	1,20	1,50	1,40	1,37	1,34	1,36
Q22011	0,90	0,50	0,57	-0,19	0,01	0,20	-0,27
Q32011	-2,10	-2,48	-1,99	-1,50	-1,80	-1,84	-1,78
Q42011	1,56	1,55	1,45	1,83	1,84	1,81	1,89
Q12012	2,65	2,75	2,80	2,79	2,34	2,31	2,80
Q22012	-1,45	-1,49	-1,41	-1,21	-1,20	-1,23	-1,30
Q32012	1,64	1,92	1,26	1,66	1,41	1,59	1,20
Q42012	-0,73	-0,82	-0,64	-0,44	1,12	1,10	1,45
Q12013	1,90	1,95	1,94	2,10	2,14	2,17	2,40
Q22013	1,20	1,15	1,35	1,46	1,34	1,21	1,36
Q32013	2,40	2,30	2,25	2,04	2,08	2,06	1,95
Q42013	0,85	0,89	0,59	2,00	1,06	0,44	1,27
Q12014	0,96	-1,10	1,51	1,40	1,48	2,00	1,31
Q22014	2,50	2,12	1,10	1,27	1,19	1,48	1,34
Q32014	-0,52	1,26	-0,88	-0,56	-1,75	-1,63	-1,57
Q42014	-0,20	0,49	-1,10	0,80	1,10	-1,40	1,10
Q12015	2,35	2,10	2,41	2,27	2,71	2,80	1,80
Q22015	1,32	1,41	1,40	1,80	1,89	1,90	1,64
Q32015	-1,73	-1,58	-1,99	-1,74	-2,22	-2,02	-2,34
Q42015	-0,78	-0,50	-0,49	0,13	-1,10	-0,90	-0,97
Q12016	1,20	0,70	1,02	2,10	1,80	1,90	2,24
Q22016	1,03	0,90	1,01	1,51	2,20	1,80	1,85
Q32016	1,44	1,60	1,40	1,27	2,30	1,90	2,10
Q42016	-1,37	-1,24	-1,29	1,20	2,45	2,50	2,31

Table 5 : Value evolution based on the Q3 2007

	Growth	Blend	Value
Q32007	100,00%	100,00%	100,00%
Q42007	93,15%	90,88%	85,09%
Q12008	84,29%	84,18%	79,83%
Q22008	85,33%	82,52%	77,46%
Q32008	74,07%	75,26%	73,99%
Q42008	54,22%	56,05%	52,72%
Q12009	50,73%	49,26%	44,52%
Q22009	58,94%	57,09%	52,44%

Table 6 : Total returns by quarter during the recession

	Growth	blend	Value
Q42007	-6,85%	-9,12%	-14,91%
Q12008	-9,51%	-7,37%	-6,18%
Q22008	1,23%	-1,97%	-2,98%
Q32008	-13,19%	-8,80%	-4,47%
Q42008	-26,80%	-25,52%	-28,75%
Q12009	-6,44%	-12,11%	-15,56%
Q22009	16,19%	15,89%	17,79%

Table 7 : Total yearly return

year perf	Growth	blend	Value
2007	9,98%	2,92%	-7,34%
2008	-41,80%	-38,32%	-38,04%
2009	38,87%	29,14%	27,17%
2010	22,58%	19,25%	22,51%
2011	0,30%	1,47%	-1,37%
2012	13,47%	15,51%	17,05%
2013	30,50%	31,96%	31,56%
2014	6,02%	11,62%	7,08%
2015	-1,85%	-1,85%	-5,32%
2016	6,25%	15,79%	24,00%

Table 8: Returns by sorting the funds every 5 years

	Growth				Value		
First 5 years	ALL	Mom	Contr	blend	ALL	Mom	Contr
Q12007	4,35%	4,80%	3,80%	3,54%	4,39%	4,76%	4,17%
Q22007	8,44%	8,60%	8,42%	7,38%	6,75%	7,34%	6,48%
Q32007	4,44%	6,38%	3,27%	1,50%	-2,15%	-0,14%	-2,50%
Q42007	-7,10%	-5,18%	-9,62%	-9,90%	-14,79%	-11,34%	-18,41%
Q12008	-9,25%	-9,49%	-8,46%	-7,46%	-6,35%	-6,87%	-5,86%
Q22008	1,13%	2,68%	-0,75%	-2,59%	-3,09%	-1,00%	-5,78%
Q32008	-13,71%	-15,67%	-11,75%	-8,70%	-4,67%	-8,09%	-3,24%
Q42008	-26,60%	-25,14%	-28,50%	-25,69%	-28,96%	-25,87%	-31,61%
Q12009	-6,43%	-6,48%	-5,58%	-12,37%	-15,48%	-14,00%	-16,96%
Q22009	15,80%	12,82%	18,38%	15,44%	17,63%	14,35%	21,47%
Q32009	15,33%	14,78%	15,44%	15,90%	17,85%	16,10%	19,98%
Q42009	10,63%	10,80%	10,85%	9,06%	8,36%	8,52%	7,56%
Q12010	5,62%	5,23%	5,28%	5,86%	7,43%	5,76%	8,57%
Q22010	-10,56%	-11,04%	-10,27%	-11,00%	-10,69%	-10,90%	-11,38%
Q32010	14,03%	14,32%	14,05%	12,62%	12,62%	12,74%	12,47%
Q42010	12,90%	13,26%	12,21%	11,38%	13,25%	12,73%	12,25%
Q12011	7,38%	7,04%	7,01%	6,80%	7,30%	6,97%	7,28%
Q22011	2,06%	1,95%	2,92%	1,18%	0,07%	0,54%	-0,59%
Q32011	-18,67%	-18,02%	-18,51%	-17,32%	-21,96%	-21,11%	-22,09%
Q42011	13,92%	13,25%	13,97%	14,90%	17,93%	16,71%	18,43%
Last 5 years	ALL	Mom	Contr	blend	ALL	Mom	Contr
Q12012	14,76%	15,10%	14,41%	11,95%	11,67%	11,73%	12,24%
Q22012	-5,31%	-5,21%	-5,04%	-3,20%	-4,11%	-4,03%	-5,11%
Q32012	6,67%	6,59%	6,04%	6,86%	6,75%	6,28%	6,94%
Q42012	-2,10%	-1,88%	-3,04%	-0,28%	2,22%	1,70%	3,26%
Q12013	8,13%	5,86%	9,67%	9,91%	11,43%	12,37%	11,66%
Q22013	5,53%	7,88%	5,19%	4,92%	4,93%	4,16%	4,91%
Q32013	9,70%	10,72%	8,68%	7,07%	8,22%	9,93%	7,66%
Q42013	4,25%	3,19%	7,67%	6,40%	3,60%	2,46%	4,92%
Q12014	2,15%	-1,52%	2,86%	4,30%	5,72%	8,45%	4,48%
Q22014	4,64%	6,88%	3,20%	4,98%	4,21%	3,28%	5,14%
Q32014	0,07%	1,30%	-1,70%	0,22%	-3,24%	-4,87%	-3,05%
Q42014	-0,89%	2,11%	-2,43%	2,53%	1,44%	1,41%	1,60%
Q12015	6,29%	6,83%	5,99%	3,75%	4,28%	5,66%	3,67%
Q22015	2,83%	3,27%	2,83%	1,74%	1,38%	1,30%	1,23%
Q32015	-7,49%	-6,75%	-9,65%	-7,19%	-9,11%	-8,43%	-10,17%
Q42015	-2,93%	-5,18%	-4,46%	1,47%	-1,95%	-2,39%	-2,59%
Q12016	1,16%	0,28%	1,43%	3,93%	4,32%	3,85%	5,42%
Q22016	2,02%	1,56%	2,62%	3,24%	3,71%	4,07%	3,08%
Q32016	6,20%	6,39%	5,87%	5,30%	6,71%	6,50%	7,09%
Q42016	-3,06%	-5,54%	-2,35%	2,29%	7,98%	9,40%	7,79%

Table 9

	Growth		
	ALL	Mom	Contr
Q32007	100,00%	100,00%	100,00%
Q42007	93,15%	96,06%	90,31%
Q12008	84,29%	86,29%	81,84%
Q22008	85,33%	88,22%	82,26%
Q32008	74,07%	74,59%	72,13%
Q42008	54,22%	55,91%	51,35%
Q12009	50,73%	52,16%	48,64%
Q22009	58,94%	58,83%	57,74%

Table 10

	Value		
	ALL	Mom	Contr
Q32007	100,00%	100,00%	100,00%
Q42007	85,09%	88,68%	82,22%
Q12008	79,83%	83,18%	77,32%
Q22008	77,46%	82,32%	72,69%
Q32008	73,99%	77,46%	69,74%
Q42008	52,72%	58,21%	48,31%
Q12009	44,52%	49,81%	39,96%
Q22009	52,44%	57,33%	48,38%

Appendix E: Panel regressions

Table 1: Returns

	Growth return_	Blend return_	Value return_
yratecr_	1.67	1.98	1.42
	(0.41)	(0.43)	(0.7)
yrate_	0.42	0.69	0.65
	(1.40)	(1.31)	(1.35)
GDPcr_	3.54**	1.89*	4.52***
	(3.24)	(2.45)	(4.53)
GDP_	1.23**	1.45**	1.63***
	(3.2)	(2.8)	(4.27)
Inflationcr_	0.26	0.321	0.352
	(0.40)	(0.3)	(0.7)
Inflation_	2.64***	2.08*	2.53**
	(3.95)	(2.20)	(2.61)
Unemplcr_	0.300	-0.233	-0.412
	(0.29)	(-0.32)	(-0.64)
Unempl_	-1.95	-1.90	-2.17***
	(-1.49)	(-1.53)	(-4.53)
VIXcr_	-0.00023	-0.00066	0.0011
	(-1.21)	(-1.05)	(1.38)
VIX_	-0.00192***	-0.00145***	-0.000768***
	(-4.18)	(-4.40)	(-3.58)
Moneycr_	0.09	0.15	0.32
	(0.30)	(0.70)	(0.89)
Money_	1.20	1.14	0.90
	(0.49)	(1.21)	(1.4)
Spendcr_	3.10***	1.45	4.28***
	(5.12)	(1.02)	(3.96)
Spend_	1.07**	0.32	1.08
	(3.14)	(1.28)	(1.80)
Exp_	-0.035*	-0.021**	-0.046**
	(-2.45)	(-3.15)	(-3.01)
Age_	-0.00595***	-0.00298***	-0.00195**
	(-3.63)	(-4.63)	(-3.16)
AUM_	-0.00000289***	-0.00000217***	-0.00000186**
	(-3.55)	(-4.04)	(-2.67)
_cons	0.018***	0.014***	0.012
	(2.59)	(2.21)	(1.87)
N	14680	14640	14680

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Alphas

	Growth alpha	Blend alpha_	Value alpha_
yratecr_	-0.0012	-0.0123	-0.0001
	(-0.34)	(-0.60)	(-0.45)
yrate_	0.0321	0.249	-0.198
	(0.52)	(0.76)	(-0.26)
GDPcr_	0.014	0.0021	0.0051
	(0.49)	(0.81)	(0.62)
GDP_	-0.024	-0.012	-0.0321
	(-0.98)	(-0.74)	(-0.45)
Inflationcr_	0.01442	0.0155	0.0042
	(0.79)	(0.32)	(0.32)
Inflation_	0.0027	0.00189	0.00745
	(0.36)	(0.25)	(0.46)
Unemplcr_	-0.015	-0.041	-0.034
	(-0.47)	(-0.415)	(-0.321)
Unempl_	-0.0019	-0.071	-0.0091
	(-0.416)	(-0.79)	(-0.348)
VIXcr_	-0.00121	-0.00314	-0.00241
	(-0.52)	(-0.51)	(-0.42)
VIX_	-0.00011	-0.00041	-0.00015
	(-0.65)	(-0.42)	(-1.12)
Moneycr_	-0.119	0.0379	0.0147
	(-0.33)	(1.34)	(1.49)
Money_	-0.0678	0.121	0.121
	(-0.41)	(1.22)	(1.22)
Spendcr_	-0.393	-0.425	-0.452
	(-0.72)	(-0.57)	(-0.49)
Spend_	0.164	0.313	0.213
	(0.39)	(1.04)	(0.94)
Exp_	-0.0142	-0.0172	-0.0521
	(-2.42)	(-2.18)	(-2.54)
Age_	-0.000392***	-0.00355***	-0.00355***
	(-6.75)	(-10.22)	(-10.22)
AUM_	-0.00000222*	-0.000142*	-0.0000351*
	(-2.21)	(-2.51)	(-1.99)
_cons	0.0012	0.0101	-0.143
	(0.40)	(0.35)	(-0.39)
N	14680	14680	14680

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Sharpe ratios

	Growth Sharpe_	Blend Sharpe_	Value Sharpe_
yratecr_	-10.45	-11.37	-13.21
	(1.45)	(1.14)	(1.31)
yrate_	-28.00***	-25.10***	-27.22**
	(-4.50)	(-4.59)	(-3.12)
GDPcr_	15.14	17.24	16.12
	(1.47)	(1.39)	(-1.52)
GDP_	40.74***	36.41*	47.76**
	(2.92)	(2.47)	(3.17)
Inflationcr_	16.51	14.31	15.02
	(1.43)	(1.31)	(1.11)
Inflation_	13.01	17.55	10.31
	(1.81)	(1.54)	(1.71)
Unemplcr_	12.91	23.22	15.44
	(1.09)	(1.30)	(1.52)
Unempl_	22.61	-21.21	-28.30
	(-1.47)	(-1.45)	(-1.34)
VIXcr_	-0.016	-0.21	-0.10
	(-0.15)	(-0.46)	(-0.88)
VIX_	-0.102	-0.0804	-0.0137
	(-0.40)	(-0.64)	(-1.49)
Moneycr_	12.19	8.31	15.39
	(0.55)	(0.52)	(1.06)
Money_	18.01	16.73	14.82
	(1.45)	(1.77)	(1.41)
Spendcr_	17.92**	19.21**	26.912**
	(2.59)	(2.76)	(2.63)
Spend_	20.68***	31.91*	39.6***
	(3.48)	(2.49)	(3.79)
Exp_	-8.23**	-6.92**	-5.891***
	(-2.75)	(-2.81)	(-2.62)
Age_	-0.00231***	-0.00314***	-0.00254***
	(-2.46)	(2.54)	(-2.62)
AUM_	-0.000247***	-0.000154***	-0.0000953*
	(-5.33)	(-3.93)	(-2.04)
_cons	0.84***	0.7924**	0.8214**
	(3.99)	(2.76)	(3.24)
N	14680	14640	14680

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Information ratios

	Growth IR_	Blend IR_	Value IR_
yratecr_	5.47	4.95	8.23
	(1.45)	(1.22)	(1.62)
yrate_	8.19	10.14	12.15
	(1.78)	(1.45)	(1.88)
GDPcr_	1.18	2.15	1.45
	(1.00)	(1.73)	(0.80)
GDP_	5.85	3.83	2.45
	(1.21)	(1.12)	(0.62)
Inflationcr_	1.32	1.07	1.75
	(0.94)	(0.47)	(1.10)
Inflation_	2.45	1.95	0.54
	(1.46)	(1.42)	(1.02)
Unemplcr_	-1.51	-3.12	-0.04
	(-1.21)	(-1.04)	(-1.41)
Unempl_	-3.21	-4.45	-1.00
	(-0.15)	(-1.78)	(-1.43)
VIXcr_	-0.03	-0.011	-0.013
	(-1.03)	(-1.55)	(-1.30)
VIX_	-0.0587***	-0.0659***	-0.0779***
	(-4.20)	(-3.32)	(-4.19)
Moneycr_	3.519	3.66	5.04
	(0.46)	(1.12)	(1.39)
Money_	10.26	8.24	11.21*
	(1.51)	(1.69)	(2.15)
Spendcr_	-0.151	-3.18	5.15
	(-0.35)	(-0.52)	(0.76)
Spend_	10.61	8.73	12.15
	(1.54)	(1.32)	(1.23)
Exp_	-0.0012**	-0.0032*	0.0014**
	(-3.12)	(-2.45)	(-3.25)
Age_	-0.00220***	-0.00331***	-0.00108***
	(-4.02)	(-4.84)	(-3.48)
AUM_	-0.0000656**	-0.0000677	-0.0000740**
	(-3.11)	(-1.04)	(-3.16)
_cons	0.25***	0.23***	0.20***
	(3.44)	(4.09)	(3.60)
N	14680	14640	14680

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix F: Indicators

Chart 1: 10 Years T-Bill rate

Source: https://fred.stlouisfed.org/series/DGS10
Inflation rate USA

Chart 2: Inflation rate USA

Source: https://fred.stlouisfed.org/series/T10YIE

Executive Summary

The over performance of value stocks over growth stocks has been a widely studied topic in finance. As early as in 1934, Graham and Dodd already noticed the tendency of cheaply priced stocks had a tendency to outperform both the market and growth stocks. However, this wasn't the case during the global financial crisis.

Another well established anomaly is called momentum: past winners portfolios have the tendency to keep performing better than past losers portfolios. Some authors have showed the benefits of combining value investing with momentum. The drawback of both strategies is that they generate costs that might not be sustainable for a particular investor. An alternative is for such small investors to invest into mutual funds.

The aim of this thesis is to study the performance of these mutual funds that are focusing on value and growth stocks. The goal is to see if the conclusions of academics concerning value and growth stocks performance during the global financial crisis are also true in practice. Second, we would like to see if the benefits of combining value or growth investing with momentum are present in mutual funds. Finally, we want to see if the performance of a mutual fund can be partly linked to macro economic factors.

The first and second part of this thesis will be dedicated to the literature review that will lead to the case study. We will divide 1100 U.S. mutual funds into different groups and then compare the performances between these groups.

The analysis of the results will give us the following answers: First, the performances of mutual funds focusing on value or growth stocks are similar to the results of academic researchers. Second, there isn't enough evidence to observe the benefits of combining momentum with value or growth. Finally, some performance indicators can be partly explained by macro economic indicators.