MASTER THESIS | 2011

SCHOOL OF MANAGEMENT & GOVERNANCE

MSC, BUSINESS ADMINISTRATION – FINANCIAL MANAGEMENT

THE PERFORMANCE OF VALUE VS. GROWTH STOCKS DURING THE FINANCIAL CRISIS

R.M. HOEKJAN

SUPERVISORS

PROFESSOR

DR. R. KABIR

ASSOCIATE PROFESSOR

DR. B. ROORDA

UNIVERSITY OF TWENTE.

FOREWORD

This thesis is the result of an extensive research executed in order to obtain my Master of Science degree in Business Administration from the University of Twente. Through the course of Corporate Finance, it became clear to me that I wanted to do research that lies within the scope of financial markets, and more specifically the stock markets. However, my interest for financial markets began years ago when acquisition perils around a large Dutch corporate bank took place. I questioned myself how it was possible that a certain shareholder (hedge fund), without a majority of stake in a company, was able to express a great deal of power in order to break-down a bank that seemed to exist for ages (?).

While there are so many things to write about and so many things that have been studied, it was difficult to find a topic that dedicated a novelty towards the academic literature within the scope of the stock market. When I started at the University of Twente, the financial crisis was daily news in every newspaper and every news website around the world. Not one day passes by without a newspaper headline or column about problems with money, assets or debt within large financial institutions and conglomerates.

I developed a couple of research questions in association with the financial crisis. I also created a question that had nothing to do with the financial crisis in its direct form. It was a question on a topic in which almost every investment book paid attention to in the form of a paragraph or chapter. It was one of those discussions in the financial markets in which investors and analysts did not and do not seem to agree upon. This discussion concerns the performance of value- versus growth stocks. During my first meeting with Prof. Kabir, I discussed my research questions with him. He helped me to form a research question that combined two of the subjects that I was interested in the most; the financial crisis & value and growth stocks.

From the start of my thesis, I knew that I did not want to finish my study with a research that was purely based for my thesis and obtaining a masters' degree. I wanted to extend my knowledge and learn something about it which could provide me the knowledge in my further life and possible future occupation. I wanted to study value and growth stocks in different financial markets and in different countries on a global scale. I did not (wanted to) see my thesis as something that must be done in order to graduate. It must become something I should be proud of on itself and not as a part of something else. Something that express(ed) my interest in financial markets.

ACKNOWLEDGEMENT

This thesis will probably be the final chapter of my educational journey in either a school or university. My educational dream to obtain a masters' degree started years ago when I followed an intermediate vocational education programme (MBO) starting in 2006. Most persons are most likely aware that writing a thesis is an interesting but also time-consuming and challenging mission. It is a mission that frequently involves the help and support of a number of people in the writer's life. Therefore, I would like to acknowledge and thank a number of people that have been instrumental in helping me to finalize my master thesis.

First of all, I would like to express my utmost acknowledgement and appreciation towards my parents – André and Joke – for all the motivation, patience, and support they have given me to pursuit my dreams. This thesis would not have been realized without you. Then, my little sister – Cay-Linn – who is my pride and joy, who is the person that inspires me and is my inner strength to work hard, excel, and to accomplish my goals. I would also like to express my gratitude and acknowledgment to Peter Birdsall – chairman of the Wittenborg Business School – and Peter van Oosten – former lecturer at the Wittenborg Business School (May his soul rest in peace) – for providing me the fundaments of knowledge and wisdom in Business Administration in order to succeed at a scientific level of education.

My first supervisor, Professor Dr. Rezaul Kabir – Chair of Corporate Finance and Risk Management & director of (International) Business Administration programmes – deserves the greatest acknowledgement and respect. Without your knowledge, wisdom, patience, and support I would not been able to write this thesis as it is written today. You supported me when I was struggling with my thesis in order to get me on the right track again and to improve it. Last but not least, I would also like to express my acknowledgment and respect to my second supervisor; Associate Professor Dr. Berend Roorda, coordinator of the Financial Engineering and Management programme. You gave me the insights and comments which motivated me to look at my thesis from another point of view. The knowledge of both Prof. Kabir and Dr. Roorda regarding the financial markets encouraged me to improve my thesis further. I am most grateful that supervisors were assigned to me that specialized within a specific field of the financial markets themselves since I appreciated their professional insights the most.

Robin Hoekjan

Enschede, December 6, 2011

This page is left intentionally blank

ABSTRACT

This study examines the performance of value and growth stocks during the financial crisis of 2007-2010 within the five most influential markets worldwide and on a global scale. Value stocks are those stocks that trade at low prices compared to the fundaments of the company whereby growth stocks are those stocks that trade at high prices compared to the company's fundaments. In this thesis, portfolios of value and growth stocks are created in the five most influential countries worldwide (United States, Germany, France, China and United Kingdom). Additionally, these five countries are combined to construct global value and growth portfolios. The performance of value and growth stocks are studied by means of value and growth portfolios, which are constructed on the basis of price-to-earnings, price-to-book and price-to-cash flow. The data to calculate these price-multiples are derived from the income statement, balance sheet and statement of cash flow of the companies within the five indices up to four years. Data on stock quotes, quotes of indices, cash dividends and risk-free rates are derived from WSJ.com, Finance.Yahoo.com, and Morningstar.com. To classify stocks to be included in value or growth portfolios, a 30 percent cut-off is used. The performance to study is separated in total return and (systematic) risk. Besides return and risk, price-multiples are studied as well to research whether one price-multiple provide higher return than others. Total return and risk-adjusted measures are studied by means of average and median monthly returns to scrutinize which class of stocks, value or growth, provided the highest return. Finally, a regression analysis is performed to study whether the CAPM and a two-factor model can explain the excess returns made by value and growth portfolios.

My findings are as follows; the results obtained from individual countries are invalid to derive statistical meaning and conclusions and are therefore obliterated from discussion. This invalidity can be assignable towards small sample sizes. However, on a global scale, there exist a positive value-growth spread for at least two of the three price-multiples on which value and growth stocks are classified. This means that value stocks provide a higher total return than growth stocks. However, the results are too small and statistically insignificant to insinuate the existence of a global value premium. While value stocks, as compared to growth stocks, also provide a fraction of higher return per unit of risk, as measured by Jensen's Alpha and Treynor, these results are statistically insignificant as well. Statistical significance could only be found in the first year of the financial crisis and only for Jensen's Alpha. Second, the study regarding the examination of price-multiples shows that value and growth portfolios classified on P/B does not provide higher returns but are frequently lower compared to portfolios classified on P/E and P/C, which suggests that classification according to P/B is a

poor classification tool for constructing value and growth portfolios. Finally, regression analyses show that both the CAPM and two-factor model can explain the excess returns on global value and growth. Moreover, the estimates on alpha in the CAPM are higher for global value portfolios and equal to the estimates on alpha in the two-factor model. However, the slight improvement on the intercept for global value portfolios by the two-factor model is suggested to be assignable towards the existence of a positive value-growth spread. However, due to the statistically insignificance of a value premium, the difference in intercepts are considerably small. Additionally, the beta coefficients of value stocks are a fraction higher than growth stocks, which is consistent with the general theory that higher betas found in stocks should, by definition, produce higher returns. A higher faction in value betas found during the financial crisis expresses itself in a fraction of higher return. Moreover, this also suggest that the reason behind the fraction of outperformance by value stocks over growth stocks is a compensation of risk rather than the behavioral explanation of investor biases.

While value and growth stocks are studied during the financial crisis of 2007-2010, some limitations and implications for future research exist. One major limitation concerns the sample size used in this thesis. In this thesis, the five most influential indices are studied, which consisted out of 187 companies. Therefore, stating (statistical) conclusion would be unreliable and makes it difficult to generalize towards other countries. Another limitation in this study is that the statistical tests concerning the difference between returns produced by value and growth stocks only give suggestions regarding market opportunities and not whether one particular trading strategy would be more profitable over another. A final limitation is the degree of survivorship bias due to databases used. While respectable databases, such as CRSP and Compustat preserve stock quotes of delisted companies in file, free extended databases delete stock quotes of delisted companies subsequent towards delisting. Moreover, there also exist a number of implications for future research on value and growth stocks. First, the inclusion of the present value of growth opportunities should be studied to determine whether under and overvaluation exist within value and growth stocks. A second implication of future research is to construct portfolios using the value-weighted approach to determine the influence on the value premium during the financial crisis of 2007-2010. A third implication is what factors influence the investor’s decision making and behavior towards the mental creation of over and undervaluation. A final implication concerns the inclusion of financial institutions and financial conglomerates within value and growth stocks during the financial crisis to determine the influence these companies have on the value premium.

TABLE OF CONTENTS

List of Figures

List of Tables

Chapter 1

INTRODUCTION

"Blaming speculators as a response to financial crisis goes back at least to the Greeks. It's almost always the wrong response."
Larry Summers – Economist – United States

1.1 BACKGROUND

From the existence of the stock exchange in 1602, investors try to beat the market and to obtain superior gains. In these years, investors were already characterized as value-driven in which risk and rewards were calculated unconsciously and implicitly (Sarna & Malik, 2010). The sentence 'Greed is good', derived from a well-known movie, became famous since it seems to reflect what investors truly undergo and strive for. Greed and fear are two opposite emotions which have the largest impact within the stock market. Fear to perceive a negative or a normal rate of return while having the greed to obtain a higher than average return on investments and for the lowest compatible level of risk (Low et al, 2005).

In the viewpoint of market efficiency, obtaining superior gains would not be feasible systematically since information is reflected into share prices immediately (Fama, 1970). This makes it impossible for investors to profit from buying and selling shares no matter what stock picking techniques or investment strategies investors employ. But how is it possible, taking the perspective of Fama into account, that some particular stocks seem to outperform other stocks and the market systematically? Numerous scholars revealed contradictory results on the efficient market theory and appointed towards inefficiency (see e.g., Basu, 1977; Lakonishok et al, 1994, La Porta et al, 1997; Best et al, 2002; Chan & Lakonishok, 2004; Athanassakos, 2009) in which it would provide investors the possibility to obtain higher capital gains and to acquire abnormal returns. Various techniques and strategies are applied by investors to achieve this superior gain (Chan & Lakonishok, 2004).

The work and results derived academically are suggested to have created the fundaments and building blocks in order to understand and to provide various investment strategies assessed in financial markets globally (Chan & Lakonishok, 2004). One of the most popular theories on classification in financial market is the usage of different investment styles (Barberis & Shleifer, 2003; Chan & Lakonishok, 2004). The allocation of securities can be classified in various manners. One can classify stocks into small- and large-cap, technological and non-technological, and cyclical and defensive. But one classification that derived its popularity decades ago and on which, as Bourguignon & De Jong (2003) acknowledge, investors and analysts do not seem to agree upon regarding superiority lies within the classification of value and growth stocks. Graham & Dodd (1934) were one of the first scholars to make a distinction between value and growth stocks (glamour stocks) while the actual recognition of 'growth' stocks can be assigned to Price Jr. (Babson, 1951). While value and growth stocks can be defined in many ways, which will be discussed in section 2.3.1, the simplest definition of value and growth stocks is: *value stocks* are those stocks that trade at low prices compared to the fundamentals of the listed company (e.g. earnings, book value, cash flow, dividends) whereby *growth stocks* are those stocks that trade at high prices compared to the fundamentals of the listed company (see e.g., Fama & French, 1993, 1998; Lakonishok et al, 1994; O'Shaugnessy, 2005; Peterson, 2007; Pinto et al, 2010)

The subject of value and growth stocks has been a widespread theme of examination during the 1990's and 2000's. Various scholars, including Lakonishok et al (1994), Fama & French (1998; 2007), Bauman & Miller (1998) and Black & McMillian (2004; 2006), studied the subject of value and growth stocks in relation with return, risk, and overall performance. Results of these studies show that value stocks are likely to generate higher total return[1] and higher outcomes on risk-adjusted measures[2] than growth stocks both in national and international markets. The reason behind this will be discussed in the section below and in the literature review. However, the performance of value stocks versus growth stocks during times of crisis remains, to some degree, unveiled.

Allen et al (2009) and Bartram & Bodnar (2009) stress that the latest financial crisis is the worst crisis since the great depression in the 1930's, if not, the greatest crises of all time. The latest financial crisis started in the subprime mortgage market of the United States (Allen et al, 2009; Bartram & Bodnar, 2009; Hull, 2011). The reason that this crisis was severe globally

---

[1] Total return refers to the gain or loss of a stock/portfolio (or in general a 'security') within a particular period. According to Hillier et al (2010) and Pinto et al (2010), this gain or loss is based on the income and capital gains.

[2] Risk-adjusted measures are, according to O'Shaugnessy (2005) and Pinto et al (2010), methods such as the Sharpe ratio, Treynor ratio and Jensen's Alpha, to calculate the performance of a stock or portfolio in association with the stocks' or portfolio's risk as measured by, for example, the standard deviation, beta and/or alpha.

lies, as Baumol & Blinder (2010) suggest, in the open economic structure since countries, including developed emerging countries, are interlinked with each other through interest rates, exchange rates, prices, and income, which was something not recognized in earlier crises (excluding the internet crisis in 2001-2002). In relation, the information processing structure is, according to Kolb (2010), faster and more advanced than ever before. This is imaginable when it is taken into account that normal individuals have access to all available and relevant information on securities, which is something that would not be possible in earlier years where trades were primarily executed by human brokers.

1.2 RESEARCH QUESTIONS

Previous studies on value and growth stocks have covered different financial markets, such as global markets (e.g., Bauman et al, 1998; Fama & French, 1998), developed domestic markets (e.g., Bird & Casavecchia, 2007; Cahine, 2008), and emerging markets (e.g., Gonenc & Karan, 2003; Yen et al 2004). Most scholars suggest that portfolios containing value stocks have the tendency to outperform portfolios containing growth stocks over extended periods of time. This is usually during a minimum 10-year time-frame (Bauman et al, 1998; Fama & French, 1998; Bird & Casavecchia, 2007; Cahine, 2008). Capaul et al (1993) and Bauman et al (1998) argue that value stocks did not outperform growth stocks in each month and quarter. In addition, various scholars, including Fama & French (1998) and Bourguignon & De Jong (2003), contend that the outperformance of value stocks upon growth stocks only exists for longer periods of time. It is unclear, however, whether this is also the case for shorter periods of time, such as the financial crisis (which lasted for approximately four years, excluding the European credit crisis of 2011). Both Beneda (2002) and Gonenc & Karan (2003) find different results in developed and emerging markets, which would contradict studies of, for example, Fama & French (1998), and Cahine (2008). While numerous articles discuss the performance of value and growth stocks in various countries in various years, most scholars do not make the separation how value and growth stocks performed in bull- and bear-markets since it can be assumed that the crises and/or recessions fell outside the sample period. While the reasoning behind this remains unclear, it is logical that the economy, including its national and international environment, changes during and after bubbles and crises which could give distorted results on the long term. To study this, the following research question is developed:

**** *Value vs. Growth stocks: which offered the highest return during the financial crisis of 2007-2010?* ****

While the research question states ‘highest return’, different interpretations of ‘highest’, in relation with the financial crisis of 2007-2010, could be given. For example; ‘outperformed’ or ‘least negative return’. Moreover, investors consider performance both in total return and in risk (Bourguignon & De Jong, 2003; Yen et al, 2004). When value stocks provide higher total return than growth stocks, it gives allowance to the existence of a positive value premium, which actually is the difference between the returns on value and growth stocks. Thus, whenever a positive value premium arises, it basically refers that the total return of value stocks are higher than the total return on growth stocks (see e.g., Fama & French, 1998; Chan & Lakonishok, 2004; Cahine, 2008). Scholars, such as Fama & French (1998) and Cahine (2008), suggest that a global value premium exists through time. Yen et al (2004) contend that a value premium only exist for a concise period of time. One of the foundations of investment theory is the relationship between risk and return. Investors continuously ask the question; ‘how could returns be optimized while, at the same time, limiting the exposure to risk. However, the reasons behind the existence of a value premium remain a puzzle. While scholars, as Fama & French (1993), contend that value premiums are generated by the level of risk, other scholars, such as Lakonishok et al (1994), argue that value premiums are generated by investor biases. However, is the existence of a value premium due to long-term studies or does the value premium also has existence in short periods of time such as the financial crisis?

Petkova & Zhang (2005) argues that betas for value stocks have a positive covariance with the anticipated market-risk premium while the betas for growth stocks tend to perform inversely. Fama & French (1998) studied the betas of value and growth stock much earlier. These scholars contend that the betas of growth stocks are not negative but these should be systematically lower for growth stocks. These results were obtained by running regression based on one-factor and multi-factor models. However, from a logical point of view, high beta stocks should also generate higher returns. In the case of value and growth stocks, the reverse exists. Further detail on this matter will be discussed in section 2.4.2.4.1. Additionally, in various studies covering the subject of value and growth stocks in relation with risk, the most prominent type of risk used is ‘systematic risk’. Various scholars scrutinize value and growth stocks on the basis of portfolios. O’Shaugnessy (2005), Hillier et al (2010) and Pinto et al (2010) argue that when stocks are added to a portfolio, the unsystematic risk inherited within individual stocks will be diminished until the part of risk that remains is the systematic risk. Therefore, it can be assumed that scholars studying value and growth stocks use systematic risk. Capaul et al (1993) and Yen et al (2004) contend that value stocks provide higher returns per unit of systematic risk (hereafter unit of risk) than growth stocks. Yen et al (2004) argue that this result arises due to the distress characteristics within value stocks. However, it is likely that during a financial crisis, investors are more risk-averse and do not prefer to invest in companies that face some sort of distress or are more likely to have a default position. However, various scholars find that value stocks are still more capable to produce higher returns than growth stocks during post-war crises (see e.g., Lakonishok et al, 1994; Brown et al, 2008). This section leads to the following sub-question:

** *Do value stocks provide a higher return per unit of systematic risk than growth stocks during the financial crisis of 2007-2010?* **

Some scholars studying value and growth stocks by means of various (price) multiples argue that classification by one (price) multiple provide higher return for portfolios composed of value and growth stocks than other price multiples (Fama & French, 1998; Bauman et al, 1998; Davis & Lee, 2008; Athanassakos, 2009). Athanassakos (2009) contend, when studying value and growth stocks in the Canadian market, that using price-to-earnings as a classification tool to compose portfolios of value and growth stocks provide higher return than price-to-book. However, Fama & French (1998) contend differently. These scholars argue that using price-to-book as a classification tool provide an investor higher return than classifying portfolios by other multiples. This was also acknowledged by Bauman et al (1998) and Davis & Lee (2008). Fama & French (1998) and O'Shaugnessy (2005) argue that portfolios classified by means of price-to-book provide a higher return than other multiples due to the level of volatility. Book value is, according to these scholars, less volatile than earnings or cash flows, which gives a mode of certainty towards investors. Davis & Lee (2008) argue differently. These scholars contend that book value signifies the accumulation of incomes over the entire history of the firm and are therefore less volatile than other price-multiples, which are only incorporated for a particular fiscal year, such as earnings. This section leads to the following sub-question:

** *Do value and growth portfolios constructed by means of price-to-book provide higher return than value and growth portfolios constructed by means of other price-multiples during the financial crisis of 2007-2010?* **

Studies covering the subject of value and growth stocks document that value stocks outperformed growth stocks, on average, in each country (see e.g., Capaul et al, 1993; Bauman & Miller, 1997; Bauman et al, 1998). Capaul et al (1993) and Bauman et al (1998) argue that this can be attributed towards a relationship across countries. Capaul et al (1993) contend that correlations of monthly returns were significantly related on a cross-country base but by a small fraction. Bauman et al (1998), however, contend that outperformances existed across countries whereby the margins in which value stocks prostrated growth stocks on performances were large. However, Allen et al (2009) argue that in times of crisis some countries are more affected than others. It can be suggested that this affection is related towards the origin and exposure of a crises. For example, during the outbreak of the internet crisis, the U.S. and its companies were affected more heavily than Germany since these internet companies were mostly established in the U.S. Additionally, the exposure of Germany towards these internet companies were less than in the U.S. It can therefore be assumed that during the financial crisis of 2007-2010, which affected multiple countries worldwide, some countries are damaged more heavily than others. In the latest financial crisis, the U.S. was damaged severely and subject to various buy-outs and governmental restructurings while the Republic of China was affected by less. It can be assumed that countries and economies that are less affected by the financial crisis, such as China, show differences in returns and in value premiums and are therefore unrelated to countries that are more affected in a negative sense by the financial crisis. Taken the arguments above into account, the following sub-question can be developed:

** *Do value stocks outperform growth stocks in each country under consideration and for each year of the financial crisis?* **

Capaul et al (1993) and Fama & French (1998) contend that a diversification effect exists with global portfolios. According to Fama & French (1998), national portfolios are exposed to the idiosyncratic risk within a country and therefore produce larger standard deviations. In relation to that, global portfolios seem to provide higher returns as compared to national portfolios. Capaul et al (1993) suggest that investing in global portfolios provide more satisfaction towards investors than investing in a national portfolio regarding the returns. However, it is doubtful whether this suggestion still holds strong in the financial crisis. The latest financial crisis is characterized by the fact that all countries were damaged each to a greater or lesser degree (Allen et al; 2009; Bartram & Bodnar, 2009).

While national portfolios are assumed to be damaged more heavily than an international portfolio due to the idiosyncratic risk associated in each country, it is doubtful whether the suggestion of Capaul et al still holds strong during the latest financial crisis. This section leads to the following sub-question:

** *Do international value (growth) portfolios still provide higher total return than national value (growth) portfolios during the financial crisis of 2007-2010?* **

While the performance between value and growth stocks are often studied by means of total return and return per unit of systematic risk, Fama & French (1998), Gonenc & Karan (2003) and Cahine (2008) also study whether asset pricing models can explain the returns produced by portfolios composed of value and growth stocks. For the CAPM to explain the excess returns in both national and international value and growth portfolios, the regression's intercept (alpha) of a portfolio's abnormal return on the market return should be indifferent from zero. If the intercept is significantly larger or smaller than zero, than it can be assumed that the CAPM fails to explain some part excess return on portfolios composed of either value or growth stocks. However, in the study of Fama & French (1998) the CAPM model failed to explain excess return. Fama & French (1998) contend that the failure of the CAPM to explain excess returns and the underlying value premium lies both in the intercept[3] and in the market slope[4]of the model. While Gonenc & Karan (2003) and Cahine (2008) found similar results on the intercepts, the slopes were normal. By using a multi-factor model, Fama & French (1998) document that value (growth) portfolios have an average intercept of 4.5 (-8.5) basis

[3] De Vaux et al (2008) define the intercept in regression as the point where the explanatory variable *x* is zero. O'Shaughnessy (2005), Dougherty (2006) and Pinto et al (2010) argue that the intercept in financial regression basically refers to a systematic number not captured by the explanatory variable(s). For example, when the market risk premium (market return minus risk-free rate) of the DJI would be zero than a stock within the DJI could still produce positive/negative return. This positive/negative return, when the market risk premium is zero, is known as the intercept.

[4] Dougherty (2006) and De Vaux et al (2008) define the slope as a ratio indicating an increase of one unit in x increases by a unit in *y*. In financial markets, this slope is often defined as the beta coefficient. The beta coefficient (beta) is a measurement of responsiveness or volatility of a security in contrast to, for example, the market (market portfolio). To determine the return of a security, investors should evaluate the market risk of a security in order to determine the sensitivity of a security to movements in the market. The sensitivity is defined as beta which gives the amount of change in stock return for additional percentage change in the market return (O'Shaughnessy, 2005; Dougherty, 2006; Hillier et al, 2010).

points (BPS)[5], meaning that a multi-factor model is more appropriate to explain the returns. The reason, as Fama & French (1998) contribute to these results lies in the slopes of HML[6] (called VMG further in this thesis), which satisfy the argument that slopes of value (growth) portfolios must be large (small). Gonenc & Karan (2003) and Cahine (2008) contend that while a multi-factor model provides a more appropriate description of returns on value and growth portfolios, the regression produces similar results on variation (R2), which indicates consistency among both models. While the intercept shows improvements concerning the results obtained from the multi-factor models, the values are still significantly distinguishable from zero (Fama & French, 1998; Gonenc & Karan, 2003; Cahine, 2008). To determine if the intercept would be indifferent from zero when the market is not the only independent variable, various scholars added different factors into a multi-factor model. The multi-factor model also imposes that the intercept or alpha is indistinguishable from zero (Fama & French 1993, 1998; Gonenc & Karan, 2003; Cahine, 2008). This means that the multi-factor model assumes that excess returns on a stock or portfolio cannot be earned when there is no excess return on the market and no statistical difference between returns on value and growth stocks. Fama & French (1998), Gonenc & Karan (2003) and Cahine (2008) find improvements in the intercept within the multi-factor models. The intercept declined considerably by more than 10 basis points. Fama & French (1998) find that the incercept declined, on average, by 28.50 basis points under the multi-factor model. Equal results were found by Gonenc & Karan (2003) and Cahine (2008). These scholars argue that the diminution in the intercept is the result of adding the value premium as an additional factor. This section leads to the development of the final sub-question:

** *Can the Capital Asset Pricing model (CAPM) and a multi-factor model explain the excess returns produced by portfolios composed of value and growth stocks during the financial crisis of 2007-2010?* **

[5] Peterson (2007) and Pinto et al (2010) define BPS as an element used in financial instruments that equals a value of 1/100 of one percent. For example, if the return of a stock is 0.75 percent it basically refers to a return of 75 basis points (BPS).

[6] The term 'HML' is an abbreviation first used by Fama & French (1993; 1998) to denote High minus Low book-to-market. This term simply defines the percentage of a value premium within a certain market (condition) and time-period. Due to this, Huang & Yang (2008) used the abbreviation 'VMG', which basically means the return of a value stock/portfolio minus the return of a growth stock/portfolio to define the value premium. In this thesis, the multiples are not based on the fundaments of the company divided by the market value. Therefore, the actual notation should be LMH. Due to the confusing effect of HML, the term VMG will be used in this thesis instead.

1.3 PERSPECTIVE

This thesis is written for two different audiences. On the one hand, the investor since these individuals and companies are interested in the performances of portfolios containing value stocks and portfolios containing growth stocks (Chan & Lakonishok, 2004). Furthermore, studies of value and growth stocks provide investors, as Chan & Lakonishok (2004) acknowledge, the instruments in order to develop style-specific benchmarks to scrutinize and appraise the performances of both value and growth stocks more effectively. On the other hand, the curiosity of academic scholars would also be triggered since this study focuses entirely on the effects of the financial crisis on value and growth stocks, which, as discussed in the previous section, is something not specifically discussed and controlled for by previous scholars and studies.

1.4 THESIS STRUCTURE

The background, research questions and perspective of this thesis are discussed. To make a well-ordered elaboration on this, my thesis is structured as follows:

1. Literature review

The literature review starts with discussing the classification of stocks and the definition of value and growth stocks. Additionally, I will discuss why, according to theory, (value and growth) stocks are classified and how. Moreover, the performance of value and growth stocks in different settings will be deliberated. The performance is reviewed in the following settings; global, domestic countries and emerging markets to identify whether value and growth stocks perform differently. An additional setting that will be discoursed is the performance within bull- and bear-markets since I want to know whether there are dissimilarities to be discovered that could be useful in my research. Finally, the reasons behind the value premium, which describes the difference in return between value and growth stocks, will be deliberated. In science there exist different theories for a certain phenomenon. Therefore, the alteration in return on value and growth stocks (value premium) will be conferred from different viewpoints.

2. Hypothesis development

From theory, different arguments are given for the existence of a difference in return, risk, and total performance between value and growth stocks. Additionally, there are also some contradictions discovered between scholars on the classification of value and growth stocks by means of price-multiples and the performance between these multiples. However, it is unclear how these arguments hold during times of crises and recessions. To study these subjects during the financial crisis of 2007-2010, certain hypotheses are developed.

3. Research Design

This chapter will describe the research design and methodology in order to test the hypotheses. The separation of value and growth stocks, the construction of portfolios, and the calculation of portfolio return and statistical testing of these portfolios will be discussed.

4. Empirical results and Discussion

This chapter will discuss the most important findings of the study on value and growth stocks during the latest financial crisis. Additionally, a link will be created towards previous studies and theories in order to verify whether arguments still holds strong during the latest financial crisis.

5. Conclusions and Implications

The final chapter of this thesis describes the most important findings of this thesis. It also provides answers to questions raised in the introduction section as well as the acceptance or rejection of the hypotheses. Additionally, the implications for future research as well as the limitations of this study will be discussed.

Chapter 2

LITERATURE REVIEW

"The critical investment factor is determining the intrinsic value of a business and paying a fair or bargain price"

Warren Buffett – Investor – United States

2.1 INTRODUCTION

This chapter describes and outlines value and growth stocks, which will give fundaments and sustenance for the rest of this thesis. This introduction will provide an understanding to the logic behind the literature review. In section 2.2, the classification of stocks in financial markets will be reviewed. Before reviewing what value and growth stocks actually are and how they perform, it is important to have an understanding why investors classify securities anyway. In section 2.3, giving understanding towards value and growth stocks is central. It is important to have an understanding what value and growth stocks are, what mechanisms are used to classify stocks as either value or growth, and whether stocks remain value or growth stocks for longer or shorter periods of time. In section 2.4, the performance of value and growth stocks in various settings will be reviewed. This section begins with reviewing the performance of value and growth stocks in international markets. After that, national markets will be discussed, both in developed and emerging markets. Additionally, the performance of value and growth stocks during bull- and bear-markets will be reviewed as well. Finally, the performance of these types of stocks will be discussed in association with risk. This section is important since investors both examine total return and the return in association with risk or per unit of risk. In section 2.5, the theories behind the outperformance or the existence of the value premium will be reviewed since it is essential to have an understanding on the rational and behavioral theories regarding the reasons of the outperformance of one over another.

2.2 CLASSIFICATION OF STOCKS

In general, people consciously or unconsciously make classifications, which gives allowance to categorize similar entities in order to provide better understanding (Barberis & Shleifer, 2003). For example, economic systems are classified according to similar structures of institutions, organizations, and relations, such as economic inputs/outputs, as well as the classes of ideologies by which economic issues are assigned to, such as crises, scarcity, and inflation. The principle of classification also exists in the world of investing, in which investors pursue specific strategies in order to create increasable and sustainable returns (Graham & Dodd, 1934; Barberis & Shleifer, 2003; Black & McMillian, 2004). The principle of classification in the world of investment is defined as *style investing*[7]. The preference of pursuing a specific style depends, as Bourguignon & De Jong (2003) argue, upon personal- or organizational characteristics as well as the economic behavior. The motivation of investors to get involved in style investing is explained by Barberis & Shleifer (2003). First, it gives a simplification of the decision-making procedure in order to process data more efficiently. Barberis & Shleifer (2003) give the example that a portfolio of ten stocks belonging to a certain style can be more efficiently tracked than 100 non-identical and independent stocks. Second, forming specific classes of individual securities comforts towards the appraisal and examination of the performance more cautiously. Third, it proliferates and upsurges the management and control of the overall risk for investors more efficiently (Barberis & Shleifer, 2003).

Bauman & Miller (1997) contend that selecting an investment style is a preliminary necessity in the decision making practices of investment. According to Barberis & Shleifer (2003), the style investing approach share common characteristics. These characteristics can be based on legal (e.g., government securities), markets (e.g., large-cap securities), or fundaments (e.g., commodities). Some style approaches have a permanent status (e.g., U.S. treasury securities) while others are of short duration (e.g., rail-road securities) (Barberis & Shleifer, 2003). In the stock market, various style investing approaches exists. The list of style investing approaches is long since it only takes two opposing entities sharing same characteristics to create a style approach. However, there are some popular styles to be recognized in the stock markets that each has its proponents and opponents. Popular style categories include large-cap versus small-cap stocks and technology versus nontechnology stocks. Typically, investors and analysts have different believes which style provides the highest return on the short- and long-term. However, one of the most popular and long-lasting styles in the financial markets, in which investors and analysts does not seem to agree upon, are the investments made in either value or growth stocks (Bourguignon & De Jong, 2003). The assumption can be made that the reason behind the popularity of these stock styles lies in the fact that value and growth function as an umbrella for other style investing approach. The style categories in large-cap versus small-cap stocks and technology versus nontechnology can all be classified as either

[7] Style investing is categorizing securities that have similarities regarding characteristics and performances (Barberis & Shleifer, 2003).

value or growth. This means, for example, that large-cap stocks can also be classified in value and growth stocks. But what are value and growth stocks, why are they important and how can they be classified? These questions will be discussed in the next section.

2.3 VALUE & GROWTH STOCKS DEMYSTIFIED

2.3.1 VALUE & GROWTH STOCKS DEFINED

While various investment style approaches exists within the financial market, Bourguignon & De Jong (2003) and Bird & Casavvechia (2007) label the value and growth investing philosophies as the utmost unanimously trailed schools in the stock market. In these value and growth investing philosophies, a classification arises. Stocks in these philosophies can be classified as either value or growth stocks. Bourguignon & De Jong (2003) and Bird & Casavvechia (2007) contend that value and growth stocks are important due to the influences they have on investors. Bourguignon & De Jong (2003) argue that investment managers always have a preference towards one of these classes of stocks. This propensity is so extreme that genuine style indexes were devised to satisfy investors. However, value and growth stocks are, according to Chan & Lakonishok (2004), each other's opponents. One of the first scholars acknowledging this opposition was Graham & Dodd (1934). The definitions raised by Graham & Dodd (1934) were prominent that the definitions behind value and growth stocks haven't changed since.

2.3.1.1 Value Stocks

Value stocks are, according to Graham & Dodd (1934), stocks whose price-to-earnings, price-to-book, and/or price-to-cash flow is/are low relative to the market average. This definition is shared by multiple scholars (see e.g.,Capaul et al, 1993; Lakonishok et al, 1994; Fama & French, 1998; Leladakis & Davidson, 2001; Bourguignon & De Jong, 2003; Chan & Lakonishok, 2004; Cahine, 2008; Athanassakos, 2009). Graham & Dodd (1934) document that this exaltation is due to poor performance in the past in which the expectation arises that this performance will continue in the future. However, poor performance does not have to refer in particular towards default. It could also be a signal that the company reached its maturity in which the company's growth becomes stable and does not give any indication anymore of excessive growth that investors expect or do not have (profitable) investment opportunities within a particular year (as compared to competitors). These value stocks are, as Hillier et al (2010) defines it, 'out of favour' by investors. This is also acknowledged by De Bondt & Thaler (1985) and Athanassakos (2009). While Graham & Dodd (1934) argue that stocks become value stocks due to poor performance or maturity and stability, Fama & French (1998) assume that 'value' companies are in distress and are therefore trading at low prices. The assumption of distress was also acknowledged by Chen & Zhang (1998) and Athanassakos (2009). These scholars suggest that, besides distress, other factors such as high financial leverages, overcapacity, and uncertainty in future earnings make them 'out of favor' by a large group of investors.

2.3.1.2 Growth stocks

Growth stocks are generally defined as those stocks that are trading at high prices relative towards a stocks' fundaments (e.g. earnings, book value, cash flow and dividends) (see e.g., Graham & Dodd, 1934; Capaul et al, 1993; Bauman et al 1998; Fama & French, 1998; Leladakis & Davidson, 2001; Bourguignon & De Jong, 2003; Yen et al, 2004). Growth stocks are characterized as those stocks whose earnings expectation and growth rates are substantially higher than the market averages and continuous to raise further (Babson, 1951; La Porta, et al, 1997; Leladakis & Davidson, 2001; Bourguignon & De Jong, 2003). These stocks, in which investors believe in a continuous rise, are referred to as growth (also called glamour) stocks (La Porta, et al, 1997). Recently, Beneda (2002) defines growth stocks as those stocks from which companies have future capital appreciation[8] that are higher than market averages. Investors pursuing this type of stock are defined as *growth investors.* These growth stocks have the tendency to be extremely popular in the market due to the (potential) creation of innovative products and grasping market opportunities. Investors expect that returns of growth stocks can be obtained when the market value of those companies rise further (Babson, 1951; Bourguignon & De Jong, 2003). According to Bourguignon & De Jong (2003), growth investors are selecting companies for the long-term based on the expectation that companies are likely to change structurally while value investors are selecting companies for the short-term in order to benefit from possible price momentums. This assumption contradicts the arguments as proposed by Graham & Dodd (1934).

While various scholars define value (growth) stocks as stocks that contains low (high) price-multiples, Bourguignon & De Jong (2003) contend towards an ambiguity in the value

[8] Peterson (2007) defines capital appreciation as a value increase of a security, which is based on the increase in price within the market. Pinto et al (2010) argue that invested capital in, for example, a stock has increased in value in which the ration of capital appreciation within a stock comprises the total market value above the value of the investment. O'Shaugnessy (2005) argues that capital appreciation is one part of the investment return whereas dividend is the other part.

and growth stock definition. These scholars contend that investors investing in growth stocks have no expectance of short-term gains. These investors are aiming towards value creation in some future point in time by investing in companies that have aspiring market- or investment opportunities targeted at acquiring (a larger) market share at the disbursement of revenue and, in association, diminishing the (current) return on equity. Furthermore, Capaul et al (1993) argue that growth in earnings and/or market share does not create added value unless the expectation arises that this growth result from aberrantly gainful investment opportunities. For investors to select value and growth stocks in this kind of manner, Pinto et al (2010) refers towards the usage of a valuation model based on the value of a company's assets plus the (net) present value of its growth opportunities (PVGO[9])[10]. However, the low outcome on earnings per share divided by the rate of return is not particularly a characteristic in growth stocks but could also occur within value stocks. This occurs when the rate of return is high. Moreover, this concept leans on the work of Modigliani and Miller from 1961. This notion basically means that growth in and of itself is only value-creating if the company's future project generates positive NPV's (Brealey et al, 2007; Bodie et al, 2009), which refers to the classification of growth stocks. When these growth opportunities are nonexistent or the outcome is equal to zero, the value of a firm's stock is equal by the dividends paid on earnings divided by its cost of equity (Pinto et al, 2010), which refers to the classification of value stocks. The importance of the PVGO lies within EPS and r, which refers to the earnings per share and the rate of return, since this quotation refers to whether the price of a stock becomes higher or lower after investing in growth opportunities. It is logical to assume that defining and classifying stocks as either value or growth by taking into account the PV of growth opportunities. However, when the probability arises that the range concerning the rate of return is small, the outcome of P_0in association with PVGO is virtually equal to the outcomes obtained from the price-multiple(s). Nevertheless, the majority of scholars defines and classifies stocks as either value or growth by using price-multiples instead of the inclusion of PVGO. By meaning of scholars it is usual and considered to make sense to use price-multiples as a classification tool to separate stocks into value and growth.

[9] According to Pinto et al (2010), the net present value of growth opportunities, or simply 'PVGO' is determined by calculating the present value of the future cash flows that a company expects to generate from a particular investment opportunity, such as an acquisition, a new product launch or entering new markets.

[10] The formula of this explanation is $P = \frac{EPS}{r} + PVGO$

2.3.2 CLASSIFYING STOCKS AS VALUE OR GROWTH

The question that arises from the definition of value and growth stocks is how one can define whether a stock is classified as either value or growth. Various scholars acknowledge that value and growth stocks drive on different scales of financial performances (multiples) to make this classification (see e.g., Fama & French, 1993; Barberis & Shleifer, 2003; Bourguignon & De Jong, 2003; Bird & Casavvechia, 2007). The typical characteristic of value (growth) stocks is that market prices are relatively low (high) compared towards the fundamental value of a company (Capaul et al, 1993; Bauman et al 1998; Fama & French, 1998, 2007; Yen et al, 2004). The motive behind the usage of multiples to classify stocks is, according to Capaul et al (1993), not extraordinary since a company's stock price represents valuations made by investors regarding how a company will perform in the future. This is also acknowledged by Penman (1996), Leledakis & Davidson (2001), O'Shaughnessy (2005) and Davis & Lee (2008).

While various multiples exist that could be used to classify stocks as either value or growth, three multiples are most frequently used by scholars. These multiples are price-to-earnings (P/E), price-to-book (P/B), and price-to-cash flow (P/C) or equivalents of these multiples, such as market-to-book, book-to-market, earnings-to-price, and cash flow-to-price. According to Fama & French (1998), these multiples are commonly used since they produce stable results in returns. These scholars also used dividend-to-price (D/P). However, D/P did not produce sufficient consistency in relation towards return as compared to the other multiples. This was also acknowledged by Lakonishok et al (1994), Bauman et al (1998) and Davis & Lee (2008). Conversely, Jeong et al (2009) document that D/P provided sufficient consistency in relation towards returns. But this was only for one of the three sample periods. These scholars argue that in this sample period, more companies paid dividends than in the sample periods before and after, which indicates the reasoning behind the consistency in D/P in Jeong et al's study. However, in general, Fama & French (2007) and Davis & Lee (2008) argue that using D/P as a classification multiple does not only produces insufficient consistency in return, it also limits the number of stocks that can be added to a portfolio since the amount of companies paying dividend is significantly reduced compared to, for example, ten years ago. This can also be assumed in times of crises and recession since it is more likely that in these time periods, companies pay lesser or no dividend in order to strengthen capital positions to cover potential losses.

Additionally, Bourguignon & De Jong (2003) contend that multiples are used for the following reasons. Stocks having extraordinary growth prospective, earnings are relatively low (compared to the expected forthcoming stages). For this reason the multiple, for example, P/E, at that particular moment is higher. The same counts, as Bourguignon & De Jong (2003) argue, for stocks that have low multiples. It is often assumed and expected that low P/E stocks will rebound and become value-added (De Bondt & Thaler, 1985). This argument assumes that investors tend to give preference towards either value or growth stocks (Bourguignon & De Jong, 2003). Cahine (2008) argues that using only one multiple, to classify stocks, would not generate appropriate results. Classifying stocks using various multiples would give more applicable results since multiples are, when comparing various countries, analyzed from different perspectives (Cahine, 2008). This was also acknowledged by Black & Fraser (2004).

Various scholars assume that multiples are determined for a particular time-frame in which negative and positive outliers are suggested to be neglected (Fama & French, 2007; Leladakis & Davidson, 2001; Cahine, 2008). Huang & Yang (2008) argue that negative multiples causes noise to the sample. Leladakis & Davidson (2001) argue that negative and extremely positive multiples are entirely meaningless since the suspicion arises that it does not capture the real value within multiples and is just demarcated as a one-time event. Cahine (2008) contends that a (positive) outlier can be noticed when a company has a multiple that exists three standard deviations from the mean. It can be assumed that numerous multiples can be used to classify stocks as value or growth. The reason behind the importance and its constitution will be discussed in the following subsections.

2.3.2.1 Price-to-earnings

The price-to-earnings ratio is a multiple that compares the company's stock price with the company's earnings per share[11]. The P/E ratio is important since the comparison of earnings and stock price gives, according to Bragg (2007), universal representation of investor's perceptions towards the eminence of a firm's earnings. Lower (higher) rates in P/E give the perception that the expectation on future earnings will also be lower (higher) (Bodie et al, 2009). Consequently, stocks with a low P/E ratio are characterized as value stocks and stocks with a high P/E ratio are characterized as growth stocks. According to O'Shaughnessy (2005) and Pinto et al (2010), a lower indication on the P/E ratio gives investors the intention that

[11] Fama & French (2007) defines earnings as the earnings per share, which is the earnings divided by the weighted average number of shares outstanding.

they are paying less for earnings and could therefore be a sign how expensive or cheap a firm's stock is compared to other stocks. A stock with a high P/E may indicate that investors believe and expect that the company's future earnings are decent and acceptable (O'Shaugnessy, 2005; Pinto et al, 2010). Athanassakos (2009) found that value portfolios classified on P/E have the tendency to perform superior and more consistently regarding the identification of value stocks and derive more consistent value premiums than value portfolios classified on P/B.

2.3.2.2 Price-to-book

While P/E was the most appropriate measure to separate stocks, the P/B became popular after a study of Fama & French in the early 1990's (Penman, 1996). While Graham & Dodd (1934) explained this multiple as a measure of expected return on equity, Fama & French have used it as a multiple to separate value and growth stocks. The price-to-book ratio is often used as an equivalent towards the market-to-book ratio and book-to-market ratio (see e.g., Fama & French, 1998; Leladakis & Davidson, 2001). This P/B ratio is important since this multiple is assessed by investors to analyze whether the market price of a stock is in excess/lower than a company's book value[12] (Bragg, 2007). A higher (lower) market price of a stock gives an indication that investors have assigned additional (no) value to a company (Bodie et al, 2009). The stocks that have a low P/B ratio are characterized as value stocks and stocks that have a high P/B are characterized as growth stocks. A low P/B ratio may indicate that the company experiences problems regarding the fundamentals of the company whereas a high P/B ratio may indicate that investors have high expectations regarding the (future) performance of the company (Bragg, 2007; Pinto et al, 2010). Fama & French (1998; 2007) document that value portfolios classified on book-to-market (as an equivalent to P/B) provides significantly higher and more consistent returns than portfolios classified on other multiples. This result was also found by Bauman et al (1998). These scholars also argue that P/B is one of the most predominant explanatory variables towards cross-sectional returns as was performed in the United States. Davis & Lee (2008) entirely devoted their research of value and growth stocks on the performance of multiples. These scholars contend that the best choice of classifying portfolios of value and growth stocks is by the usage of B/P (as an equivalent of P/B) compared to E/P and C/P (as equivalents to P/E and P/C).

[12] Yen et al (2004) defines book value as total assets minus liabilities whereas Chan & Lakonishok (2004) and Fama & French (2007) define book value as total assets minus intangible assets and liabilities.

2.3.2.3 Price-to-cash flow

Considering the amount of cash flow[13] a particular company generates is another multiple that investors employ to value the performance of a firm. According to Bauman et al (1998), P/C is not much used in previous studies to classify value and growth stocks. Chan & Lakonishok (2004) argue that the P/C has become extremely popular to classify value and growth stocks since it views the company's performance from a different point of cash in- and outflows as compared to earnings. The price-to-cash flow ratio is a multiple that measures the prospects of the market regarding a company's future health from a financial point of view (Bragg, 2007). Therefore, stocks with a low P/C ratio are characterized as value stocks and stocks with a high P/C ratio are characterized as growth stocks. The P/C ratio is considered as an additional multiple of the P/E since both ratios give indications regarding firms' current and future performances (Yen et al, 2004). This ratio is important since this multiple is used in the financial market to define a particular stock price that a company is expected to attain when it generates a certain cash flow level (Bodie et al, 2009).

2.3.2.4 The alternation of value & growth stocks

When a stock is classified as either value or growth does this suggest that value stocks can never become growth stocks and vice versa? According to O'Shaughnessy (2005) and Fama & French (2007), growth companies become value companies when aggressive competitors seek and accomplish to corrode the extraordinary profitability and growth rates, which results in a decline of multiples, hence, growth companies become value companies. On the other hand, value companies become growth companies when value companies tend and accomplish to increase profitability through product- and market innovations and by restructuring organizational costs (O'Shaughnessy, 2005; Fama & French, 2007). When those value companies accomplish to create innovative products while declining the costs, its stock price and multiple(s) should rise (Fama & French, 2007). Moreover, these arguments are in association with the market average.

However, Davis & Lee (2008) found that, on average, there exists a probability of approximately 50 percent that stocks marked as value (growth) in a year are likely to be value (growth) stocks in the following year. Furthermore, Bourguignon & De Jong (2003) argue that the general rule on which value and growth stocks are classified is unambiguous. These

[13] Yen et al (2004) defines cash flow as earnings plus depreciation whereas Bird & Casavecchia (2007) defines cash flow as net cash from operations (operating cash flow).

scholars stress that growth stocks should be classified on five-year average PE's since growth investors are to be long-term investors. By long-term, Bourguignon & De Jong, (2003) contend that growth investors need to expect longer periods of time for a growth stock to generate returns. However, this argument generalize that investors are placing monies in financial markets for multiple years. These scholars do not assume that some growth investors are in the market to benefit from price momentums lasting shorter than multiple years (e.g., Apple, Inc. (AAPL:US) generated extremely positive returns in shorter periods of time).

2.4 THE PERFORMANCES OF VALUE & GROWTH STOCKS

In the first section of the literature review, the fundaments of value and growth stocks were discussed thoroughly. But how do value and growth stocks perform to each other? Are they very much alike or are they totally different. Are there differences to be discovered regarding the performances nationally and internationally, in developed and emerging markets, and even in bull- and bear-markets? This section reviews these questions.

2.4.1 VALUE PREMIUM DEFINED

Before reviewing the performances of value and growth stocks assessed in various settings, some theoretical background needs to be explained first. When value stocks outperform growth stocks within a particular setting, it is said that a (positive) value premium, or value-growth spread as Capaul et al (1993) defines it, exists. This 'value-effect' was first acknowledged by Graham & Dodd (1934) who scrutinized value and growth stocks during the great depression. The value premium refers to the (positive) difference between the returns obtained from portfolios composed of value stocks and portfolios composed of growth stocks (Capaul et al, 1993; Bauman & Miller, 1997; Fama & French, 1998; Bauman et al, 1998; Yen et al, 2004; Cahine, 2008). This premium is important since the outcome refers to whether investors are more contented in purchasing value stocks or growth stocks (Capaul et al, 1993; Fama & French, 2007).

The higher the value premium, the more likely it is that investors give preference to value stocks due to the providence of higher returns compared to growth stocks (Bird & Casavvechia, 2007). When this figure lies around zero, it would indicate the indifference on the purchase of value or growth stocks (Capaul et al, 1993; Bourguignon & De Jong, 2003). When this figure lies below zero it would indicate, as Brown et al (2008) acknowledge, the existence of a value discount, which means that growth stocks provide higher returns than value stocks. When the value premium is significantly and substantially larger than the market return (e.g., two times the market return) than a potential bubble is shaped (Fama & French, 2007). It is logical to assume that beta is, to some degree, responsible for the difference in returns between value and growth stocks. For a beta premium to exist, a higher degree of beta premiums in bull-markets and a lower degree of beta premiums in bear-markets for value stocks is desirable. However, most scholars study the value premium only by the difference in returns (by means of a t-test). Moreover, Petkova & Zhang (2005) also studied whether there is a beta premium observed within value stocks. These scholars found that the covariance between the beta- and value premium is too small in order to explain the magnitude of the difference in return between value and growth stocks. The value premiums discussed in the next section will be for large-cap stocks and on average annualized bases. The multiples used by different scholars and the countries studied can be found in appendix 1.

2.4.2 The Performance of Value & Growth Stocks in Different Settings

2.4.2.1 International Markets

Prior empirical studies suggest that value stocks (by the use of one or many multiples) outperform growth stocks. Fama & French (1998) demonstrate that, on average, value stocks outperformed growth stocks in 12 of 13 markets, providing evidence towards the existence of a value premium (5.56 to 7.65 percent)[14] (See figure 1). Capaul et al (1993) documents that global value stocks tend to outperform global growth stocks in Japan, U.S. and Europe. This was also acknowledged by Harris & Marston (1994) when examining the influence of beta on returns. Interestingly, in the study of Fama & French 75 percent of the value premium was generated by the U.S. and Japan while in the study of Capaul et al (1993), the U.S. contributed the least[15]. However, Capaul et al (1993) did only focus on four markets, which could explain this difference[16]. Moreover, the difference could also be assignable towards the amount of multiples used. While Capaul et al (1993) used only one multiple, Fama & French (1998) used various multiples to clarify returns. Black & Fraser (2004) argue that the standard deviations, as a measure of volatility, are significantly lower in the United States than compared to other countries such as Japan, Norway, and Spain.

---

[14] The study of Fama & French (1998) was performed in individual countries for international portfolios from 1975 to 1995.

[15] In the study of Capaul et al (1993), U.S. generated a value premium of 1.35 percent, which was considered extremely low.

[16] The research of Capaul et al (1993) was based on the S&P/Barra Value and growth indices and the UBS International Value and growth indices.

Although a value premium was not observed within each of the countries being analyzed, Bauman et al (1998) document comparable results when studying 21 countries between 1985 and 1996. However, the value premiums were not as high as compared to previous studies[17]. A more recent study, performed by Cahine (2008), also shows that value stocks are likely to generate higher returns than growth stocks in the Euro-markets. Remarkably, undervalued value stocks, which are value stocks with high growth rates in earnings, provided higher value premiums than normal value stocks (.618 over .324 percent). These studies suggest that value stocks, including undervalued value stocks, have the tendency to outperform growth stocks in international markets. According to Capaul et al (1993), investors are likely to obtain higher total returns when investing in international portfolios as opposed to investing in national portfolios.

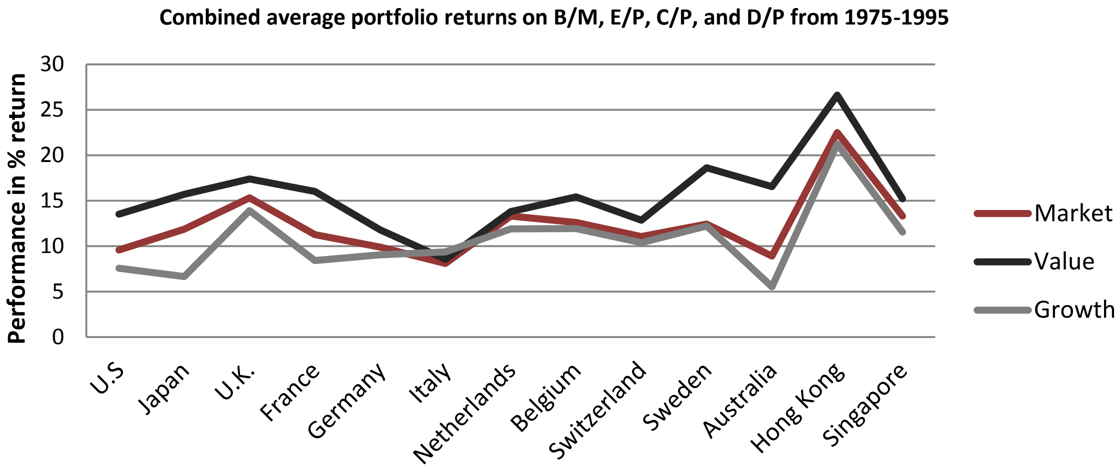


Figure I | Combined average portfolio returns per country | Source: Fama & French (1998)

Could these results be an indication of international diversification[18]? Meaning that idiosyncratic risk of stocks in international portfolios is diversified away as stocks of different countries are added to a portfolio?

2.4.2.2 Developed Domestic Markets

One of the first post-war studies analyzing value and growth stocks was performed by Basu (1977). This study shows that between 1956 and 1971; U.S. stocks with low P/E tend to offer investors 7.0 percent higher returns than stocks with high PE. Similar results were found by De Bondt & Thaler (1985). Consistent with prior studies, Bauman & Miller (1997) find

[17] Bauman et al (1998) only documented a value premium from 430 basis points (bps), on portfolios classified by P/C portfolios, to 570 bps on portfolios classified by P/B.

[18] Hillier et al (2010) defines diversification as the process of flatten unsystematic risk in a portfolio to benefit from the positive returns of stock and the neutralization of negative returns on other stocks.

evidence that value stocks are more likely to generate higher returns than value stocks. Recently, Beneda (2002) demonstrate that, on average, the long-term holding period returns, up to 18 years, on growth stocks are likely to produce higher returns that value stocks in the U.S.. Only in 1987 the results were not declared significant (Beneda, 2002). Nonetheless, it is likely to assume that after multiple years of portfolio formation, value stocks outperform growth stocks. Chan & Lakonishok (2004) also contend that value stocks are likely to provide investors higher returns than growth stocks over a wide range of historical periods and market conditions (see figure 2). Returns from the Russell 1000 Value and growth Indexes were 13.93 and 11.84 percent, respectively. The usage of the Russell indexes could explain the difference in results obtained from other studies. Leladakis & Davidson (2001) documented equal results when analyzing the U.K market.

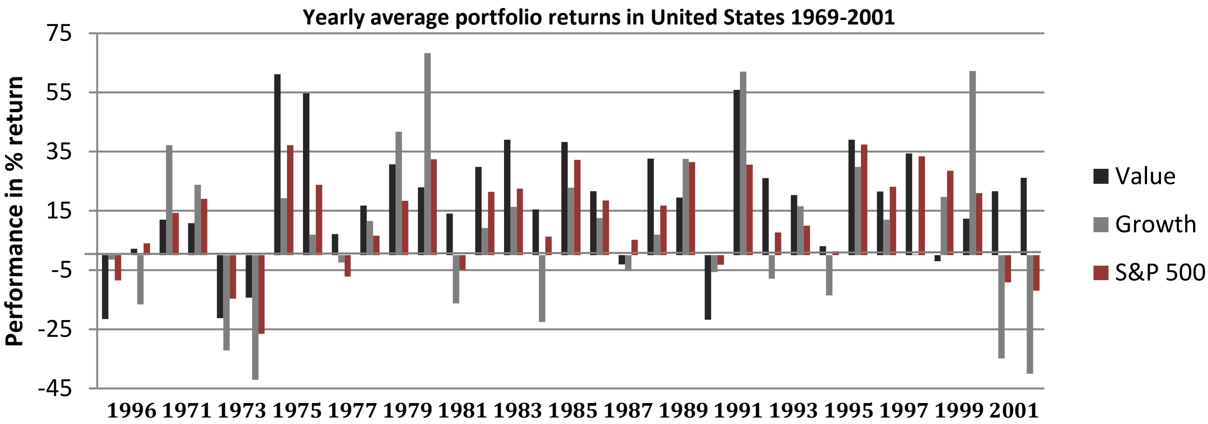


Figure 2 | Yearly Average Portfolio Returns in the U.S. | Source: Chan & Lakonishok (2004)

Athanassakos (2009) observed results equal to the outcomes obtained by previous studies when analyzing returns on value and growth stocks in the Canadian market. However, based on this result, Athanassakos (2009) states the following; “Value investing works and can help investors beat benchmarks and achieve superior long term performance” (p.120). This statement suggests that Athanassakos (2009) generalize and extrapolate the outcome to other markets and future perspectives. This result does not give any indication that value stocks will continue to beat markets or growth stocks nor does it give any indication that value stocks are equal to higher long-term performances in the future. Jeong et al (2009) contend that a value premium exists in the ‘Dogs of the Dow[19]’ during 1983-1995, but inexistence during 1995

[19] Peterson (2007) and Jeong et al (2009) define the Dogs of the Dow as an investment strategy, which indicates the purchasing of the ten stocks with the highest dividend yield on the Dow Jones at the beginning of each year. These stocks are also defined as value stocks.

and 2007. These scholars also argue that value stocks have the tendency to provide higher returns than growth stocks in the sample period studied.

Referring to the question in the previous subsection, international portfolios seem to be the result of diversification. Fama & French (1998) argue that value premiums are, in economic terms, relatively high for value stocks in domestic portfolios but, compared to their standard errors, they are not significantly larger. According to Fama & French (1998), domestic returns are assumed to provide standard deviations around 30 percent annually, which is twice as large as compared to global portfolios. These scholars admit that international portfolios are more diversified than domestic portfolios. It can be assumed that idiosyncratic risk as the main instigator is diversified away in global portfolios since standard deviations are significantly lower. This diversification effect was also acknowledged by Capaul et al (1993).

2.4.2.3 Emerging Markets

Fama & French (1998) also analyzed possible value premiums in emerging markets. From the 16 emerging markets observed (see figure 3), Fama & French (1998) finds evidence of a value premium that was remarkably high (14.13 percent) compared to developed international markets. Chen & Zhang (1998) documented similar results when emerging markets in Asia were studied. This result could be assignable to volatility [20] since emerging markets tend to be more volatile than developed markets (Chen & Zhang, 1998; Fama & French, 1998).

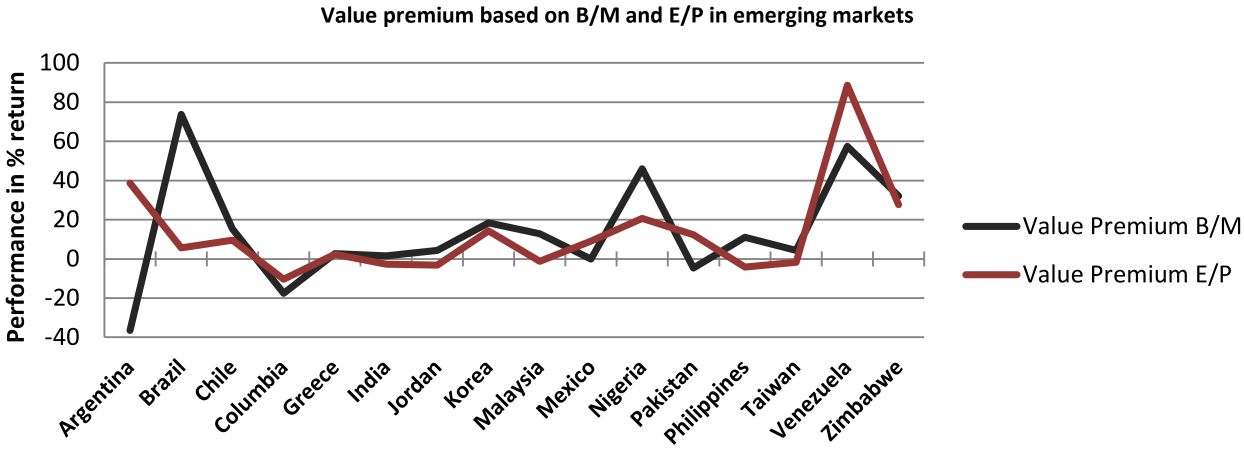


Figure 3 | Value Premiums in Emerging Markets | Source: Fama & French (1998)

However, while value premiums were significantly high, the correlations on returns were small (Fama & French, 1998) to negative (Chen & Zhang, 1998). It can be assumed that developed markets are, as Black & McMillian (2004) contend, interlinked (e.g., stocks and

[20] Peterson (2007) defines volatility as the tendency of a security's price to generate large moves. One of the mostly recognized volatility instruments is beta.

exchange rates) and are therefore more likely to be (higher) correlated compared to emerging markets. A more recent study performed by Huang & Yang (2008) also observed stable positive value premiums in the Chine stock market from 1998 to 2008. However, the value premiums declined when the holding period extended from 13 percent in year one to 7 percent in year 5. However, the average value premium observed by Huang & Yang (2008) over the 5 year holding period was 11 percent. Another recent study, performed by Gonenc & Karan (2003), did not observe value premiums in Turkey. While growth stocks had the tendency to outperform value stocks by .38 to 4.87 percent return, the performance was not significant.

A study focusing on the emerging market of Singapore was performed by Yen et al (2004). Although value stocks have the tendency to outperform growth stocks in Singapore between 1975 and 1997, the value premium was only significant for the first two years[21] (Yen et al, 2004). Chen & Zhang (1998) contend that high degrees of market growth could be an indicator of lacking value premiums in emerging markets. The higher the market growth, the smaller the value premium will be. Huang & Yang (2008) argue that the Chinese market comprises, compared to the U.S. market, an enormous segment of individual investors. These individual investors causes that the speculation in these markets are higher than in markets with large segments of institutional investors. Additionally, in order to research value and growth stocks, Gonenc & Karan (2003) argue that the stock exchange of Turkey functioned as a laboratory. Another assumption that can be made regarding the inexistence of a value premium results from the impossibility to isolate stock markets from external influences. Brown et al (2008) examined the Asian emerging markets and documented the existence of a value premium in Hong Kong (0.72 percent), Korea (0.42 percent), and Singapore (0.42 percent) but a value discount in Taiwan of 1.26 percent.

2.4.2.4 Bull- and Bear-markets

According to Reinhart & Rogoff (2008), crises and subsequent recessions are usually the effect of credit booms and pricing bubbles. This is a logical argument since latest crises were all resulting from credit booms and bubbles (e.g., internet bubble in 2001, housing price bubble in 2007, CDS- [22]boom in 2008). In times of crisis, stocks tend to decline 55 percent on

[21] The value premium observed was .48 to .42, respectively (Yen et al, 2004).

[22] CDS is an abbreviation for *Credit Default Swaps*, which is, as Hull (2011) defines it, a financial instrument that offers the holder to exercise its right to sell a financial product, usually a bond, for its par value when the issuer defaults.

average (Reinhart & Rogoff, 2008). This was also acknowledged by Lakonishok et al (1994). While most studies do not discuss results obtained in times of bubbles, crises and recessions in which stocks tend to decline, Lakonishok et al (1994) demonstrate that value stocks are likely to generate higher returns than growth stocks in bear-markets[23]. In the 25 worst months during the study, positive value premiums were observed varying from .1.10 to 1.80 percent. Huang & Yang (2008) observed similar results. Remarkably, they also found that value premiums rises quicker in bull-markets and falls slower in bear-markets. Logically, one would assume that the value premium rises and falls proportionally between different market conditions. Huang & Yang (2008) argue that this can be assignable to the sensitivity of investors towards risk alterations within the Chinese market. While Huang & Yang does not give a specific explanation of this finding, one can assume that investors are more cautious to switch between equities in bear-markets than in bull-markets. Athanassakos (2009) documents some comparison of results obtained in bull- and bear-markets[24]. This scholar demonstrates that the value premium, based on P/E, within bull- and bear-markets was 5.79 to 8.51 percent, respectively. Remarkably, the value premiums rose to 28.60 percent during recession and stagnated on 3.98 during recoveries. When stocks were classified on P/B, results were equally alike. These results suggest that, while in general stocks decline during crises and recessions, value stocks are expected to produce higher returns than growth stocks and, in some recessions, the market. However, Brown et al (2008) document that the value premium during the recovery of the Asian financial crisis becomes larger. These scholars contend that the value premium became 0.93 percent to 1.56 percent larger in the Asian stock market. Chan & Lakonishok (2004) found that value stocks were agonized less relentlessly compared to growth stocks when the market or economy performed poorly.

2.4.2.4.1 Market volatility of Value & Growth stocks

How is it possible that even in crisis and recession, as discussed in the previous section, that value stocks are more likely to generate higher returns than growth stocks? It is rational to believe that companies with distress characteristics should perform less superior to the market and growth stocks since during crisis and recession, investors are more likely to be risk-averse and would possible not invest in companies that face some sort of distress or default position.

[23] According to the National Bureau of Economic Research, four recessions occurred. These recessions occurred during 1969-1970, 1973-1975, 1980-1980, and 1981-1982 (Lakonishok et al, 1994).

[24] Peterson (2007) defines a bull (bear) market as an economic state that is characterized by substantially prolonged periods of increases (decreases) in market prices nationally and globally.

Or are value stocks less sensitive to the market, which could explain why value stocks have the tendency to generate higher returns?

The sensitivity (volatility) of a company to the market is often measured by beta[25]. Individual securities with high betas are displaying more volatility than the market in which individual securities with low betas are rising or falling more unhurriedly. (Bodie et al, 2009; Hillier et al, 2010). De Bondt & Thaler (1985), argue that the betas for growth portfolios are, on average, higher than those betas for value portfolios. According to La Porta et al (1997) and Fabozzi (2004), this could be assignable towards higher volatility risk within growth stocks as opposed to value stocks. However, the assumption arises that these scholars refer to positive shocks and bull-markets. La Porta et al (1997) and Fabozzi (2004) assume that the market is separated between pessimism and optimism. When the risk premium alternates between periods of optimism and pessimism fluctuates, value stocks have the tendency to be more volatile than growth stocks and therefore have higher betas. However, De Bondt & Thaler (1985) argue that betas of value stocks are, compared to growth stocks, relatively higher in bull-markets but lower in bear-markets. This was also acknowledged by Capaul et al (1993), Harris & Marston (1994), Rozeff & Zaman (1998), and Athanassakos (2009). Harris & Marston (1994) contend that lower betas anticipated that the return premium within value stocks is highest when the market drops.

Petkova & Zhang (2005) contend, by studying the relative risk of value and growth stocks, that time-varying risk moves in the correct course regarding the explanation of the value premium. These scholars argue that in bull-markets, value betas have a tendency to covary positively and growth betas have the tendency to covary negatively in relation with the excess return. These scholars also find evidence that in bear-markets, value betas are lower and growth betas are larger. This means that when the market return is negative, value stocks are less sensitive to market perils than growth stocks. This was also acknowledged by Lakonishok et al (1994). These scholars assume that “value stocks could be described as having higher up-market betas and lower down-market betas than glamour (growth) stocks with respect to economic conditions” (Lakonishok et al, 1994, p. 1569). However, Black & McMillian (2006) found the reverse. These scholars contend that after negative macro-economic shocks,

[25] O’Shaugnessy (2005, Hillier et al (2010) and Pinto et al (2010) defines beta as a sensitivity measure that gives the amount of change in stock return for each additional percentage change in the market return.

which results in a crisis or recession, value premiums bear higher volatility as a result of higher volatility recognized in value stocks. Due to most of these arguments, it can be explained why value stocks also documents higher returns than growth stocks. In bull-markets, value stocks tend to have higher betas than growth stocks whereas in bear-markets, the betas of value stocks are lower than betas of growth stocks. Concerning the financial crisis, these arguments could provide evidence that value stocks are less sensitive to the market and its perils and are therefore responding lesser towards crises and recessions than growth stocks.

2.4.3 THE ENACTMENT OF REWARD TO VARIABILITY WITHIN VALUE AND GROWTH STOCKS

The performances of value and growth stocks discussed in the previous sections covers the total return. The question remains whether value stocks still have the tendency to generate higher rewards per unit of risk than growth stocks. Risk is referred to as the systematic risk [26]within securities. Basu (1977), Sharpe et al (1999), and Collison et al (2008) argue that three of the most acceptable measures to use are the Sharpe ratio, Treynor measure, and Jensen's Alpha. Basu (1977) demonstrate, based on these measures, that value stock generates two to four percent higher rewards per unit of risk [27]than growth stocks. This was also acknowledged by Capaul et al (1993) and Harris & Marston (1994). According to Capaul et al (1993), value stocks have higher Sharpe ratios than both growth stocks and the market, which indicate, according to Yen et al (2004), that value stocks are more capable to generate higher returns for the amount of risk that a security or portfolio bears[28]. This was also acknowledged by Jeong et al (2009). These scholars document that the Sharpe ratios on value stocks were, on average, 31.3 percent higher than the Sharpe ratios on growth stocks. However, based on E/P, the Sharpe ratios were 19- to 59 percent higher compared to growth stocks, which suggest that growth stocks, classified by E/P, provide higher returns per unit of risk.

Although return to variability of value stocks were not superior over growth stocks in every market, Bauman et al (1998) argue that, on average, value stocks have the tendency to generate higher returns for the amount of bearing risk. On a risk-adjusted basis, growth

[26] Hillier et al (2010) and Peterson (2007) defines systematic risk as the risk inherent in the market, which is also known as market risk.

[27] Yen et al (2004) and Peterson (2007) defines risk-adjusted return as the notion that sophisticates return by calculating how much risk is associated in generating that return

[28] In the study of Capaul et al (1993), the Sharpe ratio averaged 0.4678 for value stocks and 0.2675 for growth stocks, and 0.3715 for the overall market.

portfolios generated higher returns temporarily in Switzerland and the Netherlands but not in the majority of cases, such as, Australia, Germany, France, Japan, and Hong Kong. Yen et al (2004) also suggest that value stocks have the tendency to generate higher risk-adjusted returns than growth stocks[29]. However, these returns were, as the value premium, only significant for the first two years. The risk-adjusted measures produced higher outcomes for value stocks than growth stocks on all multiples used. It can be assumed that the results discussed in this subsection indicates that value stocks provide higher returns for the amount of risk associated in stocks or portfolios. While the reason behind the return to variability or reward per unit of risk is not delicately explained within articles, it is likely to assume that the instigator lies within the securities' beta. The study of Fama & French (1998) implies that multiples containing prices have information regarding returns overlooked by the beta coefficients. As discussed in the previous section, value stocks are more likely to have lower betas in bear-markets as compared to its counterpart. It is therefore likely to assume that due to the argumentation that value stocks shows less sensitivity to the market it also shows higher outcomes regarding the returns per unit of risk calculated by different risk-adjusted measures.

2.5 REASONS BEHIND THE PERFORMANCES OF VALUE & GROWTH STOCKS

Various scholars, as discussed in the previous section, suggest that value stocks have the tendency to outperform growth stocks in various settings both in terms of total return and return per unit of risk, which gives viability to the existence of the value premium. But what is the reason that value stocks documents higher returns than growth stocks or, in other words, what is the reason behind the existence of the value premium? In most scientific topics there is not one clear answer to a question but rather different theories proposing different reactions and producing different advocates and opponents. In the subject of value and growth stocks, the existence of the value premium could be interpreted from a rational- and behavioral point of view.

2.5.1 THE VALUE PREMIUM RATIONALLY EXPLAINED

From a rational point of view, the most important reason behind the value premium is compensation for bearing higher risk (Fama & French, 1993). The arguments towards higher risk stem from the notion that value stocks trade at low multiples whereat those stocks are expected to rebound in order to become value-added. In this manner, the probability arises that the companies will be involved in some sort of financial distress. Therefore, these stocks

[29] Yen et al (2004) made use of the Sharpe ratio, Treynor measure, and Jensen's Alpha.

are riskier for investors to purchase due to the likelihood that investors will not receive any payments when the company defaults (Fama & French, 1993). This argumentation was also documented at later points in time when Fama & French (1998) found that value stocks generate higher returns than growth stocks both nationally and internationally and therefore provided existence to value premiums.

The argument that the value premium serves as a compensation for risk is also shared by Chen & Zhang (1998) and Black & McMillian (2006). Doukas et al (2004) only found partial support for this argument. These scholars studied whether investors' and analysts' opinions could explain the discrepancies between returns on value and growth stocks. These scholars found that the earnings forecast by analysts were dispersed since forecasts were significantly lower for growth stocks, as compared to value stocks. These findings suggest that value stocks bear higher risk than growth stocks for some part of the return (Doukas et al, 2004). Black & McMillian (2006) share the rational explanation of Fama & French. After examining the value premium under several changes in economic conditions they document that value premium bear higher volatility after negative macro-economic shocks, as opposed to positive shocks, and therefore contribute to the compensation for risk. It is logical to assume that stocks offering higher returns are more likely to bear higher risks. However, if this compensation for risk stems from the notion of financial distress, it seems like the opposite world on which investors would act. When a company is likely to be involved in financial distress, it can be assumed that investors would sell the stocks massively since these investors do not want to lose money when the company actually goes bankrupt. The result of this dumping is the production of negative returns and investors would not be rewarded for bearing the company's risk. For example, before Lehman Brothers filled its Chapter 11 at the Securities and Exchange Commission (SEC) (Bartram & Bodnar, 2009), investors pulled away since they were aware that the company was involved in some sort of financial distress.

2.5.2 THE VALUE PREMIUM BEHAVIORALLY EXPLAINED

The advocates of the behavioral explanation suggest that value premiums exist due to expectation and overreaction errors in returns made by investors and do not function as a compensation or proxy for risk. De Bondt & Thaler (1985) argue that higher returns of value stocks are the result of the notion that investors have the tendency to overreact towards past events, such as earnings announcements. These scholars found that value stocks became too low-priced and rebounded, whereas growth stocks experienced the reverse. This was also acknowledged by Lakonishok et al (1994), Rozeff & Zaman (1998), Bauman et al (1998), and Yen et al (2004). Lakonishok et al (1994), Chan & Lakonishok (2004) and Huang & Yang (2008) suggest that the value premium is due to unreasonable/mispricing pricing of stocks and does not serve as a proxy for associated risk. In addition to this overreaction, these scholars assume that investors have the tendency to extrapolate past earnings, meaning that past earnings are elaborated too far in the future. This extrapolation is assumed to result in the underestimation of value stocks and overestimation of growth stocks, meaning that value stocks have the tendency to generate higher returns than growth stocks when rebounding takes place. Lakonishok et al (1994) contend that psychological studies suggest that individuals have the tendency to apply simple 'heuristics' in the process of decision making, which causes the probability that condemnatory biases in investment decisions and behaviors can occur. This was later acknowledged by La Porta et al (1997) and Chan & Lakonishok (2004).

In addition towards the expectation errors of overreaction, Bauman & Miller (1997) found evidence that the EPS growth rate have the tendency to become mean-reversed over the long-term. These scholars observed that high growth rates, as accompanied within growth stocks, have the tendency to decline while stocks with low growth rates, as supplemented within value stocks, have the tendency to increase. These findings suggest systematical overestimation by analysts regarding the forthcoming EPS in value and growth stocks. Consequently, growth stocks give the impression to experience lower stock returns especially when the ultimate EPS growth rates are lower than expected by investors and analysts. This was also acknowledged by La Porta et al (1997). Merely, both Bauman & Miller (1997) and La Porta et al (1997) assume that stocks fail the recognition that corporate trends, such as EPS and EPS growth rates, have the tendency to act as a random walk resulting that value stocks are therefore producing higher returns. Chan & Lakonishok (2004) also acknowledge the investor biases within returns. These scholars argue that in recent markets (to 2001/2002) investors have the tendency to extrapolate historical performances and are extremely agitated about new technologies. Therefore, investors are more likely to overreact excessively on growth stocks (such as internet and technological stocks).

From the viewpoint of the efficient market hypothesis (EMH)[30], the rational explanation of the value premium does not refer that markets are inefficient. In essence, the EMH implies

[30] The basic rational behind the EMH is that investors cannot obtain superior gains or abnormal returns since, as Fama (1970) explained delicately, information is replicated and incorporated into stock prices

that investors cannot obtain superior gains systematically. But, once risk is taken into account, this superior performance would be possible since EMH also implies that higher returns should be associated with higher risk. Since proponents of the rational explanation argue that value portfolios are associated with higher risk compared to growth portfolios and, in some degree, the market, the anomaly dissolves. From the viewpoint of EMH, the behavioral explanation of the value premium refers, as opposed to the rational explanation, towards inefficiency. The behaviorists argue that the errors in behavior and extrapolation of investors are biased systematically, which contradicts EMH, because EMH argue that errors are unbiased since the theory implies that stocks fully reflect available information. However, when investors' behavior and extrapolation arises one can earn superior gains since the information is not reflected into the market systematically.

2.5.3 Issues associated with Value & Growth Stocks

While the definitions, performances, and reasons of outperformance regarding value and growth stocks have been discussed, it does not mean that there are no issues involved. Earlier articles seems to fail considering potential issues with value and growth stocks, the innovative viewpoint of some later articles deliberate certain conflicts. Bird & Casavecchia (2007) echoes that some issues can be enumerated for both value and growth stocks. An issue for value stocks to be deliberated is the dangerousness of remaining cheap for several time-periods in which multiples could give an inaccurate and misleading image. The result of this could be that investors invest in them too early and returns that are expected may be misplaced. An issue for growth stocks, as suggested by Bird & Casavvechia (2007), is that these stocks are relatively expensive to trade, which could result to substantial price corrections in the future. A cause of this price correction could be that a company cannot generate innovative products anymore. In a recent article, Fama & French (2007) discusses the inclusion of convergence and drift within value and growth stocks. While these are not exactly demarcated as issues, convergence could have a negative impact on the portfolios and returns of value and growth stocks. Negative convergence could result in a conflict for value and growth stocks when returns become less thrilling after those stocks are included within portfolios. This suggests that negative convergence could give an inaccurate and undesirable appearance on stock returns. For example, when a growth (value) stock with a high (low) P/E ratio is included within an investors' growth (value) portfolio and after that inclusion the

in such a way that it has an immediate effect on the stock prices itself and the financial market whereby information should always be at the hand of investors. Therefore, the EMH implies the impossibility for investors to obtain superior gain or, in other words, 'beat the market' systematically.

company's P/E ratio declines (inclines) enormously or its stock generates unexpected returns. It is therefore arguable whether this stock could still be characterized as a true growth (value) stock. From a rational point of view, convergence within growth, returns, and profitability are estimated and thus denoted into stock prices, which means that, according to rationalists, this circumstance does not matter (Fama & French, 2007). However, Lakonishok et al (1994) argue that investors will never understand the convergence in stocks, suggesting that surprises arises in growth and profitability whereat convergence, either positive or negative, is not denoted into stock prices and therefore not influencing stock returns.

Chapter 3

HYPOTHESIS DEVELOPMENT

"[C]apitalism without financial failure is not capitalism at all, but a kind of socialism for the rich."
James Grant – Journalist – United States

3.1 RETURN OF VALUE & GROWTH STOCKS

It is widely accepted that portfolios of value stocks have the tendency to generate higher returns than portfolios of growth stocks both in national and international markets and in bull markets. Additionally, there is evidence that this outperformance continues during times of bear-markets. However, the numbers of studies following value and growth stocks in bear-market are scarce and somewhat outdated or for single countries alone. Furthermore, numerous scholars argue that value stocks have low multiples because of poor performances (Graham & Dodd, 1934), show distress characteristics (Fama & French, 1998) expressed in high financial leverages, overcapacity, and uncertainty in future earnings or show parts of these characteristics (Chen & Zhang, 1998; Athanassakos, 2009) as opposed to growth stocks. Therefore, Fama & French (1993; 1998) take the rational approach to suggest that value stocks provide higher returns as compensation for risk investors have to cope with. This was later acknowledged by Chen & Zhang (1998), Black & McMillian (2006), Black & Fraser (2004) and Bartram & Bodnar (2009). Opponents of this rationality contend that value stocks are more likely to produce higher returns than growth stocks due to investor biases as explicated in extrapolation- and overreaction errors (see e.g., Lakonishok et al, 1994; Bauman & Miller, 1997; Yen et al, 2004). Furthermore, various scholars also argue that investing in value stocks produce higher returns per unit of risk because a company with distress characteristics, which are riskier, should, by definition, produce higher returns (see e.g., Fama & French, 1998; Doukas et al, 2004; Yen et al, 2004). In addition, De Bondt & Thaler (1985), argue that the betas for growth portfolios are, on average, significantly larger than betas for value portfolios. This was also acknowledged by Harris & Marston (1994), Rozeff & Zaman (1998), and Athanassakos (2009). Due to the arguments given that value stocks have the tendency to beat growth stocks in both total return and return per unit of risk in various economic settings and conditions, I would like to test whether this outperformance would still exist during the latest financial crisis.

Therefore, the following hypothesis can be developed:

Hypothesis 1. *During the financial crisis of 2007-2010, portfolios composed of value stocks provide higher returns than portfolios composed of growth stocks.*

3.2 Multiples versus Multiples

Various scholars argue that portfolios classified on one specific multiple produce higher and more consistent returns than portfolios classified on other multiples. While Athanassakos (2009) find that portfolios classified on price-to-earnings (P/E) produce more contended results than price-to-book (P/B), various scholars argue differently. Fama & French (1998; 2007) contend that portfolios classified on book-to-market (B/M, as an equivalent to P/B) produces significantly higher and more consistent (lower standard deviations) returns than portfolios classified on other multiples. This was also acknowledged by Bauman et al (1998) and Davis & Lee (2008). Davis & Lee (2008) argue that the exhibition of book-to-price (B/P, as an equivalent to P/B) showing higher and more consistent returns is because the book value of a company signifies the accumulation of incomes over the entire history of the company. The cumulative sum of those earnings embodied within book value (as a 'stock' variable) will therefore be likely to show lower volatility than the earnings within a particular fiscal year (as a flow variable). Therefore, these scholars argue that P/B is less subject to the management of earnings than, for example, P/E. Fama & French (1998) and O'Shaughnessy (2005) argue that the reason that a multiple enfolding book value produces higher and more consistent return is due to the volatility of multiples. These scholars argue that book value is less volatile than earnings and cash flows, which gives investors a particular certainty on the company's fundaments he or she invests in. In other words, while earnings and cash flow can rise and fall significantly from year to year when incorporated with stock price, book value remains, to some degree, equal in which investors can expect, to some degree, what the book value will be for the upcoming year(s). Due to these arguments, I want to research whether during the latest financial crisis, portfolios classified on P/B still produce higher returns than P/E and P/C. To test this, the following hypotheses are developed.

Hypothesis 2. *During the financial crisis of 2007-2010, value and growth portfolios classified on P/B provide higher return than value and growth portfolios classified on P/E and P/C.*

Chapter 4

RESEARCH DESIGN

"One of the very nice things about investing in the stock market is that you learn about all different aspects of the economy. It's your window into a very large world."
Ronald Chernow – Author – United States

4.1 METHODOLOGY

In literature, two methods exist to perform research. The first method is the qualitative research method. This method is dealing with measurements on the nonnumeric level to give an understanding of human experiences and thoughts for exploring the meaning behind a particular phenomenon (Babbie, 2010). The second method is the quantitative research method. These quantitative methods allow to statistically testing hypothesis of a sample in order to make generalizations to the population as a whole (Babbie, 2010). The research method which suits this thesis the most is the quantitative method since the research in this thesis is based on examining returns on both value and growth stock portfolios.

4.1.1 RESEARCH METHOD

To test the different hypotheses and to give answer to the main research question and different sub-questions, a research method needs to be established. First, stocks needs to be classified as either value or growth stocks. Second, portfolios need to be constructed since conclusions cannot be stated on individual stocks alone. Third, it needs to be determined how returns on those portfolios are calculated since there are various mechanisms to calculate returns. Finally, risk-adjusted measures need to be determined and explained in order to test the hypotheses that incorporate risk.

4.1.1.1 Separation of value & growth stocks

As discussed in section 2.3.2, the most frequently used method to classify stocks as value or growth is the usage of price-multiples. The most repeatedly used price-multiples to compose portfolios of value and growth stocks are multiples that include earnings, book value, and cash flow. Additionally, using more multiples to measure various performances of companies has the advantage that they are not subject to country or sector specific disposition which is the case when only one multiple is used (Cahine, 2008). The usage of various multiples ensures the coverage of different aspects on which companies are examined (income statement, balance sheet, and cash flow statement). In relation with the stock price, these multiples represent valuations made by investors regarding how a company will perform in the future (Capaul et al, 1993; Penman, 1996; Leledakis & Davidson, 2001; O'Shaughnessy, 2005; Davis & Lee, 2008). Due to academic justification, the P/E, P/B, and P/C is used in this thesis to classify value and growth stocks (see equation 1, 2, and 3).

$$P/E\ ratio = \frac{\bar{P}_y}{EPS_f} \tag{1}$$

$$P/B\ ratio = \frac{\bar{P}_y}{\left[TA_f - \left(IA_f + TL_f\right)\right]/\overline{NSO}_f} \tag{2}$$

$$P/C = \frac{\bar{P}_y}{NOCF_f/\overline{NSO}_f} \tag{3}$$

where $\bar{P}_y$ is the daily average closing price of a company's stock in fiscal year y (see equation 4), EPS is earnings per share [31]at fiscal-year-end (FYE) f, TA_f is total assets at FYE f, IA_f is intangible assets at FYE f, TL_f is total liabilities at FYE f, $NOCF_f$ is Net operating cash flow at FYE f, and $\overline{NSO}_y$ is the weighted-average number of shares outstanding at FYE y.

$$\bar{P}_y = \frac{\sum_{t=1}^{N} stock\ price_t}{N} \tag{4}$$

were $\overline{P_f}$ is the daily average year stock price, $\sum_{t=1}^{N} stock\ price_t$ is the sum of daily stock prices at year t, and N is the total number of trading days within a given year.

O'Shaughnessy (2005), Bragg (2007), Pinto et al (2010) contend that in financial reporting, the average stock price of a company in a year is always calculated by averaging the daily closing price throughout the year. Moreover, several companies (such as Arcelor Mittal, LVMH, and Reckitt Benckiser) report their average share price and P/E ratio for a particular year in which these figures correspond exactly with the daily average closing price. However, Bauman et al (1997) used the share price on the day of fiscal year end (which is usually December, 31) to determine the market value (per share). However, this could give a distorted image since it basically measures a multiple on a particular day and month and not for an entire fiscal year (Bragg, 2007; Pinto et al, 2010). Therefore, the possibility could arise that news reports causes the stock price to fluctuate too heavily on a single day and month.

[31] Peterson (2007) and Pinto et al (2010) defines earnings per share (EPS) as the company's yearly earnings divided by the weighted average of the number of shares outstanding.

Additionally, using daily average stock prices prevents stock prices to be subject to biases or effects, such as the January effect (O'Shaughnessy, 2005; Pinto et al, 2010). By calculating the daily average stock price of a fiscal year ensures that the multiple will be based on a total fiscal year and not on the fluctuations arisen within the final month.

The price-to-book multiple can be calculated in two ways. First, P/B can be equated by shareholder's equity plus deferred taxes and credit taxes on investments minus the preferred stock's book value (see e.g., Fama & French, 1993; Lakonishok et al, 1994; Doukas et al, 2004) and, second, total assets minus intangible assets[32] and total liabilities. (Lakonishok et al, 1994; Leledakis & Davidson, 2001; Yen et al, 2004; Bodie et al, 2009; Pinto et al, 2010). Nevertheless, the first method has the disadvantage that the real value of preferred stocks is not directly available and should be collected by either obtaining or calculating the liquidation, redemption, or par value of preferred stocks, which is also based on availability (Fama & French, 1993). Lakonishok et al (1994) and Chan & Lakonishok (2004) argue that the assumption arises that determination on book values are unequal among different companies under consideration, which, eventually, has its effect on the P/B multiple. Due to this argument, the second method is used to calculate the P/B multiple. The price-to-cash flow multiple can also be calculated in two-fold. First, P/C can be equated by using earnings plus depreciation (EBITD) (Yen et al, 2004) and, second, net cash flow from operations (NOCF) (Bird & Casavecchia, 2007). Net cash flow from operations is more stable since EBITD does not encompass changes in working capital which has the disadvantage that it is distorted towards an organizations' true operating cash flow (Robertson & Wright, 2006; Bragg, 2007; Pinto et al, 2010). Due to this argument, the net operating cash flow is used as a proxy for the company's cash flow. Net cash flow from operations can usually be found in financial reports[33].

4.1.1.2 Portfolio construction of value & growth stocks

The next step often assessed by investors when they have selected stocks is constructing portfolios of those stocks since there is always a tradeoff between return and risk that is

[32] Peterson (2007) defines intangible assets as an asset that is not physically present within a company. Bodie et al (2009) and Pinto et al (2010) argue that intangible assets are a collective noun for brand names and recognition, intellectual property and goodwill.

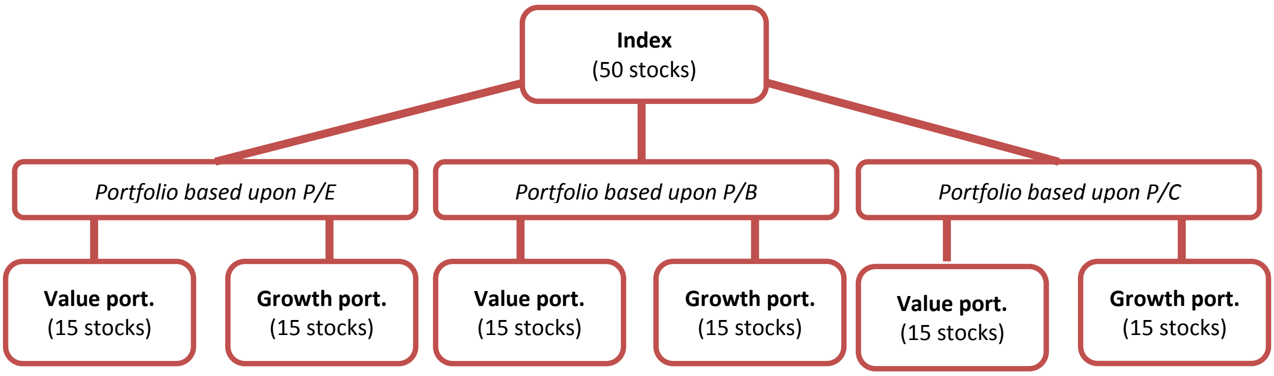
[33] Bodie et al (2009) and Pinto et al (2010) contend that NOCF can be determined as follows:

$$NOCF = net\ income\ [+\Delta Depreciation\ expense - \Delta Prepaid\ insurance + \Delta Accrued\ liabilities - \Delta Inventories + \Delta Accounts\ payable - \Delta Accounts\ receivable]$$

contingent upon investors' motives (Barberis & Shleifer, 2003; Yen et al, 2004). In practice, investors construct portfolios by analyzing and valuing companies in order to select those securities that will be included within a portfolio (Bourguignon & De Jong, 2003). In academic research, this portfolio construction is different since the research is most often grounded on analyzing historical returns and risk since it is not the intention of scholars to invest and forecast returns but to analyze them.

Various scholars construct portfolios for each year under examination since multiples change over time (Fama & French, 1998; Athanassakos, 2009). The portfolios are constructed on multiples prior to the year of examination since it diminish the under- or overreaction by investors when annual reports are publicly available (see e.g., Bauman &Miller, 1997; Bauman et al, 1998; Chan & Lakonishok, 2004; Black & McMillian, 2004). In this thesis, portfolios are constructed on the prior FYE as well. Various scholars construct portfolios, for example, six months after the FYE since investor behavior, such as pessimism, can lead to speculation (see e.g., Bauman et al, 1998; Yen et al, 2004; Athanassakos (2004). However, it can be assumed that, during times of crisis, pessimism is expressed continuously. Additionally, the financial crisis of 2007-2010 started in early 2007, which makes it difficult to base and construct portfolios six months after the FYE (which is usually December 31), because the early behavior of value and growth stocks during this crisis cannot be captured.

In order to rank stocks as either value or growth, various scholars use country index cut-offs. The most widely used cut-offs are 25 percent (see e.g., Capaul et al, 1993, Athanassakos, 2009) and 30 percent (see e.g., Fama & French, 1998; Bird & Casavecchia, 2007). This means that in an index, the 25 or 30 percent of stocks with the lowest (highest) multiples are characterized as value (growth) stocks. Due to academic justification, a 30 percent cut-off is used in this thesis for each country index under consideration since it can be assumed that more stocks added to a portfolio will be beneficial to the results. When an index cannot be divided in equal numbers of stocks, the numbers of stocks are rounded to the closest number above (for example, 10.3 = 11). See figure 4 for an example of portfolio construction.



** The 50 companies/stocks denoted as value stocks by the P/E multiple does not have to not be the same as for the other multiples*

Figure 4 | Example of portfolio construction

Additionally, the weight of stocks within portfolios can be applied in two ways (Fama & French, 1998). These are the equal-weighted and value-weighted approach[34]. However, the disadvantage of the value-weighted approach is that portfolios could be dominated by, for example, blue-chips, which could give wrong indications of results (Black & McMillian, 2004). Fama & French (1993) earlier discovered that the value-weighted approach has a negative association with size, which could influence stock returns negatively. The equal-weighted approach stems that each stock has an equal chance to influence the portfolio positively or negatively, which is considered as a fair approach (Black & McMillian, 2004). Most scholars (see e.g., De Bondt & Thaler, 1985; Fama & French, 1998; Black & McMillian, 2004; Doukas et al, 2004; Yen et al, 2004; Bird & Casavecchia, 2007; Athanassakos, 2009) use the equal-weighted approach. Due to these arguments, the portfolios within this thesis are constructed using the equal-weighted approach. The international portfolio(s), to study the performance of value and growth stocks globally, is constructed in the same way as for national portfolios. The international portfolio(s) consists of value and growth stocks of all countries under consideration. The reason for choosing those particular countries will be discussed in section 4.2.1.2.

4.1.1.3 Portfolio returns of value & growth stocks

After portfolio construction, portfolio returns need to be calculated. According to Bourguignon & De Jong (2003) and Yen et al (2004), an investor values performance both in total return and in risk since investors observe and examine how a stock/portfolio has performed. Therefore, hypothesis one, as stated in section 3.1, will be examined both in total

[34] Fama & French (1998) defines the equal-weighted approach as a portfolio in which stocks all has the same weights whereas the value-weighted approach is defined as a portfolio in which stocks are weighted according to their market capitalization.

return and the return per unit of risk. Furthermore, to study the subject of value and growth stocks during the financial crisis in depth, hypothesis one will be tested both nationally and internationally, for each year of the financial crisis and for the entire duration of the financial crisis. The methods assessed to examine return and risk will be discussed in the following sub-sections.

4.1.1.3.1 Total portfolio return

The term 'total return' is one of the most important information of an investor since it defines how much the investor has earned on his/her investment (which commonly means a portfolio of stocks when investing in the equity market) over a certain period of time, including capital gains and dividends (Pinto et al, 2010). As written above, hypothesis one will be tested for total return and return per unit of risk. This total return can be daily, monthly, quarterly or annually. However, scholars studying value and growth stocks use monthly total returns to determine which portfolio outperformed the other (see e.g., Fama & French, 1998, Leledaksis & Davidson, 2001; Chan & Lakonishok, 2004). There are various methods one could use to determine total monthly portfolio returns. The most common are the (geometric) average of the simple holding-period-return (HPR) and the average logarithmic return (Log) of individual securities within a portfolio[35]. Stock prices are commonly adjusted for stock dividends and stock splits (see e.g., Fama & French, 1998, Chan & Lakonishok, 2004; Black & McMillian, 2006). However, the HPR has drawbacks as compared to the logarithmic return (Campbell, 1997). The HPR does not take into account the effect of (continuous) compounding[36] (Campbell et al, 1997). Another drawback is that it unveils limited liability, which means that the total loss an investor can make on a stock is -1. This limited liability is, according to Campbell et al (1997), contradictory to normal distribution since the domain as explicated within the normal distribution suggests that -1 noticeably disrupts normality. Basu (1977) and Yen et al (2004) used the method of continuously compounding (log).

[35] Pinto et al (2010) defines holding-period-return as the total return received from an individual security or portfolio whereas logarithmic return is the continuously compounded total return received from an individual security or portfolio.

[36] According to Hillier et al (2010) and Hull (2011), compounding refers to the process of the aptitude of a security to produce earnings which are reinvested in order for those earnings to generate new earnings again. It basically refers to the process of generating earnings on earnings.

Due to this drawback, the average logarithmic portfolio return is used to determine monthly portfolio returns for both national and international portfolios for a particular year in the financial crisis (equation 5).

$$\bar{R}_{Py,log} = \frac{\sum_{N=1}^{t=1} w_i \left[In \left(\frac{p_{t+1} + Div_{t+1}}{p_t} \right) \right]}{N} \tag{5}$$

where $\bar{R}_{Py,log}$is the monthly portfolio return in year y, w_i is the individual weight of a stock in a portfolio, p_{t+1} is the stock price of an individual stock at time $t+1$, $Div_{t+1}$is the dividends of an individual stock at time $t+1$, p_t is the stock price of an individual stock at time t, and N is the total number of stocks within a portfolio.

Additionally, various scholars calculate or collect monthly returns of portfolios composed of value or growth stocks with a holding period of one year [37](see .e.g, Lakonishok et al, 1994; Fama & French, 1998; Chan & Lakonishok, 2004; Cahine, 2008). Due to academic justification, this thesis will abide by this one year holding period. However, some scholars also study the performance of portfolios composed of value and growth stocks for numerous years, usually up to ten years, after portfolio formation in order to capture the essential value premium over the long-term (see .e.g., Lakonishok et al, 1994; Fama & French, 1998; Chan & Lakonishok, 2004; Yen et al, 2004). However, since the financial crisis lasted approximately four years (excluding the Euro crisis), it is impossible to study performances of value and growth portfolios for ten years after portfolio formation. Due to this, the value and growth portfolios will be studied separately for each year during the financial crisis. After studying value and growth stocks on a year-to-year base, the returns on value and growth stocks will be discussed throughout the financial crisis to study the performances when an investor switched and changed its portfolio each year to capture true value and growth stocks.

4.1.1.3.2 Portfolio return per unit of risk

In previous studies, portfolios composed of value and growth stocks are not only examined on total return but also on the aspect of risk. The risk in equity (portfolios) can usually be

[37] This essentially refers to the practice in which investors, such as hedge funds, mutual funds and pension funds running a value and growth portfolio or index, adjust their portfolios to select true value and growth stocks. As discussed in section 2.3.2.4, a particular stock characterized as a value stock in one year does not automatically mean that this is also a value stock in the upcoming year (Bourguignon & De Jong, 2003; Fama & French, 2007). Therefore, adjusting portfolios for true value and growth stocks is logical.

separated between systematic- and unsystematic risk[38]. Most frequently, unsystematic risk of assets can be obliterated within a portfolio when more securities are included since not every company or industry is affected by this risk. Therefore, studies on value and growth stocks usually use the term 'risk' to define the 'systematic' risk included within value and growth portfolios. Academics studying value and growth stocks usually examine the amount of return a portfolio generated per unit of risk associated within that portfolio. To examine this, various measures could be used. The outcomes of these measurements are called the risk-adjusted outcomes (Capaul et al, 1993; Yen et al (2004) or risk-reward ratios (Peterson, 2007; Bodie et al, 2009). Basu (1977), Sharpe et al (1999), and Collison et al (2008) contend that three of the most acceptable measures to use are the Sharpe ratio[39], Treynor measure[40], and Jensen's Alpha[41]. Capaul et al (1993), O'Shaugnessy (2005) and Collison et al (2008) argue that negative Sharpe ratios are nonsensical since no interpretation can be derived from negative Sharpe ratios which is something not found in the Treynor measure and Jensen's alpha. Due to the argument of total risk associated with the possibility that Sharpe ratios will be negative within times of crises in which the probability arises that the outcomes will be nonsensical, Treynor measure and Jensen's alpha as risk-adjusted measures will be used in this thesis to function as risk-adjusted measures (see equation 6 and 7).

$$Treynor = T_P = \frac{\bar{R}_P - \bar{r}_f}{\beta_P} \tag{6}$$

where $\bar{R}_P$ circumscribes the portfolio return within a particular time-frame, $\bar{r}_f$ is the risk-free rate within that same time-frame, β_P is the beta of the portfolio related to the market

[38] Black & Fraser (2004), Peterson (2007), Bodie et al (2009) and Hillier et al (2010) defines systematic risk as the risk that is inherited within the entire market or market segments and frequently affects large part of assets included within a portfolio whereas unsystematic risk is defined as the risk that is inherited in within companies or industries and frequently affects only one or a small portion of assets included within a portfolio.

[39] Sharpe et al (1999) and Collison et al (2008) defines the Sharpe ratio as a measure to compare the risk premium incorporated within a portfolio and the risk-free at a particular moment in time in order to analyze the average portfolio return per unit of variability of the disparity in return.

[40] Sharpe et al (1999) and Collison et al (2008) define the Treynor measure as a mechanism that tends to describe the relation between average portfolio return, in excess of the risk-free rate, and the systematic risk of that portfolio.

[41] Sharpe et al (1999) and Collison et al (2008) defines Jensen's alpha is a measure that tends to describe the difference between average portfolio return in addition towards the risk-free rate and the return as explicated by the market model

index, which is the weighted-average of the betas of individual securities incorporated within that portfolio.

$$Jensen's\ alpha = \alpha_P = \bar{R}_P - \left[\bar{r}_f + \beta_P\left(\bar{R}_M - \bar{r}_f\right)\right] \quad (7)$$

were $\bar{R}_P$ is the return of the portfolio, $\bar{r}_f$ is the risk-free rate, the measure $\left(\bar{R}_M - \bar{r}_f\right)$ is the market risk premium. β_P is the beta of the portfolio related to the market index, which is the weighted-average of the betas of individual securities incorporated within that portfolio (equation 7).

Additionally, the rates on Treasury bills and other governmental bills are often used as a proxy for the risk-free rate. However, Yen et al (2004) uses the Singaporean deposit rate (SIBOR) as a proxy for the risk-free rate. Brooks et al (1999) and Hull (2011) argue that in financial markets, investors and traders often make use of deposit rates, such as LIBOR. According to Hull (2011), investors/traders presume that rates on treasury bills are significantly too low to serve as a proxy for the real risk-free rate[42]. Although LIBOR and other deposit rates are often used for derivatives valuation, Brooks & Yan (1999) argue that LIBOR could also serve as a proxy for the risk-free rate in the equity market. These scholars also argue that, on average, the level of LIBOR is higher, steeper and shows less curvature compared to treasury rates. Additionally, Brooks & Yan (1999) document that in extreme cases, the rates completely differ in direction. This is logical during crises and recessions since banks often increase rates for borrowing while governments lower interest rates in order to avoid financial disruptions. This basically means that the treasury rates are too low during crises and recessions to serve as a true proxy for the risk-free rate. Therefore, this thesis uses the deposit rates as a proxy for the risk-free rates. Yen et al (2004) contend that the average portfolio alpha (α_p) and the portfolio beta (β_P) can be derived from the intercept and the slope of the CAPM regression model. However, these scholars did not hypothesize whether value (growth) portfolios provide higher return per unit of risk than growth (value) portfolios. It is therefore impossible to obtain monthly outcomes for Jensen's alpha in order to perform statistical testing. It is due to this reason that this measure will be calculated manually. However, the slope of the CAPM will be used as a standardized monthly average beta since

[42] Hull (2011) argues that one of the reasons why investors/traders presume that Treasury bill rates are too low is because financial institutions must purchase a sufficient number of Treasury bills to realize and satisfy a diversity of regulatory requirements. This results that the demand for these Treasury bills increases, which leads to an increase in prices and a decrease in yields.

manual calculations could result that betas are too far from reality, which could give a distorted image on the outcome of both the Treynor measure and Jensen's alpha. Therefore, the CAPM based regression will be performed for each year and for each portfolio to obtain the average monthly beta for a certain year during the financial crisis of 2007-2010.

4.1.2 STATISTICAL TESTING

The hypotheses in chapter 3 are developed to study value and growth stocks from different angles of incidence. In order to study value and growth stocks in depth, each hypothesis, except regression analyses, will be repeated for each year during the financial crisis, for each country under consideration, and for each multiple on which portfolios are classified.

4.1.1.1 T-test

Various scholars assessed a t-test to discover statistical differences in both return and risk between portfolios composed of value and growth stocks (see e.g., Capaul et al, 1993; Fama & French, 1998; Yen et al, 2004; Cahine, 2008). According to Dougherty (2006) and De Veaux et al (2008), a two sample t-test is a statistical method that gives allowance to state conclusions regarding the difference between means of two autonomous groups, which makes it the most frequently used method when comparing two independent groups. In this thesis, the two independent groups are portfolios composed of value stocks and portfolios composed of growth stocks. As described in section 4.1.1.3, hypothesis 1 is studied both in total return and in return per unit of risk. For total return, the differences that will be tested are the average monthly returns generated by these portfolios (equation 8). For each year, for each country and its totality, this t-test will be assessed. If the difference in returns, as explicated by the value premium, on portfolios composed of value stocks is significantly positive than value stocks have the tendency to outperform growth stocks during the financial crisis. If the value premium is significantly negative than it is more likely that growth stocks have the tendency to outperform value stocks during the financial crisis.

$$t_{Portfolio\ return} = \frac{(\bar{R}_{Value} - \bar{R}_{Growth}) - \Delta 0}{\sqrt{\frac{\sigma^2_{Value}}{N_{Value}} + \frac{\sigma^2_{Growth}}{N_{Growth}}}} \qquad (8)$$

Where $\bar{R}_{Value} - \bar{R}_{Growth}$ the difference between the average monthly return is generated by value and growth portfolios, $\Delta 0$ is the hypothesized difference, and $\sqrt{\frac{\sigma^2_{Value}}{N_{Value}} + \frac{\sigma^2_{Growth}}{N_{Growth}}}$ is the standard error of the mean differences between value and growth portfolios. For Treynor and Jensen's Alpha, this explanation is virtually identical.

For return per unit of risk, the differences that will be tested are the outcomes of the Treynor measure and Jensen's alpha generated by these autonomous portfolios (equation 9 and equation 10). For each multiple, for each year, for each country and its totality, this t-test will be assessed. If the difference of outcomes generated by these risk-adjusted measures is significantly positive, than value stocks provide higher returns per unit of risk than growth stocks, and vice versa.

$$t_{Treynor} = \frac{(\bar{T}_{Value} - \bar{T}_{Growth}) - \Delta 0}{\sqrt{\frac{\sigma^2_{Value}}{N_{Value}} + \frac{\sigma^2_{Growth}}{N_{Growth}}}} \tag{9}$$

$$t_{Jensen's\ alpha} = \frac{(\bar{\alpha}_{Value} - \bar{\alpha}_{Growth}) - \Delta 0}{\sqrt{\frac{\sigma^2_{Value}}{N_{Value}} + \frac{\sigma^2_{Growth}}{N_{Growth}}}} \tag{10}$$

For price-multiple base portfolio comparison, the difference that will be tested are the returns generated by P/B based value and growth portfolios and the returns generated by P/E- and P/C based value and growth portfolios (equation 11).

$$t_{\bar{R}p} = \frac{\left(\overline{P/B}_P - \overline{P/E}\,(\overline{P/C})_P\right) - \Delta 0}{\sqrt{\frac{\sigma^2_{P/B}}{N_{P/B}} + \frac{\sigma^2_{P/E\,(P/C)}}{N_{P/E\,(P/C)}}}} \tag{11}$$

4.1.1.2 Mann-Whitney U test

Besides testing the average monthly portfolio return composed of value and growth stocks, Bauman et al (1998) and Athanassakos (2009) also test the median of the monthly portfolio return. Athanassakos (2009) contends that studying both the mean and median provides enhanced insights in portfolio returns of value and growth stocks since the median monthly portfolio return is not subject to outliers. One of the most powerful nonparametric tests used in order to test the median difference between two independent groups is, according to Israel (2009), the Mann-Whitney U test or, simply, Mann-Whitney test (also known as the Wilcoxon Rank-sum test). According to De Veaux et al (2008) and Israel (2009), the Mann-Whitney U test (equation 12) is the nonparametric counterpart of the parametric t-test to test the median instead of the mean. The same as the t-test, the Mann-Whitney U test will be used to test total return and return per unit of risk as well as returns generated by different price-multiples. For total return, the differences that will be tested are the medians of monthly returns generated by these portfolios. For return per unit of risk, the differences that will be tested are the median outcomes of the Treynor measure and Jensen's alpha generated by these autonomous portfolios. For price-multiple comparison, the differences that will be tested are the medians of monthly returns produced by P/B based portfolios and thereby to test the difference between returns produced by P/E- and P/B based portfolios.

$$U, R_P = N_{P1}N_{P2} + \frac{N_{P1}(N_{P1}+1)}{2} - T_{P1} \quad (12)$$

where $N_{P1}N_{P2}$ are the number of monthly portfolio returns in the value and growth portfolio and $T_{P1}$is the observed sum of ranks for the value (growth) portfolio 1.

4.1.1.3ANOVA

Various scholars argue that one multiple provide higher return and more consistency than other multiples (see e.g., Fama & French, 1998; Bauman et al, 1998; Davis & Lee, 2008; Athanassakos, 2009). However, these scholars document the results derived from total returns and observed whether one multiple provided higher returns and lower standard deviations than others. These findings are not based on statistical testing whether there is non-equivalence across different multiples. In other words, these scholars did not use any statistical test to conclude whether one price multiple provided a higher return than other multiples throughout the years and/or sample (these scholars only looked at the tables of portfolio returns that are classified by different price-multiples). It needs to be tested whether there actually is a statistical difference to be found across returns generated by different multiples on which portfolios are classified. One of the most widely applied methods to test the equivalence of means across different groups is, according to De Veaux et al (2008), the statistical method Analysis of Variance (ANOVA). Hypothesis 2 is developed to test the differences in returns of portfolios composed of P/E, P/B, and P/C. For this hypothesis, ANOVA is used to test whether there exist differences between returns produced by P/B based portfolios and P/E, P/C based portfolios by using the outcomes of the F-statistic. In ANOVA, portfolio returns function as a dependent variable whereas portfolio style and different multiples function as independent variables. However, Dougherty (2006) and Israel (2009) argue that ANOVA is not a suitable statistical method to test whether one variable produce higher results than the other only whether there exist a difference. Therefore, a one-tailed t-test and one-tailed Mann-Whitney U test will be used to examine whether P/B based portfolios produce higher returns than P/E- and P/C based portfolios.

4.1.1.4 Regression

The most frequently used regression analysis in studies covering value and growth stocks is the CAPM and a multi-factor model (see e.g., Fama & French, 1998; Chan & Lakonishok, 2004; Huang & Yang, 2008). These models are most frequently used since the CAPM explains the excess return based on one factor (market risk premium) while a multi-factor model includes additional factors in order to study whether excess returns could be explained when additional factors are included. Due to the wide usage of these asset pricing models in studies on value and growth stocks, these asset pricing models will be used in this thesis as well.

To statistically test whether the Capital Asset Pricing Model (CAPM) and a multi-factor model can explain the excess return on portfolios of value and growth stocks, various scholars used regression (see e.g., Fama & French, Bauman et al, 1998; Chan & Lakonishok, 2004; Yen et al; 2004). According to Dougherty (2006) and De Vaux et al (2008), regression analysis is the most widely accepted statistical method for analyzing (several) independent variable(s) and its relationship towards the dependent variable. In this thesis, the CAPM and two-factor model will be used to study the total of 48 months of average monthly portfolio returns composed of value and growth stocks to determine whether the models can explain the excess returns. In the CAPM regression, the excess returns on a value and growth portfolios are regressed against the excess return on the market[43] (equation 13). The CAPM imposes that the intercept or alpha is indistinguishable from zero (Fama & French 1993, 1998; Gonenc & Karan, 2003; Cahine, 2008). This means that the CAPM assumes that excess returns on a stock or portfolio cannot be earned when there is no excess return on the market. To test whether the CAPM can explain the excess return produced by portfolios composed of value and growth stocks, a regression analysis is performed taking into account all the 48 monthly observations. In this regression, the dependent variable is the monthly return produced by value and growth portfolios in access of the risk-free rate.

[43] Also known as the market risk premium (MRP)

The independent variable is the return on the market in excess of the risk-free rate (market risk premium).

$$CAPM = R_{pt} - r_{ft} = a_p + \beta_p(R_{mt} - r_{ft}) + \varepsilon_p \quad (13)$$

While various scholars contend that a CAPM model cannot explain the returns on value and growth stocks, a multi-factor model is frequently added (Fama & French, 1998; Gonenc & Karan, 2003; Cahine, 2008). The most frequently added factors are SMB[44] and VMG (see footnote 34). These factors were originated from the study of Fama & French (1993, 1998). The SMB was created since it is assumed that small-cap stocks provide higher returns than large-cap stocks. The VMG was created since high book-to-market stocks/portfolios (value) have the tendency to provide higher returns than low book-to-market stocks/portfolios (growth) (Fama & French, 1993, 1998; Bauman et al, 1998; Gonenc & Karan, 2003; Cahine, 2008). In this thesis, the only factor added to the original CAPM model is the factor 'VMG'. The factor 'SMB' is not added to the multi-factor model since this thesis concentrates on the value premium and not on size premium. Various scholars who only study the value premium only use VMG as an additional factor (see e.g., Bauman & Miller, 1997; Fama & French, 1998; Chan & Lakonishok, 2004; Yen et al, 2004). Some other scholars studied the performance of value and growth stocks versus small- and large cap stocks (see e.g., Lakonishok et al, 1994; Bauman et al, 1998; Gonenc & Karan, 2003; Brown et al, 2008), which makes it reasonable to include SMB in regression.

Additionally, Banz (1981), Fama & French (1998) and Yen et al (2004) argue that including SMB as an additional factor when studying value premiums within large-cap indexes does not give meaningful results. Since this thesis only focuses on the value premium and not the size premium, VMG will be applied as the only additional factor to determine whether the CAPM or two-factor model could explain the excess returns on portfolios of value and/or growth stocks (equation 14). To test whether a two-factor model can explain the excess return produced by portfolios composed of value and growth stocks, a regression analysis is performed as well which also takes into account all the 48 monthly observations.

[44] SMB (also abbreviated as SMB) is an abbreviation used by various scholars as a factor to denote the returns made by companies with a small market capitalization (cap) or listed in a small-cap index and companies with a large market cap or listed in a large-cap index. It is a term used by scholars in regression to scrutinize the existence of a possible size premium and whether stock returns could be explained by the difference between returns on small- and large companies/indices.

In this regression, the dependent variable is also the monthly return produced by value and growth portfolios in access of the risk-free rate whereas the independent variables are the market risk premium and the difference in monthly returns produced by portfolios composed of value and growth stocks (VMG). Fama & French (1993) and Cahine (2008) equate this model as follows.

$$Two\ factor\ model = R_{Pt} - r_{ft} = \alpha_P + \beta_P\left(R_{mt} - r_{ft}\right) + \delta_P(VMG) + \varepsilon_P \qquad (14)$$

If the intercept is significantly larger or smaller than zero, than it can be assumed that the CAPM and/or the two-factor model fails to explain the excess return on portfolios composed of either value or growth stocks. If the intercept is significantly larger than zero in the CAPM and/or the two-factor model, than it can be assumed that some stocks within the portfolio are mispriced because the excess return on the portfolio are, on average, too large. In statistical terms, if the p-value of the intercept is lower than five percent, which rejects the null hypothesis, referring that alpha might not be equal to zero. This means that part of the average monthly portfolio return of value or growth stocks is not explained by the CAPM and/or two-factor model.

4.2 SAMPLE & DATA

4.2.1 SAMPLE

4.2.1.1 Sample period

The time-frame of this thesis covers the period of the latest financial crisis occurred between 2007 and 2010. One can criticize that analyzing only one financial crisis could not provide sufficient and valid results. However, Allen et al (2009) acknowledge that post-war crises are very much alike to each other. While these scholars suggest that financial crises are related to each other, they also emphasized that the latest financial crisis had a significant impact on the global economic system as a whole, which was something not discovered during earlier crises. These results are also acknowledged by Reinhart & Rogoff (2008). These scholars assume that financial crises are usually the effect of credit booms and pricing bubbles. However, while the average statistics make sound conclusions, Reinhart & Rogoff (2008) and Bartram & Bodnar (2009) also stress that this financial crisis had the worst impact on the global economy as compared to other crises. Both Allen et al (2009) and Reinhart & Rogoff (2008) assumes that future financial crises are inevitable whereat future crises are expected to be similar to the latest financial crises since financial markets are highly correlated to each other, which was something also discovered by Capaul et al (1993) and Black & McMillian

(2006). For these reasons, it can be assumed that choosing the latest financial crisis is expected to provide reliable and valid results towards both investors and academics.

There has been some topical debate regarding the time-period at which the financial crisis started. Bartram & Bodnar (2009) argue that the financial crises approximately started on the day that the statement of the bail-out of Fanny Mae and Freddy Mac by the U.S. government became official as it showed high volatility in global markets. Moreover, these scholars document that the financial crisis was already visible at the end of 2006 referring to the fact that stock markets declined massively by approximately 40 percent. Others define that the official warning arose when New Century Financial filled a Chapter 11 on the 2nd of April 2007 (Bartram & Bodnar, 2009). However, the Wall Street Journal reported that HSBC Holding Plc. was one of the first financial institutions that were heavily hit by subprime mortgages, what later would be called the financial crisis (Bartram & Bodnar, 2009). This can also be seen in figure 5 in which the Case-Shiller index declined heavily on February-March 2007. Due to conveniences of an ongoing year-to-year analysis, the start of the financial crisis defined in this thesis is January 2007. By analyzing value and growth stocks from January 2007 makes it more appropriate to base conclusions on a year-to-year base instead of sampling on February or April.

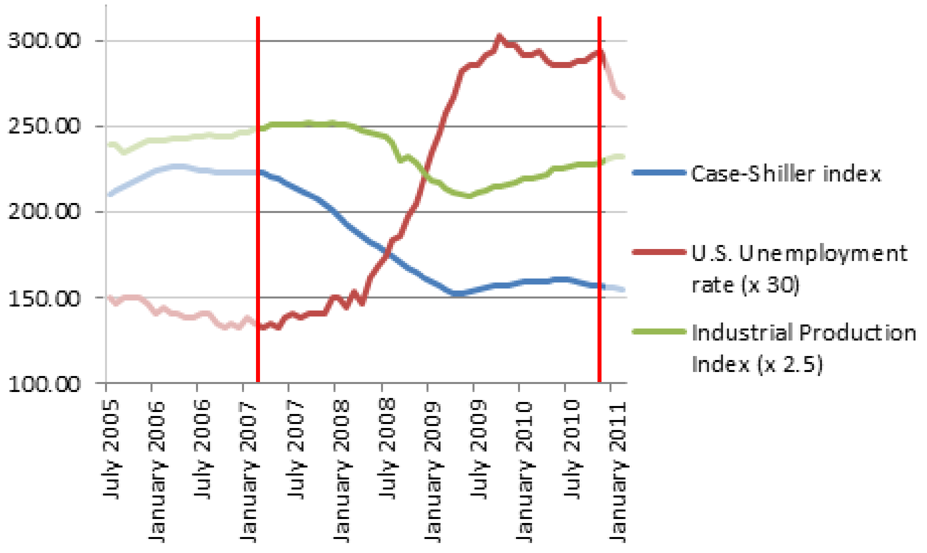


Figure 5 | Economic indicators for financial crisis 2007-2010

In order to define the end of the financial crisis, indicators are needed to make confirmations. According to Kolb (2010), three important indicators exist that mirrors the global economic sentiment, which are derived from the United States. These three global indicators are the Case-Shiller U.S. housing price index, unemployment rates of the U.S. Bureau of Labor Statistics, and the Industrial production index of the U.S. Federal reserve. The Case-Shiller index is considered as one of the most predominant indicators during the financial crisis (Allen, 2009; Kolb, 2010). While the Case-Shiller index does not show any improvement, it is visible that in December 2010 industrial production rate is slightly upwards by 1.35 percent while the employment rate in the same month declines by 0.41 percent, meaning that it can roughly be defined that the financial crisis is on the downturn in December 2010. Therefore, the end of the financial crisis is stated at the end of December 2010, which, again, makes it more convenient to derive conclusions on a year-to-year base. By defining the end of the financial crisis on December 2010, no after-effect regarding the Euro-crises within, for example, Greece and Portugal, which both started in February-March 2011 (Wise, 2011).

4.2.1.2 Sample size

Due to a non-continuous time to analyze all countries in relation with value and growth stocks, a sample is created. In this thesis, interest is given to those stock indices that have a major impact on the global economy because other indices will take these as benchmarks. For example, when the Dow Jones Industrial Index (DJI) indicated a loss on a specific day, it is most likely that the Dutch AEX will open with a loss that mirrors the DJI.

According to Bloomberg (2011) a total of 36 major large-cap equity indices exist within 33 of the most developed financial markets (countries). Scholars established value and growth portfolios derived from stock indices internationally in order to examine the performances of value and growth stocks since, as Black & McMillian (2004) acknowledge, indices worldwide are highly (auto)correlated thus, selecting indices that are most influential globally, would seem to be most appropriate to study. Some of the most respectable financial news sources are Bloomberg, Reuters, Financial Times (FT), and the Wall Street Journal (WSJ). All these news sources display daily quotes on numerous exchanges and indices worldwide. It is remarkable to state that some indices are presented first before all others. It can therefore be assumed that these indices are highly important towards the global economic system. It is for this reason that the focus is based upon those stock indices that are first presented. More detailed information is presented in table 1 and table 2.

Country	Exchange	Index	Total number of listed stocks
United States	NYSE Euronext	DJI	30
Germany	Deutsche Börse	DAX	30
France	Paris Stock Exchange	CAC-40	41
China	Hong Kong Stock Exchange	Hang Seng	45
United Kingdom	London Stock Exchange	FTSE-100	102
Total stocks			***248***

This table displays the total number of companies for each index (country) in the sample. The number of companies displayed in this table does include financial institutions and companies with insufficient financial data.

Table 1 | Sample size of indexes | Source: WSJ, FT, and Reuters (26-03-2011)

	U.S.	Germany	France	China	U.K.	Global
Number of companies in sample	25	22	32	34	74	187
Average value/growth stocks within P/E portfolio	8/8	7/7	10/10	11/11	23/23	57/57
Average value/growth stocks within P/B portfolio	8/8	7/7	10/10	11/11	23/23	57/57
Average value/growth stocks within P/C portfolio	8/8	7/7	10/10	11/11	23/23	57/57
Average monthly observations per portfolio	12	12	12	12	12	12

This table shows the number of companies within the sample, the average companies to be included within the value or growth portfolio for each year under consideration. The average monthly observations are the monthly stock prices for one year.

Table 2 | Overview of companies within the sample indices

4.2.1.3 Exclusions

When analyzing data derived from equity indices across multiple countries over a four year time period is guaranteed to have impediments and obstacles at which the stocks signified towards these problems are excluded from the sample.

First, the data to classify value and growth stocks are derived from annual reports. Since these derivations are to be found manually, all companies need to deliberate appropriate financial statement data[45]. By appropriateness it is meant that the accounting information on a fiscal year end prior to the year of examination needs to be available. When that accounting information is not available, that company is omitted from the sample. Additionally, companies with extreme negative or positive price-multiples will also be excluded from the sample since extreme multiples will indicate potential distress or exceptional growth which could have a negative influence on portfolio returns.

[45] This refers to the company's profit & loss accounts, balance sheets, and statement of cash flows.

Second, during financial crises the probability increases that companies face some sort of financial distress, such as bankruptcy, whereat, in the worst case, these companies will be delisted from the assigned stock exchange and equity index. Including these companies for the few months before delisting could produce biases on results and weakens the weight on portfolios when companies are delisted and no stock prices will be quoted. When that inhibition arises for a particular year, that company is excluded from the analysis of that year.

Third, transaction cost and taxes are also essential parts of an investors' clear return. However, Best et al (2000) documents that the inclusion of transaction costs or taxes do not create different results when those costs and taxes are not taken into consideration. Transaction cost and taxes unequal the weighting of portfolios since particular stocks within a portfolio are more heavily affected than others (Harris & Marston, 1994; Best et al, 2000). For this reason, transaction cost and taxes are not taken into account.

Fourth, Fama & French (1993) argue that inclusion of financial institutions could provide biases when stating conclusions related towards the value premium since the leverages and financial multiples are not equally the same as for non-financial institutions. This was also acknowledged by Best et al (2000) and Bird & Casavecchia (2007). Additionally, Yen et al (2004) argue that the structures among debt and equity within these financial institutions are also unequal to non-financial institutions. Chan et al (1995) argue that databases, such as Compustat, also treat financial companies differently due to the results founded by Fama & French (1993). Due to these reasons, financial institutions are excluded.

4.2.2 DATA

In the field of research, data can be distinguished in primary and secondary data. Primary data is, according to Saunders et al (2009), specific data that is collected by the person(s) assessing research whereby the person can tailor the data towards the specific needs of the research and provides accurateness. Secondary data is, according to Saunders et al (2009), data that is already collected by individual(s) and/or organizations. The type of data used within this thesis is secondary data. It involves the collection of stock prices, annual figures, and risk-free rates, which are already documented and processed by others. The empirical analysis is based on data obtained from financial data and quotes on stocks and risk-free rates.

4.2.2.1 Financial data

Annual reports of all 187 companies included in the sample are consulted in order to derive the following variables to calculate the multiples: net earnings, total assets, intangible assets, liabilities, number of shares outstanding, and net cash flow from operations. The annual reports of the companies are obtained from the investors' relation link on corporate websites. In some cases, financial data is stated in a currency different from the country's original currency. In that case, financial data are converted to the original currency of that country. The quotes on exchange rates are collected by means of the OANDA Corporation since this firm presents extensive historical exchange rates. This corporation is used due to the reason that this company is the market leader and award-winning company regarding the provision of historical exchange rates on all global currencies (OANDA, 2009). To structure the variables, Microsoft Excel is used since this program provides sophisticated modeling options in order to derive financial multiples efficiently.

4.2.2.2 Stock quotes, Index quotes, and risk-free rates

Stock quotes, cash dividends and index quotes are collected from WSJ.com, Finance.Yahoo.com and Morningstar.com since these sources have extended databases which gives instant access to reliable quotes on stock prices of companies within the sample. The average year stock prices are included in the database of financial multiples in Microsoft Excel. Since portfolio returns are determined monthly, the deposit rates will also be based on one month. The risk-free rates are collected as follows: United States (1-Month U.S. LIBOR rate), United Kingdom (1-Month U.K. LIBOR rate), Europe (1-Month EURIBOR), China (1-Month HIBOR rate), and the international market (1-Month US LIBOR rate). In China, three rates can be used for the risk-free rate and function as a benchmark, which are the CHIBOR, HIBOR, and SHIBOR[46]. In this case the HIBOR is used as a risk-free rate since it can be assumed that this is the most appropriate rate to use for the Hong Kong stock market and be representative for the Chinese financial market as a whole. LIBOR rates for U.S. and U.K., EURIBOR rates, and HIBOR rates will be collected by consulting the British Banking Association (BBA), EURIBOR, and Hong Kong Monetary Authority (HKMA) websites. After the completion of portfolio formation, monthly returns and risk-adjusted outcomes are incorporated in a separate database within Microsoft Excel when they are converted towards SPSS to statistically test the hypotheses.

[46] China Interbank Offered Rate, Hong Kong Interbank Offered Rate, Shanghai Interbank Offered Rate.

Chapter 5

Empirical results and Discussion

"The difference between playing the stock market and the horses is that one of the horses must win."
Joey Adams – Comedian – United States

5.1 Difference in total return and risk-adjusted measures

Table 3 shows the characteristics of the global sample, as explained within the methodology section. It exhibits the average number of firms (57) and the average market capitalization of value and growth portfolios, which are 47.3 and 48.8 billion USD, respectively. Additionally, table 3 exhibits the average (median) price-multiple within the entire index as well as the average, median price-multiples value and growth portfolios and the average standard deviation between price-multiples of value and growth portfolios. Remarkably, the standard deviation of price-multiples between the 57 companies is considerably smaller for value portfolios as it is for growth portfolios. This was something also acknowledged by Fama & French (1998). The considerable difference in standard deviations between value and growth portfolios can be subject towards the investors' expectations for growth potentials in earnings, market and investment opportunities within growth stocks as well as the expectation of poor outlooks in performances within value stocks. Table 4 reports the performance of value and growth based portfolios during the financial crisis of 2007-2010 (detailed information can be found in appendix 2). Panel A summarizes the difference in average and median monthly portfolio return between value and growth stocks as well as the difference in standard deviation. Panel B and C exhibits the difference in risk-adjusted measures, bifurcated in Jensen's Alpha and the Treynor ratio, on which value and growth portfolios were evaluated as well as the difference in beta. The results discussed within this chapter are based on the global portfolios only since the outcomes in individual countries on various statistical tests are presumed to be invalid due to the small sample-sizes used. However, Bauman et al (1998) found, when studying value and growth stocks in 19 financial markets that portfolios composed on a global scale show favorable outcomes than the results obtained from studying countries separately. This was also acknowledged by Fama & French (1998). According to these scholars, this might be assignable towards the diversification effect existing within global or international portfolios.

The results within Panel A indicate that, during the financial crisis, there is no statistical difference in monthly average and median returns between global portfolios composed of value stocks and global portfolios (hereafter portfolios) composed of growth stocks. For P/E based portfolios, value portfolios provide higher return in two and three years of the financial crisis with a mean and median of 0.200 percent (*t=0.146*) and 0.194 percent (*p=0.146)* on an average monthly base, respectively. For P/B based portfolios, value stocks provide higher average monthly returns in three of the four years of the financial crisis. Based on the median, value stocks provide higher return in only two of the four years. Generally, the difference in average monthly returns for P/B based portfolios are the highest among the three price-multiples with an average of 0.398 percent (*t=0.268*). Equal results were found for the median monthly return between value and growth portfolios. For P/C based portfolios, the performance of value and growth stocks show similar patterns to that of portfolios based on P/E (mean=0.217 percent, *t=0.150* and median=0.353 percent, *p=0.353*). Overall, value portfolios are likely to provide higher return in 58.3 percent of the average yearly observations (see table 4 and figure 6) while for the median, value portfolios for only 50 percent of the yearly observations.

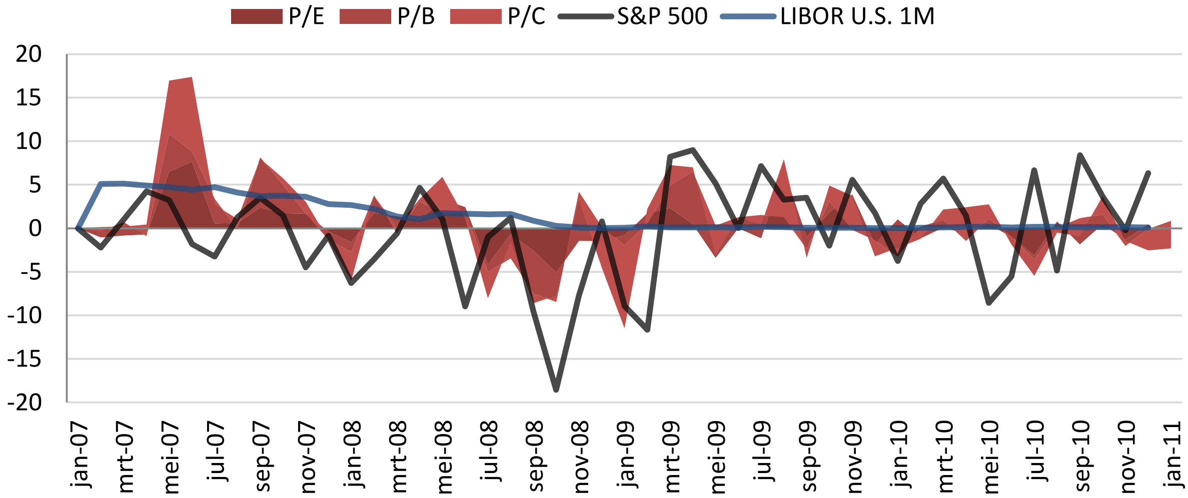


Figure 6 | Global average value-growth spread compared to market and risk-free rate

However, the positive value-growth spread for the median is, on average, higher than the positive value growth spread for the mean (average). The combined monthly returns of value and growth portfolios provide an average and median positive value-growth spread of 0.272 percent and 0.379 percent, respectively. This was also acknowledged by Athanassakos (2009). Additionally, Athanassakos (2009) find that, during crises and recessions, value stocks do not outperform growth stocks in each year of market perils. Lakonishok et al (1994), however, find that value stocks outperform growth stocks in each of the worst 25 months studied.

Table 3 | Characteristics of the global sample

Portfolios of value and growth stocks are formed at the end of each year from 2006 to 2009, classified on P/E, P/B and P/C. Value portfolios are those portfolios composed of stocks that is among the lowest 30 percent in a particular country whereby growth stocks are portfolios composed of stocks that is among the highest 30 percent in a particular country. This table displays the characteristics of the global sample. It shows the average number of firms within the value and growth sample as well as the average market capitalization of the companies includes. The average (median) price-multiples of all companies within the global index and the average, median price-multiples of the value and growth portfolios as well as the standard deviation.

V=Value G=Growth N/A=Not Applicable	2007		2008		2009		2010		Avg. 2007-2010	
	V	G	V	G	V	G	V	G	V	G
Avg. Number of firms	57	57	57	57	57	57	57	57	57	57
Avg. Market cap ($B)	39,7	44,3	52,8	58,7	53,9	52,5	43,0	39,5	47,3	48,8
Avg. (Mdn.) P/E Index	19,36	(12,19)	15,73	(14,40)	15,43	(13,16)	15,22	(13,38)	16,43	(13,28)
Avg. (Mdn.) P/B Index	-8,13	(2,36)	6,06	(2,52)	37,35	(15,05)	-12,12	(11,43)	5,79	(7,84)
Avg. (Mdn.) P/C Index	18,86	(8,22)	10,82	(9,60)	23,55	(9,64)	19,20	(7,39)	18,10	(8,71)
Avg. P/E	6,66	25,60	7,57	24,23	8,23	25,77	9,43	35,93	7,97	27,88
Avg. P/B	1,62	27,39	1,90	16,16	2,10	19,58	1,45	42,47	1,77	26,40
Avg. P/C	4,29	25,99	5,07	26,00	5,57	60,05	4,46	59,47	4,85	42,88
Mdn. P/E	7,04	19,61	7,76	21,33	8,59	20,85	10,15	23,12	8,38	21,22
Mdn. P/B	1,54	8,53	1,84	8,98	1,91	8,91	1,38	5,89	1,67	8,08
Mdn. P/C	4,65	16,27	5,21	20,39	5,87	45,49	4,67	33,89	5,10	29,01
Std. P/E	2,33	19,96	2,51	8,46	2,31	11,07	2,77	34,49	2,48	18,49
Std. P/B	0,66	62,30	0,73	19,63	0,83	26,74	0,53	112,82	0,69	55,37
Std. P/C	1,54	32,34	1,45	21,27	1,74	10,56	1,29	99,64	1,51	40,95

While, during the financial crisis of 2007-2010, the average and median monthly portfolio returns of value stocks are higher by several basis points than the average and median monthly portfolio returns on the corresponding growth stocks on different classification schemes used. However, the outcomes are statistically insignificant to proclaim it as a value premium. Consequently, the absent of statistical significance of value premiums for value portfolios results in a failing to reject the null-hypothesis ($H_0: \bar{R}_{Value} = \bar{R}_{Growth}$). Moreover, I can assume that, during the financial crisis, there is no substantial and statistical difference in average and median monthly portfolio returns between value and growth stocks. Besides the statistical indifference in returns between value and growth portfolios, neither value portfolios nor growth portfolios outperform the market by a (large) constructive difference. Additionally, the difference in standard deviations between value and growth portfolios is, on a yearly base and on average, higher for value portfolios, as compared to growth portfolios. This conjecture was earlier acknowledged by Bartram & Bodnar (2009) and Allen et al (2009). According to Fama & French (1993) and Lakonishok et al (1994), value portfolios experience larger variations in monthly returns than growth portfolios. The higher percentage volatility level occurring within value portfolios is also found by Black & McMillian (2004; 2006). These scholars argue that, during negative shocks or market perils, value stocks (portfolios) experience larger fluctuation within returns than growth stocks (portfolios). This was also acknowledged by Brown et al (2008). While no particular reason is given towards this averment, this effect could be assignable towards the diversity of investor's sentiment in value stocks during times of crisis. Lakonishok et al (1994), Brown et al (2008) and Athanassakos (2009) find that, during times of crises and recessions, value stocks outperform growth stocks, which give existence towards a (statistically significant) value premium. However, while a positive value-growth spread is observed during the financial crisis of 2007-2010, it gives, according to Fama & French (1998), no existence towards a true (statistical significant) value premium. The inexistence of a value premium during the financial crisis could have several causes. Fama & French (1998; 2007) argue that the sample period is small to discover value premiums since these scholars assume that the value premium can only be statistically significant over extended periods of time, which is usually a minimum of ten years. Dougherty (2006) argues that smaller sample sizes have the disadvantage that data of two groups, in this case monthly returns on value and growth portfolios, show constricted resemblances among each other making it difficult to test the difference between groups. Bartram & Bodnar (2009) and Allen et al (2009) argue that the economy during a bear-market could take such extreme negative postures that no type of stock provides superior return. The sample size in reference to the amount of stocks used by various scholars are considerably larger compared to the amount of stocks used within this thesis (e.g., Lakonishok et al, 1994; Brown et al, 2008; Athanassakos, 2009). Therefore, it can be assumed that the statistical insignificance of the value premium is assignable towards, as Dougherty (2006) acknowledge, smaller sample sizes.

Panel B of table 4 summarizes the difference in average and median monthly Jensen's Alpha (hereafter Alpha) generated by portfolios composed of value and growth stocks. The results obtained from the one-sided t-test and one-sided Mann-Whitney U (hereafter Mann-

Whitney) test indicate that there are indifferences in average and median monthly Alpha's between value and growth portfolios during the financial crisis of 2007-2010. Overall, statistical significance was only found in the first year of the financial crisis for all three price-multiples on which portfolios were classified. This statistical significance varies between α=*0.10* for the median difference in Alpha to α=*0.05* for the average difference in Alpha. Since statistical significance is only found in the first year of the financial crisis, I fail to reject the null-hypothesis and impose that value stocks do not provide higher average and median monthly Alpha's than growth stocks ($H1B_0$: $\bar{\alpha}_{Value} = \bar{\alpha}_{Growth}$) during the entire financial crisis. However, in practical terms, value portfolios generate higher Alpha's than growth portfolios on a yearly base and on average for at least two of the three price-multiples on which portfolios were classified. Regarding average monthly Alphas, value portfolios provide between 0.125 percent (*t=0.194*) to 0.556 percent (*t=0.825*) higher Alphas than growth portfolios. Regarding the median monthly Alphas, value portfolios provide between 0.208 percent (*p=0.354*) to 1.277 percent (*p=0.398*) higher Alphas than growth portfolios. Overall, in practical terms these outcomes suggest that value portfolios engender higher excess returns than the theoretical return estimated by the CAPM (Pinto et al, 2010). While not tested explicitly, value portfolios provide, on a yearly base and on average, higher betas than growth portfolios. The difference in beta coefficients varies, on average, between 0.029 and 0.101. As written in section 2.4.2.4.1, La Porta et al (1997) and Fabozzi (2004) argue that investor's sentiments of pessimism and optimism are important factors within the financial markets since these factors trigger stock prices to rise or fall, which is assignable towards the buying and selling of securities. These scholars argue that when the risk premium interchange fluctuations among phases of optimism and pessimism arises, which could result that value stocks are likely to have the tendency to show higher sensitivity as compared to growth stocks and therefore give protrude towards the higher difference in betas (La Porta et al, 1997; Fabozzi, 2004). In times of pessimism, for example during an (extreme) bear-market, Black & Fraser (2004) argue that those stocks that are performing poorly neither attracts investors in purchasing nor does it attract investors to hold them for longer periods of time. Therefore, to compensate the purchasing and holding of these stocks should and will be rewarded in the form of higher returns and thus a value premium or positive value-growth spread (Fama & French, 1998; Black & Fraser, 2004).

Table 4 | Average monthly return differences on portfolios composed of value and growth stocks

Portfolios of value and growth stocks are formed at the end of each year from 2006 to 2009, classified on P/E, P/B and P/C. Global value (growth) portfolios are those portfolios composed of stocks that are among the lowest (highest) 30 percent of the five most influential countries worldwide. All portfolios are equal-weighted. Consequently, monthly returns are collected for each year from 2007 to 2010. Panel A shows the average and median (in parentheses) monthly return of the market, the risk-free rate and the difference between value and growth stocks in percentage. Panel B shows the percentage of average and median monthly difference in Jensen's Alpha. Panel C shows the average and median monthly difference in Treynor ratio by a factor 100 (x100). To determine Treynor, the returns are used to calculate the outcomes by means of the CAPM model. The average beta is determined by running regression analysis on the CAPM for each month and for each year separately. The t-statistic (Mann-Whitney p-value) for the average (median) monthly portfolio return, Jensen's Alpha and the Treynor ratio are stated in parentheses. Detailed information on average monthly portfolio returns for value and growth stocks, their standard deviations, beta and risk-adjusted measures can be found in appendix 2. The levels of statistical significance are divided as follows; * denotes significance at 10% level, ** denotes significance at 5% level and *** denotes significance at the 1% level.

	2007		**2008**		**2009**		**2010**		**Avg. 2007-2010**	
Panel A: Difference in average and median monthly portfolio return and difference in standard deviation										
Average monthly return on market and risk-free rate (%)										
Market	-0.350	-(3.349)	-4.270	(6.582)	2.190	(5.875)	1.550	(5.367)	-0.220	(3.189)
Risk-free	4.130	(0.838)	1.050	(0.775)	0.090	(0.058)	0.120	(0.033)	1.350	(0.399)
Average monthly portfolio return (%)										
P/E	1.376	(0.645)	-0.537	(-0.165)	0.696	(0.314)	-0.731	(-0.565)	0.200	(0.146)
P/B	1.384	(0.641)	-0.476	(-0.139)	0.141	(0.051)	0.546	(0.387)	0.398	(0.268)
P/C	1.265	(0.613)	-1.017	(-0.313)	0.875	(0.341)	-0.258	(-0.195)	0.217	(0.150)
Median monthly portfolio return (%)										
P/E	1.585	(0.235)	-2.453	(0.489)	1.778	(0.420)	-1.169	(0.646)	0.194	(0.398)
P/B	1.108	(0.170)	-0.068	(0.580)	-2.212	(0.557)	0.590	(0.443)	0.889	(0.646)
P/C	1.996	(0.201)	-3.383	(0.603)	1.702	(0.398)	-0.503	(0.688)	0.053	(0.353)
Standard deviation monthly portfolio return (%)										
P/E	1.253		1.343		0.380		0.019		0.284	
P/B	1.338		1.382		2.365		0.526		0.562	
P/C	1.564		0.163		-0.605		0.117		0.522	
Panel B: Difference in average and median monthly Jensen's Alpha (%)										
Average monthly Jensen's Alpha (%)										
P/E	2.209	(1.822)**	0.429	(0.301)	0.697	(0.568)	-0.601	(-0.681)	0.125	(0.194)
P/B	2.792	(2.399)**	0.271	(0.197)	-0.511	(-0.215)	0.432	(0.477)	0.556	(0.825)
P/C	2.200	(2.029)**	-0.600	(-0.407)	0.085	(0.037)	0.189	(0.056)	0.179	(0.255)
Median monthly Jensen's Alpha (%)										
P/E	2.224	(0.063)*	0.551	(0.398)	0.781	(0.292)	-0.098	(0.728)	1.277	(0.398)
P/B	3.295	(0.023)**	0.039	(0.420)	-0.806	(0.688)	-0.179	(0.398)	0.290	(0.253)
P/C	1.997	(0.030)**	0.194	(0.580)	0.136	(0.466)	-0.033	(0.512)	0.208	(0.354)
Beta monthly portfolio return										
P/E	0.186		0.182		0.085		-0.093		0.029	
P/B	0.314		0.141		0.243		0.082		0.101	
P/C	0.208		0.078		-0.041		-0.125		0.045	
Panel C: Difference in average and median monthly Treynor ratio (factor x100) and difference in beta										
Average monthly Treynor ratio (x100)										
P/E	1.485	(0.947)	0.184	(0.064)	0.614	(0.195)	-1.207	(-0.393)	0.175	(0.119)
P/B	1.800	(1.151)	0.131	(0.047)	-0.763	(-0.278)	0.694	(0.243)	0.516	(0.356)
P/C	1.513	(0.991)	-0.606	(-0.208)	1.088	(0.402)	-0.078	(-0.082)	0.205	(0.138)
Median monthly Treynor ratio (x100)										
P/E	0.655	(0.185)	-1.467	(0.466)	1.554	(0.466)	-3.258	(0.668)	0.903	(0.375)
P/B	0.617	(0.143)	0.039	(0.489)	-0.694	(0.603)	0.587	(0.352)	0.137	(0.253)
P/C	1.051	(0.170)	-2.401	(0.580)	1.937	(0.375)	-1.302	(0.646)	-0.162	(0.312)

Higher betas for value portfolios, in association with higher standard deviations and positive value-growth spreads, indicate that value stocks are, according to theory, riskier than growth stocks. Since, according to Hillier et al (2010), riskier stocks should, by definition, provide higher return. This assumes that value stocks provide a fraction of higher return because of a compensation for risk. However, regression analyses by means of asset pricing models should be performed in order to make proper conclusions on this matter.

Panel C in table 4 reports the difference in the average and median monthly Treynor ratios between value and growth portfolios. In statistical terms, the outcomes obtained from the one-sided t-test and one-sided Mann-Whitney test indicate that value portfolios do not provide higher Treynors than growth portfolios. Since statistical significance concerning the difference in Treynor ratios generated between value and growth portfolios could not be found during the financial crisis, I fail to reject the null-hypothesis and conclude that value stocks do not provide higher average monthly Treynors than growth stocks ($H1C_0: \bar{T}_{Value} = \bar{T}_{Growth}$). These results suggest that there are indifferences in yields between the average monthly return within value and growth portfolios in excess of what an investor could have earned on a risk-free trade or investment. These results are equal to the findings of Alpha. While for Alpha, statistical significance could only be found in 2007 of the financial crisis, the difference in Treynor shows insignificance in all years of the financial crisis. However, while statistical significance could not be found within Treynor, the outcomes, as shown in table 4, favor value portfolios. Regarding the average monthly Treynor ratio, value portfolios provide, on average, a Treynor of 0.175 (*t=0.119*) to 0.516 (*t=0.356*) higher than growth portfolios during the financial crisis of 2007-2010. Regarding the median monthly Treynor ratio, value portfolios provide, on average, a Treynor of 0.137 (*p=0.253*) to 0.903 (*p=0.375*) higher than growth portfolios. For the P/C based portfolio, the difference in Treynor was negative. Overall, it can be assumed that the outcomes are equal to the outcomes obtained from Alpha. According to Basu (1977) this is logical since the risk-adjusted measures are a reflection of the total return provided by value or growth stocks. This was also acknowledged by Yen et al (2004). Moreover, Basu (1977) and Yen et al (2004) also argues that finding both positive outcomes on Alpha and Treynor is not remarkable since both measures captures the systematic risk associated within the portfolios. These results are equal to the results obtained by Yen et al (2004). Despite the fact that Yen et al (2004) only find statistical significance of Alpha and Treynor in the first two years, Yen et al still concluded that value stocks are more likely to provide higher return per unit of risk than growth stocks even when the results were insignificant after two years. Therefore, I can suggest that, during the financial crisis, value stocks provide a higher fraction of return per unit of risk than growth stocks. This means that the fraction of higher risk found in value stocks during the financial crisis are more than compensated for by their fraction of higher total return.

5.2 DIFFERENCE IN RETURN BETWEEN PRICE-MULTIPLES

Table 5 summarizes the difference in average and median monthly returns generated by value and growth portfolios classified by P/B as compared to portfolios classified by P/E or P/C (detailed information can be found in appendix 3). Panel A (B) of table 5 exhibits the comparison of differences in average and median monthly returns as well as the standard deviation produced by P/B based global value (growth) portfolios and P/E-, P/C based global value (growth) portfolios (hereafter value (growth) portfolios). In this section, global portfolios will be discussed since the outcomes obtained from individual countries are invalid to derive statistical meaning and are therefore erased from deliberation (information of individual countries can be found in appendix 3). In section 2.3.2 and 3.2, it became clear that various scholars argue that portfolios classified on P/B are likely to generate higher returns than when portfolios are classified by P/E and P/C. To study whether this is also likely during the financial crisis of 2007-2010, I hypothesized that portfolios classified on P/B are more likely to produce higher returns, as measured by the average and median monthly return, than when value and growth classifications are made based on P/E or P/C[47]. In this section, the results of global value and global growth portfolios (hereafter value and growth portfolios) will be discussed since the results within individual countries give invalid results regarding statistical conclusions. The outcomes derived from value and growth portfolios in individual countries can be found in appendix 3.

During the financial crisis of 2007-2010, the outcomes obtained from ANOVA indicates that, statistically, there exist no difference between monthly returns generated by P/B based value-and growth portfolios and monthly returns produced by P/E- and P/C based value and growth portfolios. The F-statistic between groups are, on average, 0.002 (*p=0.998*) for value portfolios and 0.018 (*p=0.983*) for growth portfolios. Equal results on the F-statistics were observed on a yearly base throughout the financial crisis.

[47] $H2_0: \bar{R}_{PB,\ value/growth} = \bar{R}_{PE,\ value/growth} = \bar{R}_{PC,\ value/growth}$

$H2_1: \bar{R}_{PB,\ value/growth} > \bar{R}_{PE,\ value/growth}, \ \bar{R}_{PC,\ value/growth}$

Table 5 | Difference in average monthly portfolio return between P/B-, P/E, and P/C-based portfolios

Portfolios of value and growth stocks are formed at the end of each year from 2006 to 2009, classified on P/E, P/B and P/C. Global value portfolios are composed on the lowest 30 percent of all companies within each of the five countries whereby global growth portfolios are composed on the highest 30 percent. Global portfolios are also classified on the price-multiples. Panel A (B) shows the in average and median monthly portfolio return of P/B based portfolios and the difference between average and median monthly return between P/E and P/C based portfolios for value (growth) portfolios as well as the difference in standard deviations. The F-statistic and significance between groups are derived from ANOVA. The t-statistics (p-value) are derived from a two-sample one-tailed t-test (two-sample one-tailed Mann-Whitney test) and are stated in parentheses. Detailed information on the five individual countries concerning the difference in return between price-multiples, including the F-statistic and its level of significance can be found in appendix 3. The levels of statistical significance are divided within this table as follows; * denotes significance at 10% level, ** denotes significance at 5% level and *** denotes significance at the 1% level.

	2007	2008	2009	2010	Avg. 2007-2010
Panel A: Difference in average and median monthly return produced by price-multiples within value portfolios					
F-statistic b/t groups	0.012	0.030	0.015	0.203	0.002
Significance b/t groups	0.998	0.971	0.985	0.818	0.998
Average return P/B	1.405	-4.484	3.692	1.644	0.564
Difference in average return (%)					
- P/E	-0.235 -(0.980)	-0.773 -(0.214)	-0.080 -(0.288)	0.876 (0.621)	-0.053 -(0.035)
- P/C	0.132 (0.055)	-0.071 -(0.020)	-0.434 -(0.153)	0.555 (0.388)	0.046 (0.029)
Median return P/B	2.406	-2.595	2.514	1.308	-0.139
Difference in median return (%)					
- P/E	-0.089 (0.466)	0.741 (0.557)	-2.318 (0.603)	1.268 (0.312)	-0.827 (0.557)
- P/C	0.055 (0.466)	0.910 (0.466)	-2.223 (0.625)	1.500 (0.333)	-0.394 (0.489)
Standard deviation P/B	5.916	9.058	7.813	3.711	3.903
Difference in Std. (%)					
- P/E	0.105	0.424	2.202	0.532	0.415
- P/C	0.138	1.024	1.836	0.416	0.098
Panel B: Difference in average and median monthly return produced by price-multiples within growth portfolios					
F-statistic b/t groups	0.013	0.039	0.021	0.049	0.018
Significance b/t groups	0.987	0.962	0.979	0.952	0.983
Average return P/B	0.022	-4.007	3.554	1.097	0.166
Difference in average return (%)					
- P/E	-0.243 -(0.130)	-0.835 -(2.732)	0.470 (0.219)	-0.404 -(0.311)	-0.251 -(0.188)
- P/C	0.014 (0.008)	-0.609 -(0.192)	0.304 (0.123)	-0.250 -(0.193)	-0.135 -(0.100)
Return P/B	1.299	-2.527	4.636	1.302	0.705
Difference in median return (%)					
- P/E	0.388 (0.646)	-1.644 (0.603)	1.581 (0.420)	-0.270 (0.625)	0.256 (0.646)
- P/C	0.944 (0.443)	-2.405 (0.668)	1.599 (0.512)	0.989 (0.557)	0.442 (0.535)
Standard deviation P/B	4.578	7.676	5.448	3.185	3.341
Difference in Std. (%)					
- P/E	0.020	0.385	0.217	0.025	0.137
- P/C	0.364	-0.195	-1.134	0.007	0.058

The level of significances are extremely large, which, according to Dougherty (2006) indicates that the results are insignificant to conclude that there is a statistical difference in monthly return among portfolios classified by P/B, P/E, and P/C. The outcomes obtained from a two-sample one-tailed t-test show that, on average, the difference in average monthly return between P/B based portfolios, P/E and P/C based portfolios for value stocks are -0.053 (*t=-0.035*) as compared to P/E based portfolios and 0.046 percent (*t=0.029*) as compared to P/C based portfolios. For the median, the outcomes, obtained from a two-sample one-tailed Mann-Whitney test, are -0.827 percent (*p=0.557*) and -0.394 percent (*p=0.489*), respectively. While not tested, the standard deviations for P/B based value portfolios are higher varying from 0.415 percent (P/E) to 0.098 percent (P/C). Equal results were obtained on a yearly base of the financial crisis. For growth portfolios, the difference in average monthly return between P/B based portfolios, P/E and P/C based portfolios are -0.251 percent (*t=-0.188*) and -0.135 percent (*t=-0.100*), respectively. For the median, P/B based growth portfolio produced higher returns than P/E- and P/C based portfolios. Regarding the median outcomes, P/B based growth portfolio produced 0.256 percent (*t=0.646*) to 0.442 percent (*p=0.535*) higher return than P/E- and P/C based growth portfolios, respectively. However, the standard deviations are also higher for P/B growth based portfolios. According to Fama & French (1998) and Davis & Lee (2008) that P/B-based portfolio generate higher volatility in (monthly) return than P/E and P/C based portfolios and therefore produce less stable returns than when value and growth stocks were classified by other price-multiples. Equal outcomes were found on a yearly base throughout the financial crisis. From a statistical point of view, the differences in average and median monthly return do not favor P/B based portfolios. Thereby, the t-statistics (p-values) are, on a yearly base and on average, considerably low (high). Therefore, I fail to reject the null hypothesis ($H2_0\text{: } \bar{R}_{PB,\ value/growth} = \bar{R}_{PE,\ value/growth} = \bar{R}_{PC,\ value/growth}$) and conclude that P/B based portfolios give no higher average and median monthly returns than portfolios classified by P/E and P/C.

Overall, these outcomes are opposing the findings of Bauman et al (1998), Fama & French (1998) and Davis & Lee (2008). While Fama & French (1998) argue that P/B is less volatile than other price-multiples, Davis & Lee (2008) argue that P/B signifies the accumulation of incomes over the firm's history. However, it is arguable that during times of crisis, the (value of) fixed assets possessed by manufacturing- and industrial companies declines considerably since companies have, as Allen et al (2009) assume, to cut down costs/expenses in order to survive. However, this declining of cost also has its influence on the company's stock return, which is likely to assume to decline. Therefore, it can be suggested that (value and growth) portfolios classified on P/B which includes many manufacturing- and/or industrial companies, the return on the entire (value or growth) portfolio declines as well. Additionally, P/B based value and growth portfolios frequently provide negative average monthly returns as compared to P/E- and P/C based value and growth portfolios. This indicates that P/B is a poor price-multiple to classify value- growth portfolios. From the viewpoint of Lakonishok et al (1994) and Chan & Lakonishok (2004) this is logical. These scholars argue that companies characterized as growth stocks might have intangible assets that are not reflected in the bookkeeping because most of these assets are expensed. However, another possible reason, as Lakonishok et al (1994) and Chan & Lakonishok (2004) argue, is that those companies might also have attractive growth opportunities that have its influence on the market price immediately, which can occur on a yearly base or are established on the long-term. Since the possibility arises that a stock is classified as value in year 2007 and as growth in 2008. From the viewpoint of Lakonishok et al (1994) and Chan & Lakonishok (2004), this means that when, for example, a company, which is marked as a value stock in year x, creates a growth opportunity that has its direct influence on the market price in year y. When other companies do not create equal growth opportunities, this value company becomes, as compared to the market, a growth company in year y. Black & Fraser (2004) and Cahine (2008) argue that using several price-multiples when analyzing portfolio returns in different countries would provide more applicable results since portfolios are classified from different perspectives. In practical terms, the outcomes, within value portfolios, indicate that the average monthly return for P/B based portfolios are lower as compared to P/E based portfolios and higher as compared to P/C based portfolios. As for growth portfolios, this indicate that the average monthly return for P/B based portfolios are lower as compared to P/E and P/C based portfolios. From the viewpoint of Black & Fraser (2004) and Cahine (2008), these findings suggest that global value and growth portfolios should not be classified by using the price multiple ‘price-to-book’. While not tested, the outcomes suggest that P/E based portfolios are more likely to provide higher average monthly portfolio return than other classification schemes, which follows the findings of Athanassakos (2009).

5.3 ASSET PRICING MODELS TO EXPLAIN THE RETURNS ON VALUE- & GROWTH STOCKS

In this section, the results on the CAPM and the two-factor model will be discussed in order to identify whether these asset pricing models can explain the risk-adjusted returns on the value-based- and growth-based strategy. The same as previous scholars, I follow the assumptions that equity markets are integrated whereby investors in the global portfolios do not care about deviances from the purchasing power parity[48] and markets are mean-variance efficient[49] (see e.g., Fama & French, 1993, 1998; Petkova & Zhang, 2005; Cahine, 2008). Table 6 summarizes the estimates of equation 13 and 14 obtained the global value and growth portfolio based on 48 monthly observations during the entire financial crisis of 2007-2010. The regression outcomes of individual countries are diminished from discussion. Detailed information on regression outcomes within individual countries can be found in appendix 4. The regression's intercept (α) is stated in decimals and will be discussed in basis points of one percent of return. For an asset pricing model to explain the risk-adjusted returns on portfolios composed of value and growth stocks, the regression's intercept (α) of a portfolio's abnormal return on the market return (and additional factors) should be indifferent from zero. If the t-value is higher than 1.960 than the p-value of the intercept is lower than the five percent level, which rejects the null hypothesis referring that alpha might not be equal to zero. This means that part of the average monthly portfolio return of value or growth stocks in excess of the risk-free rate is not explained by the CAPM and/or multi-factor model.

The estimates on equation 13 in table 6 indicate that the CAPM can explain the average monthly returns on global portfolios composed of value and growth stocks. The intercept of the three global value and growth portfolios are at least 6 BPS (*t=1.198*) to 3 BPS (*t=0.637*) from zero, respectively. The outcomes on the intercept obtained from value portfolios contradict the findings of Fama & French (1998), Gonenc & Karan (2003), Petkova & Zhang (2005) and Cahine (2008). These scholars find that the CAPM cannot explain the excess returns on value and growth portfolios since the t-statistic or F-statistic is large, which refers to a p-value lower at the five percent level indicating that the intercept is distinguishable different from zero. During the financial crisis of 2007-2010, the intercept fully reflect the results obtained for total return on value and growth portfolios. If a value premium existed during the period of 2007 and 2010, the return on value portfolios should be (extremely) positive while the return on growth portfolios should be lower than the return on value portfolios or negative. Therefore, the results on the intercept indicate the indifference in superior performance of value stocks over growth stocks. The finding that the CAPM can be

---

[48] Peterson (2007) and Pinto et al (2010) define purchasing power parity as a financial theory that estimates the alterations in quantity regarding the exchange rate that separate countries in order to equalize the currency's purchasing power on each exchange. For example, the London Metal exchange that sets prices in different currencies for steel per metric ton should be based equally. Steel per metric ton that sells for £88,- in the United Kingdom should be approximately ¥10.731,- in Japan.

[49] Fama & French (2003) implies that when the market is mean-variance efficient the relationship between risk and return holds for all assets within that market.

an indicator concerning the existence of a value premium was also acknowledged by Cahine (2008). According to Dougherty (2006) the coefficient of determination, or goodness of fit, (R^2) should be at least 0.70 (or 70 percent) for the (asset pricing) model to be useful. The closer R^2 is to one, the greater the aptitude of the (asset pricing) model to forecast a trend in which extrapolation of upcoming results can be used on the basis of other information. In the CAPM, the R^2 for global value and growth portfolios are between 0.706 and 0.763, respectively. Overall, the outcomes of R^2 are equivalent to the results obtained by other scholars (e.g., Fama & French, 1998; Gonenc & Karan, 2003; Cahine, 2008).

According to Fama & French (1993, 1998), Petkova & Zhang (2005) and Cahine (2008), the CAPM ignores risk factors other than the excess return on the market. Therefore, a two-factor model is added towards this research. The two-factor model is equal to the CAPM regarding the explanation of excess returns on value and growth portfolios. In order for the two-factor model to explain the risk-adjusted returns on value and growth portfolios, the intercept of the regression must be equal to zero. In previous studies, a multi-factor model showed improved capability in explaining risk-adjusted returns on value and growth portfolios while the CAPM failed both in individual countries and globally (see e.g., Fama & French, 1998; Gonenc & Karan, 2003; Cahine, 2008). The estimates on equation 14 in table 6 shows that a two-factor model, with 'value minus growth' (VMG) as an additional factor, can explain the excess returns within value and growth portfolios as well. While in previous studies, the intercept declined considerably, the intercept on value portfolios during the financial crisis declined, on average, by 10 BPS whereas the intercept on growth portfolios remained equal to the outcomes obtained from CAPM. Overall, these outcomes indicate that a two-factor model can explain excess returns on value and growth portfolios since the intercept was most likely indistinguishable from zero. Fama & French (1998) and Cahine (2008) argue that adding VMG would result, on average, in a declining of the intercept. During the financial crisis, the difference in intercept on value and growth portfolios for CAPM and the two-factor model varies considerably. From the viewpoint of Fama & French (1998), it can be assumed that the success or failure of a two-factor model as well as the improvement compared to the CAPM model on the subject of explaining excess return on value and growth stocks lies within the value premium (VMG). Fama & French (1998) assume that the substantial declination of the intercept can be referred to the value premium. Fama & French (1998) argue that the CAPM and two-factor model produce similar slopes. Thus, as Fama & French (1998) and Cahine (2008) argue, the improvement must be formed by the value premium (VMG). While, as discussed in section 5.1, a positive value-growth spread is observed, the difference is too small to define it as a true value premium. Therefore, it can be assumed that because of the positive value- growth spread, value portfolios show small improvements in the intercept while the intercept on the growth portfolios remained unchanged. If a true value premium existed throughout the financial crisis than the intercepts would decline considerably. Additionally, the two-factor model produces higher coefficient of determination (R^2) than the CAPM. By adding the factor 'VMG', the R^2 for global portfolios varies from 0.807 for global value portfolios and 0.788 for global growth portfolios.

Table 6 | CAPM & Two-factor regression models explaining monthly risk-adjusted return on global value- & growth portfolios: 2007-2010

The results are the estimates provided by the regression analysis. All returns are on an average monthly base. Rm is the market return whereby Rf is the one-month depository rate (LIBOR, EURIBOR or HIBOR). Rp is the average monthly portfolio return to be explained. The construction of value and growth portfolios explained in table 2. t( ) refers to the t-statistic on the explanatory variable 'alpha' (*a*p) and 'beta' (*B*p). The regression analysis of both asset pricing models are based on the 48 monthly returns obtained from the analysis of value and growth portfolios in individual countries and globally.

Panel A: Capital asset pricing model

Rp - Rf = *a*p + *B*p(Rm - Rf) + e(p)

Rp - Fp	*a*	*B*	*t(a)*	*t(B=1)*	R^2	*s(e)*
Value portfolios						
Low P/E	0.007	0.900	1.264	10.499	0.706	0.036
Low P/B	0.008	1.036	1.425	11.029	0.726	0.040
Low P/C	0.006	0.931	1.198	11.103	0.728	0.035
Growth portfolios						
High P/E	0.004	0.854	0.998	13.094	0.788	0.028
High P/B	0.003	0.916	0.637	14.314	0.817	0.027
High P/C	0.004	0.913	0.819	12.156	0.763	0.032

Panel B: Two-factor model (VMG as additional factor)

Rp - Rf = *a*p + *B*p(Rm - Rf) + *c*p(V-G) + e(p)

Rp - Fp	*a*	*B*	*c*	*t(a)*	*t(B=1)*	*t(c)*	R^2	*s(e)*
Value portfolios								
Low P/E	0.004	0.853	1.014	0.972	12.843	5.728	0.830	0.028
Low P/B	0.002	0.898	1.156	0.400	13.453	7.435	0.875	0.027
Low P/C	0.005	0.920	0.638	1.055	12.870	4.293	0.807	0.030
Growth portfolios								
High P/E	0.004	0.853	0.014	0.972	12.843	0.077	0.788	0.028
High P/B	0.002	0.898	0.156	0.400	13.453	0.992	0.821	0.027
High P/C	0.005	0.920	-0.362	1.055	12.870	-2.432	0.790	0.030

These results are a fraction higher than observed within the CAPM. Fama & French (1998) and Cahine (2008) argue that this is assignable towards the additional factor(s) that are being added to the regression analysis of CAPM. Fama & French (1998) discussed that the failure of the asset pricing regression model (in the study of Fama & French, reference is given towards the CAPM model) regarding the explanation of the risk-adjusted returns on the value-based and growth-based strategy could be assignable towards beta. These scholars also argue that a tendency of higher returns in value (growth) stocks compared to growth (value) stocks should result in higher betas in the regression model for value (growth) stocks and lower betas for growth (value) stocks in relation with the associated market risk premium. Petkova & Zhang (2005) contend that in times of crisis, the reverse should be true. If value (growth) stocks have the tendency to produce higher returns than growth (value) stocks than the outperforming stock should have higher betas in the regression model since the sensitivity towards market perils is higher. In other words, if value stocks have tendency to produce higher returns than growth stocks during a particular market peril or crisis than its beta should be lower since a negative return on the market does not have to be a sign that the return of the value stock should be lower as well.

The slopes, or beta coefficients, within the CAPM and two-factor model are denoted as β. The t-statistics on the slopes within the CAPM model were for all gobal portfolios higher than 1.960. This indicates the existence of a linear relationship between risk-adjusted return on value/growth portfolios and the market risk premium (Petkova & Zhang, 2005; Dougherty, 2006). Equal results were obtained from the two-factor model. In section 5.1, I discussed that, during the financial crisis of 2007-2010, a statistically significant value premium did not exist in global value portfolios. However, a value-growth spread favoring value stocks was observed. In other words, value stocks have the tendency to produce higher returns than growth stocks but by a very small fraction, which is too small to actually define it as a premium. From the viewpoint of Petkova & Zhang (2005) this means that value betas should be a fraction smaller than growth betas. The difference in slopes by means of the CAPM during the financial crisis of 2007-2010 between value and growth portfolios are 0.046 (P/E), 0.120 (P/B) and 0.018 (P/C). These results controvert the finding and argument of Petkova & Zhang (2005). Globally, value betas are higher than growth betas. In other words, while Petkova & Zhang (2005) found that value betas are lower than growth betas during market perils, the reverse occurred. These outcomes equal the findings obtained by Fama & French (1998).

Moreover, from another point of view, during the financial crisis of 2007-2010 the beta difference between value and growth stocks obtained from the CAPM regression contribute to the theory of beta that stocks and/or portfolios with higher beta coefficients should also produce higher returns (Hillier et al, 2010; Pinto et al, 2007). The results obtained from the CAPM regression, suggest that the value premium, and in this case the positive value- growth spread, refers to a compensation of risk rather than the behavioral explanation of investor biases as referred to by previous scholars (see e.g., Lakonishok et al, 1994; Bauman & Miller, 1997; La Porta et al, 1997). From a rational point of view it is assumed that value stocks outperform growth stocks since value stocks are compensated for the risk it bears (Fama & French, 1993, 1998; Chen & Zhang, 1998; Doukas et al, 2004; Black & McMillian, 2006). This compensation of risk is clarified by the beta coefficient in regression. From table 4 and 6 as well as section 5.1, value stocks have higher betas and also provide higher returns than growth stocks during the financial crisis of 2007-2010, even if it is only by a small fraction. Therefore, it can be assumed that, during the financial crisis, value stocks provide higher returns than growth stocks because they are compensated for the risk. This finding shares the rational explanation of the value premium.

Chapter 6

Conclusions, Limitations and Implications for future research

"Stock market bubbles don't grow out of thin air. They have a solid basis in reality, but reality as distorted by a misconception."

George Soros – Investor – United States

The amount of research done on value and growth stocks is wide-spread. Various scholars scrutinized value and growth stocks in different settings. However, there are always some gaps to be discovered in order to contribute and extend the research on this matter. My research contributes towards the theme of value and growth stocks in two ways. First of all, most scholars study the performance of value and growth stocks through bull-markets and not through bear-markets. However, this could have happened unintentionally since the sample period did not cover severe bear-markets. The scarce amount of research done on value and growth stocks in bear-markets, such as crises and recessions, are outdated. Therefore, my research setting is on the financial crisis of 2007-2010, which is considered by some authors and scholars as one of the worst crises in history.

6.1 Conclusions

Previous studies documented that portfolios composed of value stocks show superior performances as compared to portfolios composed of growth stocks in various settings and through time. My research on value and growth stocks does not conform towards previous empirical evidence. The empirical results obtained from individual countries are invalid to derive statistical conclusions and are therefore diminished. This can be assignable towards the subject of small sample sizes within individual countries. Therefore, the results are discussed for global value and growth portfolios only. From a statistical point of view, there is indifference in average and median monthly returns obtained between value and growth portfolios. The outcomes (t-statistics and p-values) of the two-sample one-tailed t-test and two-sample one-tailed Mann-Whitney test are statistically insignificant to provide support for a statistical difference. Therefore, hypothesis one, which stated that during the financial crisis of 2007-2010, portfolios composed of value stocks provide higher returns than portfolios composed of growth stocks cannot be accepted. From the outcomes obtained, I conclude that, statistically, portfolios composed of value stocks do not provide higher total returns than portfolios composed of growth stocks during the financial crisis of 2007-2010.

While, on average, portfolios composed of value stocks have the tendency to provide higher average and median monthly returns than portfolios composed of growth stocks for all three price-multiples on which portfolios are classified, the results are, overall, too small and statistically insignificant to define it as a true value premium. Another point of interest is the finding that both global value and portfolios do not outperform the market or the risk-free rate securities. This means that, during the financial crisis, no superior return could be earned for investing in value and growth stocks. This failure to reject the null-hypothesis provide an answer to the main research question; what class of stock, value or growth, offered the highest return during the financial crisis of 2007-2010. From a statistical point of view, the answer to my research question is that neither value stocks nor growth stocks offered the highest return. From a practical viewpoint, value stocks offered the highest return by only a few basis points.

The portfolio return in association with systematic risk, as measured by Jensen's Alpha and Treynor, indicate that portfolios composed of value stocks show higher return per unit of risk than portfolios composed of growth stocks. For Jensen's Alpha, this means that the compensation of value portfolios, by an extra Alpha (return) versus the return and risk existing in the market, was higher than the compensation for growth portfolios. In case of Treynor, value stocks provide a higher return than growth stocks in relation to what the return would be in a riskless investment per unit of (systematic) market risk. However, the compensation in rate of return for portfolios composed of value stocks is only higher by a few basis points as compared to portfolios composed of growth stocks. Overall, this means that the outcomes obtained from the two-sample one-tailed t-test and two-sample one-tailed Mann-Whitney test are too small to statistically conclude that statistically portfolios composed of value stocks provide higher average and median monthly Alphas and Treynors than portfolios composed of growth stocks during the financial crisis. Therefore, the null-hypothesis, that there is indifference in average and monthly outcomes in risk-adjusted measures, cannot be rejected. From a statistical viewpoint, I therefore fail to reject the null-hypothesis and conclude that there is no statistical difference between value and growth stocks regarding the outcomes on the risk-adjusted measures. This failure to reject the null-hypothesis provides an answer to the first sub-question; whether value stocks offered a higher return per unit of systematic risk than growth stocks during the financial crisis of 2007-2010. From a statistical point of view, value stocks do not offer a higher return per unit of systematic risk, as measured by Jensen's Alpha and Treynor, than growth stocks. From a practical point of view, the outcomes on Alpha and Treynor are higher than for growth stocks which insinuate that higher return per unit of systematic risk for value stocks.

Some scholars also take into account the monthly returns produced by various price-multiples on which value and growth portfolios are classified. Previous research indicates that value and growth portfolios classified on price-to-book provide higher monthly returns than value and growth portfolios classified on price-to-earnings or price-to-cash flow. These scholars support the argument that book value remains, to some degree, equal while the earnings and cash flow rise and fall on a yearly base. However, results from ANOVA on the average monthly returns of the three price-multiples show that portfolios classified on P/B does not provide higher average monthly return in every sense. From the F-statistic it can already be concluded that the significance is extremely large, referring to an insignificant difference in average monthly return obtained from portfolios classified by the three price-multiples. Additionally, on average and on a yearly base, the t-statistic from the one-tailed t-test and the p-value from the one-tailed Mann-Whitney test regarding the difference in average and median portfolio returns produced by portfolios classified by P/B compared to P/E and P/C are extremely large. Therefore, hypothesis two, which states that portfolios classified on P/B produce higher returns than portfolios classified on P/E and P/B during the financial crisis cannot be accepted. I fail to reject the null-hypothesis and conclude that P/B based value and growth portfolios do not provide statistically higher returns than P/E- and P/C based portfolios during the financial crisis of 2007-2010. This conclusion provides an answer to the second sub-question, whether value and growth portfolios classified by P/B provide a higher return than value and growth portfolios classified by other multiples. From the outcomes obtained, P/B based portfolios most likely produced negative returns as compared to P/E- and P/C based portfolios. Therefore, the assumption arises that classifying stocks as either value or growth by using price-to-book is a poor classification scheme.

The results obtained from regression on asset pricing models indicate that both the CAPM and the two-factor model can explain the return in excess of the risk-free rate for value and growth portfolios. The p-values are considerably high, which means that both asset pricing models produce intercepts that are indistinguishable from zero. When the difference in monthly return produced by value and growth portfolios (VMG) was added as additional factor, the intercept on value portfolios declined while the intercept on growth portfolios remain equal. This outcome could be assignable towards the small fraction by which value portfolios outperform growth portfolios whereby a statistically significant value premium was not observed during the financial crisis of 2007-2010. These outcomes give answer to the final sub-question; whether the CAPM model and multi-factor model can explain the excess return of value and growth portfolios. From a statistical and practical point of view, both the

CAPM model and the two-factor model can explain these excess returns. Additionally, the beta-coefficient in the CAPM and two-factor model indicates the existence of a linear relationship between the excess return obtained from value and growth portfolios and the market risk premium. However, in prior studies, scholars argue that during a bear-market, value betas should be lower than growth betas for obtaining higher returns since the level of sensitivity is lower. However, during the financial crisis of 2007-2010, value betas are in most cases higher than growth betas. While this result disconfirms the earlier findings, it does contribute towards the reason behind the value premium, or value-growth spread. The positive value-growth spread observed during the financial crisis, in association with higher betas observed, leans towards the rational explanation that value stocks provide higher return than growth stocks because of a compensation for risk rather than the behavioral explanation of investor biases.

6.2 LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

In this thesis, I studied value and growth stocks on an equalized construction by which previous scholars have studied this subject of matter. However, the various markets as well as the economic setting and the time-frame in which this study took place vary considerably. The findings, as discussed in the empirical section, may raise a number of critical questions about my research, the performance of value and growth stocks, and the financial crisis itself. In this section, the major limitations of my research as well as the implications for future research are discussed.

One of the major limitations concerning the research within this thesis is the sample size used. The most influential indices of five countries are analyzed. According to Capaul et al (1993), analyzing the countries that are most influential concerning the global economy should provide a representative sample for the financial markets as a whole. However, in totality, 187 companies where analyzed, which is by far less than the large sample size used by other scholars. Therefore, outcomes on individual companies are not discussed in this thesis since they lead to invalid outcomes and conclusions, which could have impact on the generalization of the results towards other individual countries. While the sample size of global value and growth portfolios are considerably larger than the sample size within individual countries, the amount of companies used to construct global value and growth portfolios may be small to generalize the outcomes towards the global financial markets as a whole. One can also criticize that using five countries to construct a global portfolio is incongruous and unreliable to state (statistical) conclusions for the global financial market. Additionally, since the outcomes of statistical test on value and growth portfolios in individual countries are obliterated from discussion and conclusion, it also has its influence on answering two sub-questions. The sub-questions; “Do value stocks outperform growth stocks in each country under consideration and for each year of the financial crisis?” and “Do international value (growth) portfolios still provide higher total return than national value (growth) portfolios during the financial crisis of 2007-2010?” remain unanswered.

The outcomes on the monthly return produced by value and growth portfolios produce another limitation. As written in the section 4.2.1.3, the transaction costs are not included within monthly returns. According to Harris & Marston (1994), this provides a limitation since the outcomes of the statistical test on whether value stocks provide higher return than growth stocks during the financial crisis only give suggestions regarding market opportunities. These scholars argue that it does not provide irrefutable evidence whether a particular trading strategy could have been profitable over another.

While the stock quotes of companies included within value or growth portfolios are collected from free available databases and not from prestigious and respectable databases, such as CRSP, there exists a survivorship bias. As explained within section 4.2.1.3, delisted companies are excluded for a particular year or entirely. However, stock quotes could not be found in case of delisting. CRSP, however, tries to find a consequent quote and uses this quote to calculate the return for the last period on which the company was listed or the last listed price before the stock was delisted. This means that CRSP maintains these stocks in file in the years they are traded irrespective of any delisting. Some scholars using databases, such as CRSP and Compustat, included the historical return of the delisted stock up to the month of delisting (see e.g., Bauman et al, 1998; Athanassakos, 2009). However, according to Fama & French (1998) and Black & McMillian (2004, 2006), the degree of survivorship bias is reduced when the historical data of delisted firms are taken into account on the month or year of delisting while the historical data of newly added firms are not included. In this thesis, the data of newly added firms are included in the year on which another company is delisted. Bird & Casavecchia (2007) argue that studying indices that include international companies reduced the amount of survivorship bias since it can be assumed that large international companies are not often delisted as compared to small companies in small indices. Therefore, it can be assumed that a degree of survivorship bias exist within this thesis due to databases used, however, the degree of survivorship bias is minimized due to the methods proposed by various scholars.

As written in the theoretical framework, Graham & Dodd (1934) were one of the first to recognize the separation of value and growth stocks. While Graham & Dodd (1934) define value and growth stocks from the viewpoint of performance and market average, they also argue that value stocks are undervalued because the market misprices the company's intrinsic- or fundamental value. However, it is challenging to contend whether value and growth stocks are under- and overvalued based on price-multiples used to classify value and growth stocks. Pinto et al (2010) argue that affirming a stock as under- or overvalued incorporates a valuation model based on the value of a company's assets plus the (net) present value of its growth opportunities (PVGO). This basically means that growth in and of itself is only value-creating if the company's future project generates positive NPV's (Brealey et al, 2007; Bodie et al, 2009). When these growth opportunities are nonexistent or the outcome is equal to zero, the value of a firm's stock is equal by the dividends paid on earnings divided by its cost of equity (Pinto et al, 2010). Therefore, to study whether value stocks are undervalued and growth stocks are overvalued during the financial crisis of 2007-2010, research should be performed in connotation with the value of the firm and its associated growth opportunities[50].

In this thesis, I used the equal-weighted approach to construct portfolios of value and growth stocks based on different price-multiples. While the value-weighted approach to construct portfolios has the drawback by means of domination of blue-chips, some scholars used this type of portfolio construction in order to scrutinize the difference between value and growth stocks based on the value- and equal-weighted approach. Fama & French (1998) find that the value premium based on value-weighted portfolios provide, on a yearly average, 2.78 percent higher value premiums than equal-weighted portfolios. Black & McMillian (2004) find contradictory results. They argue that value-weighted portfolios are too dominated by blue-chips, which result that the performance of value-weighted portfolios is reduced when the performance of blue-chips value and growth stocks declines. Brown et al (2008) found equal results when studying the Asian market. Brown et al (2008) argue that equal-weighted portfolios provide, on an average one-year holding period, 1.593 percent higher value

[50] A question that arises from these argumentations is whether under- and overvaluation would even be possible from the viewpoint of market efficiency as explicated by Fama (1970). Basu (1977) argue that prices are biased since they fail to reflect and incorporate information abundantly and therefore under- and overvaluation would be difficult to obtain under the efficient market hypothesis[50]. In the viewpoint of Basu (1977), under- and overvaluation of stock prices is possible due to the pessimistic or optimistic behavior that investors have on different types of stocks. However, this possibility would not exist within the EMH (Basu, 1977). Nevertheless, the EMH does not imply that stock prices of a company must equalize the true value at all times or at a given moment in time, but it implies that errors in stock prices are unbiased. In other words, under- and overvaluation would be possible under EMH if, and only if, these errors are arriving randomly.

premium than value-weighted portfolios. An implication for future research on this matter enfolds in studying portfolios composed of value and growth stocks based on the value-weighted approach in order to scrutinize which approach provide investors the highest total return and return per unit of risk.

Another implication for future research refers towards the under- and overreaction in value and growth stocks made by investors. In the behavioral explanation of the value premium, I discussed that various scholars assume that the value premium arises due to the extrapolation and biases that investors make on past earnings and growth rates (see e.g., Lakonishok et al; 1994), Chan & Lakonishok; 2004) and Huang & Yang; 2008). According to Lakonishok (1994), individual(s) (investors) leaning towards the application of unpretentious 'heuristics' in the decision making practices. This could lead towards the occurrence of denouncing partialities in both the investor's decision making and behavior. Therefore, during the financial crisis, it should be studied which of the factors influence the investor's decision making process and behavior towards the mental creation of under- or overreaction and, thereby, the extrapolation of past earnings and growth rates. In addition, it should be tested whether this under-or overreaction is applicable and assignable towards value/growth stocks.

A final implication for future research concerns the inclusion of financial companies and study financial companies separately. In previous studies and in this thesis, financial institutions and financial conglomerates were excluded from the sample. Fama & French (1993), Best et al (2000) and Bird and Casavecchia (2007) argue that including financial institutions in the sample could lead towards biases in conclusions regarding the value premium since multiples and leverages are unequal to companies in other sectors. However, Allen et al (2009) and Bartram & Bodnar (2009) argue that the activities of financial institutions and financial conglomerate are assumed to have led to the financial crisis of 2007-2010. Therefore, it should be studied whether the inclusion of these 'financials' have an impact on the monthly returns of value and growth portfolios and the impact on the value premium. Besides this, it should be studied the degree of impact these financial institutions and financial conglomerates have on the monthly returns of value and growth portfolios, hence the value premium.

REFERENCES

Allen, F., Babus, A. & Carletti, E. (2009). Financial crises: theory and evidence, *Annual Review of Financial Economics*, Vol. 1, p. 97-116.

Athanassakos, G. (2009). Value versus growth stock returns and the value Premium: The Canadian experience 1985-2005. *Canadian Journal of Administrative Sciences*, Vol. 26, p. 109-121.

Babbie, E.R. (2009). The practice of social research (12th edition). Wadsworth Publishing, Thomson Learning, Stamford, CT, United States.

Babson, D.L. (1951). The case of growth vs. income stocks on a yield basis. Babson and Company, Inc., Weekly Staff Letter, September 17, 1951.

Banz, R.W. (1981). The relationship between return and market value of common stock, *Journal of Financial Economics*, p. 3-18.

Barberis, N. & Shleifer, A. (2003). Style investing, *Journal of Financial Economics*, Vol. 68 (2), p. 161-199.

Bartram, S.M. & Bodnar, G.M. (2009). No place to hide: The global crisis in equity markets in 2008/2009, *Journal of International Money and Finance*, Vol. 28 (2009), p. 1245-1292.

Basu, S. (1977). The investment performance of common stocks in relation to their price-earnings ratios: a test of the efficient market hypothesis, *Journal of Finance*, Vol. 32, p. 663-682.

Bauman, W.S. & Miller, R.E. (1997). Investor explanation and the performance of value stocks versus growth stocks, *Journal of Portfolio Management*, Vol. 23, p. 57-68.

Bauman, W.S., Scott, Conover, C.M. & Miller, R.E. (1998). Growth versus value and large-cap versus small-cap stocks in international markets, *Financial Analysts Journal*, Vol. 54 (2), p. 75-89.

Baumol, W.J. & Blinder, A.S. (2010). Macroeconomics: principles and policy, (11th Ed.), Cengage Learning, Stamford, CT, United States.

Best, R.J., Best, R.W. & Yoder, J.A. (2000). Value stocks and market efficiency, *Journal of Economics and Finance,* Vol. 24 (1), p. 28-35.

Bird, R. & Casavecchia, L. (2007). Sentiment and financial health indicators for value and growth stocks: The European experience, *The European Journal of Finance*, Vol. 13 (8), p. 769-793.

Black, A.J. & McMillan, D.G. (2004) Non-linear predictability of value and growth stocks and economic activity, *Journal of Business Finance & Accounting*, Vol. 31 (3), p. 439-474.

Black, A.J. & McMillan, D.G. (2006). Asymmetric risk premium in value and growth stocks, *International Review of Financial Analysis*, Vol. 15, p. 237-246.

Bloomberg (2011). World Indexes, Retrieved on May 16 from http://www.bloomberg.com/markets/stocks/world-indexes/

Bodie, Z., Kane, A. & Marcus, A.J. (2009). Investments, 8th Ed., McGraw-Hill, New-York, NY, United States.

Bourguignon, F. & De Jong, M. (2003). Value versus growth – investor styles and stock characteristics, *Journal of Portfolio Management*, Vol. 29 (4), p. 71–79.

Bragg, S.M. (2007). Accounting Best Practices, 5th Ed., Wiley, Hoboken, NJ, United States.

Brealey, R.A., Myers, S.C. & Allen, F. (2007). Principles of corporate finance (7th ed.), McGraw-Hill, New York, NY, United States.

Brooks, R. & Yan, D.Y. (1999). London Inter–Bank Offer Rate (LIBOR) versus Treasury Rate - evidence from the parsimonious term structure model, *The Journal of Fixed Income*, Vol. 9 (1), p. 71-83.

Brown, S., Rhee, G.S. & Zhang, L. (2008). The return to value in Asian stock markets, *Emerging Markets Review*, Vol. 9 (2008), p. 194-205.

Cahine, S. (2008). Value versus growth stocks and earnings growth in style investing strategies in Euro-markets, *Journal of Asset Management*, Vol. 9, p. 347-358.

Campbell, J.Y., Lo, A.W. & Mackinlay, A.C. (1997). The econometrics of financial markets, Princeton University Press, Princeton, NJ, United States.

Capaul, C., Rowley, I. & Sharpe, W.F. (1993). International value and growth stock returns, *Financial Analysts Journal*, 1993, January-February, p. 27-36.

Chan, L.K.C. & Lakonishok, J. (2004). Value & growth investing: Review and Update, *Financial Analysts Journal*, Vol. 60 (1), p. 71-86.

Chan, L.K.C., Jegadeesh, N. & Lakonishok, J. (1995). Evaluating the performance of value versus glamour stocks – The impact of selection bias, *Journal of Financial Economics*, Vol. (38), p. 269-296.

Chen, N. & Zhang, F. (1998). Risk and return of value stocks, *Journal of Business*, October 1998, p. 71-102.

Collison, D.J., Cobb, G, Power, D.M. & Stevenson, L.A. (2008). The financial performance of the FTSE4Good indices, *Corporate Social Responsibility and Environmental Management – Wiley*, Vol. 15, p. 14-28.

Davis, J.L. & Lee, I. (2008). Defining value and growth – implications for returns and turnover, *Dimensional Fund Advisors White Paper,* 2008.

De Bondt, F.M. & Thaler, R. (1985). Does the stock market overreact? The Journal of Finance, Vol. 40 (3), p. 793-805.

Dougherty, C. (2006). Introduction to Econometrics (3rd Ed.), Oxford University Press, Oxford, United Kingdom.

De Veaux, R.D., Velleman, P.F. & Bock, D.E. (2007). Stats: Data and Models, international edition (2nd Edition), Pearson Education, Harlow, United Kingdom.

Fabozzi, F.J. (2004). Short selling: strategies, risks, and rewards, Wiley, Hoboken, NJ, United States.

Fama, E.F. (1970). Efficient capital markets - a review of theory and empirical work. *The Journal of Finance*, Vol. 25 (2), p. 383-417.

Fama, E. F. & K.R. French (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, Vol 3 (1993), p. 3-56

Fama, E. F. & K.R. French (1998). Value versus growth: the international evidence, *Journal of Finance* Vol. 53

Fama, E.F. & French, K.R. (2003). The CAPM: theory and evidence, *Center for Research in Security Prices (CRSP),* University of Chicago, Working paper, No: 550, p. 1-27.

Fama, E.F. & French, K.R. (2007). The anatomy of value and growth stock returns, *Financial Analysts Journal*, Vol. 63 (6), p. 44-54.

Graham, B. & Dodd, D.L. (1934). Security Analysis, McGraw-Hill, New York, NY, United States.

Gonenc, H. & Karan, M.B. (2003). Do value stocks earn higher returns than growth stocks in an emerging market? Evidence from the Istanbul stock exchange, *Journal of International Financial Management and Accounting*, Vol. 14 (1), p. 1-25.

Hillier, D., Ross, S.A., Westerfield, R.W., Jaffe, J. & Jordan, B.D. (2010). Corporate Finance: European Edition, McGraw-Hill - Higher Education, New York, NY, United States.

Hull, J.C. (2011). Fundamentals of Futures and Options Markets (Global Edition), Pearson Education, Inc., Boston, MA, United States.

Huang, Y. & Yang, J. (2008). Value premium in the Chinese stock market: free lunch or paid lunch?, Working paper, p. 1-31.

Israel, D. (2009). Data analysis in business research: a step-by-step nonparametric approach, Sage Publications, London, United Kingdom.

Kolb, R.W. (2010). Lessons from the financial crisis: causes, consequences, and our economic future (Robert W. Kolb Series), John Wiley & Sons, Hoboken, NJ, United States.

Jeong, J.G., Lee, G. & Mukherji, S. (2009). Do Dow stocks offer a value premium?, *The Journal of Wealth Management*, Vol. 12 (3), p. 95-103.

La Porta, R., Lakonishok, J. Shleifer, A. & Vishny, R.W. (1997). Good news for value stocks: further evidence on market efficiency, *Journal of Finance*, Vol. 52, p. 859-874.

Low, A.W., Repin, D.V. & Steenbarger, B.N. (2005). Fear and greed in financial markets: a clinical study of day-traders, *American Economic Review*, Vol. 95 (2), p. 352-359.

OANDA (2008). OANDA wins two rewards for forex innovation, Retrieved on May 15, 2011 from http://www.oanda.com/corp/news/pr/oanda061809

O'Shaughnessy, J.P. (2005). What Works on Wall Street: a guide to the best-performing investment strategies of all time, McGraw-Hill, New-York, NY, United States.

Petkova, R. & Zhang, L. (2005). Is value riskier than growth?, *Journal of Financial Economics*, Vol. 79, p. 187-202.

Pinto, J.E., Henry, A., Robinson, T.R. & Stowe, J.D. (2010). Equity Asset Valuation, CFA Institute. John Wiley & Sons, Hoboken, NJ, United States.

Reinhart, C. & K. Rogoff (2008). This time is different: a panoramic view of eight centuries of financial crises, NBER Working Paper 13882, March 2008.

Robertson, D. & Wright, S. (2006). Dividends, total cash flow to shareholders, and predictive return regressions, *Review of Economics and Statistics*, Vol. 88 (1), p. 91-99.

Rozeff, M.S. & Zaman, M.A. (1998). Overreaction and insider trading-evidence from growth and value Portfolios, *The Journal of Finance*, Vol. 53 (2), p. 701-716.

Sarna, D.E. & Malik, A. (2010). History of greed: financial fraud from tulip mania to Bernie Madoff, Wiley, Hoboken, NJ, United States.

Saunders, M., Lewis, P. & Thornhill, A. Research Methods for Business Students. Pearson Education, Harlow, United Kingdom

Sharpe, W., Alexander, G. & Bailey, J. (1999). Investments. Prentice Hall, Upper Saddle River, NJ, United States.

Wise, P. (2011). Financial Times - Portugal crisis threatens to trigger poll. Retrieved on May 12, 2011 from http://www.ft.com/cms/s/0/2a8721ea-5470-11e0-979a-00144feab49a.html

Yen, J. Y., Sun, Q. & Yan, Y. (2004). Value versus growth stocks in Singapore, *Journal of Multinational Financial Management*, Vol. 14, p. 19-34.

Appendixes

Appendix 1 | Studies and their multiples

Study	Period	Country/Sample	Multiples
International markets			
Capaul et al (1993)	1981-1992	6 markets, including U.S., France, and Japan	Book-to-market
Fama & French (1998)	1975-1995	13 markets, including U.K. Switzerland, the Netherlands	Book-to-market, Earnings-to-price, Cash flow-to-price, Dividend-to-price
Bauman et al (1998)	1986-1996	21 markets, including Canada, U.S. U.K. and Japan	Price-to-earnings, Price-to-book, Price-to-Cash flow, Dividend-yield
Cahine (2008)	1988-2003	Europe	Price-to-earnings
Developed markets			
Basu (1977)	1956-1971	United States	Price-to-earnings
De Bondt & Thaler (1985)	1933-1988	United States	Price-to-earnings
Lakonishok et al (1994)	1963-1990	United States	Book-to-market, Price-to-earnings, Cash flow-to-price
La Porta et al (1997)	1971-1993	United States	Book-to-market, Cash flow-to-price
Leladakis & Davidson (2001)	1980-1996	United Kingdom	Book-to-market, Sales-to-price
Beneda (2002)	1983-2001	United States	Price-to-earnings, Price-to-book, Price-to-Cash flow
Chan & Lakonishok (2004)	1979-2002	United States	Price-to-book
Black & McMillian (2006)	1975-2000	United States	Book-to-market
Athanassakos (2009)	1985-2005	Canada	Price-to-earnings, Price-to-book, Price-to-Cash flow
Jeong et al (2009)	1983-2006	United States	Book-to-price, dividend-to-price, earnings-to-price, cash flow-to-price, sales-to-price
Emerging Markets			
Fama & French (1998)	1975-1995	16, including Argentina and Hong Kong	Book-to-market, Earnings-to-price, Cash flow-to-price, Dividend yield
Chen & Zhang	1970-1993	6, Including Hong Kong, Malaysia and Thailand	Book-to-market
Gonenc & Karan (2003)	1993-1998	Turkey	Price-to-book
Yen et al (2004)	1975-1997	Singapore	Price-to-earnings, Price-to-book, Price-to-Cash flow
Huang & Yang (2008)	1998-2008	China	Book-to-market
Brown et al (2008)	1990-2005	4, including Hong Kong, Korea, Singapore and Taiwan	Book-to-market, Earnings-to-price, Cash flow-to-price, Dividend-to-price

APPENDIX 2 | SUMMARY STATISTICS ON VALUE AND GROWTH PORTFOLIOS

United States

	2007		2008		2009		2010		Average 2007-2010	
Market (Dow Jones Industrial index)										
Average monthly return (%)	0.020		-3.820		1.910		1.390		-0.120	
Median monthly return (%)	-0.278		-2.255		2.864		2.605		0.734	
Standard deviation (%)	3.291		5.702		5.810		4.827		3.100	
Risk-free rate (LIBOR U.S. 1M)										
Average monthly return (%)	4.130		1.050		0.090		0.120		1.350	
Median monthly return (%)	4.265		1.190		0.095		0.135		1.421	
Standard deviation (%)	0.838		0.775		0.058		0.033		0.399	
Value portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average monthly portfolio return (%)										
Low P/E	0.780	(0.573)	-3.880	-(1.427)	2.400	(2.460)	1.220	(1.598)	0.130	(0.945)
Low P/B	0.900	(0.822)	-2.490	(0.534)	1.860	(2.503)	1.950	(2.260)	0.555	(1.571)
Low P/C	0.690	(1.260)	-3.260	-(0.964)	2.170	(2.427)	2.010	(2.241)	0.403	(0.530)
Beta										
Low P/E	1.172		1.265		0.913		0.667		0.760	
Low P/B	1.150		0.995		0.714		1.147		0.870	
Low P/C	0.906		1.035		1.009		1.213		1.170	
Standard deviation (%)										
Low P/E	4.238		8.577		5.460		3.544		2.794	
Low P/B	4.301		6.740		4.679		5.769		3.170	
Low P/C	4.151		6.699		6.020		5.955		3.713	
Jensen's Alpha (%)										
Low P/E	1.470	(2.252)	1.230	(0.186)	0.640	(0.361)	0.260	(0.329)	-0.100	(0.730)
Low P/B	1.500	(2.240)	1.310	(0.968)	0.470	(1.206)	0.370	(0.457)	0.490	(1.075)
Low P/C	0.290	(0.035)	0.730	(1.393)	0.230	(0.497)	0.350	(0.727)	0.780	(0.344)
Treynor										
Low P/E	-2.850	-(2.780)	-3.890	-(1.629)	2.530	(2.585)	1.650	(2.246)	-1.600	-(0.643)
Low P/B	-2.810	(3.034)	-3.550	-(0.580)	2.470	(3.360)	1.590	(1.853)	-0.910	(0.221)
Low P/C	-3.790	-(2.650)	-4.160	-(2.844)	2.050	(2.277)	1.550	(1.729)	-0.810	-(0.361)

Growth portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average monthly portfolio return (%)										
High P/E	0.410	(0.552)	-2.190	-(0.674)	3.010	(3.873)	1.680	(1.928)	0.728	(1.354)
High P/B	0.370	(1.138)	-3.890	-(0.587)	3.660	(4.862)	1.550	(2.306)	0.423	(1.086)
High P/B	0.650	(0.589)	-2.490	-(1.152)	3.070	(5.477)	1.210	(2.110)	0.610	(0.854)
Beta										
High P/E	1.152		0.920		0.923		1.025		1.052	
High P/B	1.170		1.121		1.281		0.983		1.160	
High P/B	1.131		0.838		1.007		0.972		1.015	
Standard deviation (%)										
High P/E	4.142		5.426		5.698		5.135		3.343	
High P/B	4.255		6.991		7.616		4.901		3.671	
High P/B	4.256		5.242		6.239		4.932		3.278	
Jensen's Alpha (%)										
High P/E	1.010	(0.909)	1.240	(1.473)	1.240	(1.683)	0.270	(0.619)	0.930	(0.936)
High P/B	1.050	(1.563)	0.520	(1.153)	1.230	(1.131)	0.180	(0.378)	-0.800	(0.706)
High P/B	1.170	(1.346)	0.540	(0.957)	1.140	(1.141)	-0.140	-(0.321)	0.760	(0.981)
Treynor										
High P/E	-3.230	-(2.950)	-3.520	-(1.721)	3.160	(4.098)	1.520	(1.744)	-0.590	(0.485)
High P/B	-3.210	-(2.490)	-4.400	-(1.953)	2.780	(3.696)	1.450	(2.239)	0.780	-(0.766)
High P/B	-3.070	-(2.795)	-4.220	-(2.591)	2.950	(5.394)	1.120	(2.063)	-0.730	-(0.646)

Value minus Growth	2007		2008		2009		2010		Average 2007-2010	
Difference in average monthly return (%) (t-statistic in parentheses)										
P/E	0.377	(0.220)	-1.687	(-0.576)	-0.614	(-0.270)	-0.462	(-0.256)	-0.596	(-0.474)
P/B	0.526	(0.301)	1.403	(0.501)	-1.801	(-0.698)	0.397	(0.182)	0.131	(0.094)
P/C	0.004	(0.023)	-0.768	(-0.313)	-0.902	(-0.360)	0.794	(0.356)	-0.209	(-0.146)
Difference in median monthly return (%) (Mann-Whitney p-value in parentheses)										
P/E	0.021	(0.443)	-0.754	(0.625)	-1.413	(0.557)	-0.329	(0.688)	0.408	(0.728)
P/B	0.316	(0.489)	1.122	(0.272)	-2.358	(0.815)	-0.046	(0.489)	0.486	(0.420)
P/C	0.671	(0.557)	0.189	(0.535)	-0.305	(0.728)	0.132	(0.375)	-0.324	(0.512)
Difference in median monthly Jensen's Alpha (%) (t-statistic in parentheses)										
P/E	0.460	(0.680)	-0.009	(-0.070)	-0.594	(-0.887)	-0.008	(-0.014)	-1.026	(-2.394)**
P/B	0.442	(0.619)	0.791	(0.635)	-0.769	(-0.991)	0.190	(0.326)	-0.296	(-0.618)
P/C	-0.884	(-1.115)	0.188	(0.177)	-0.905	(-1.222)	0.488	(0.908)	0.019	(0.056)
Difference in median monthly Jensen's Alpha (%) (Mann-Whitney p-value in parentheses)										
P/E	1.343	(0.235)	-1.287	(0.782)	-1.322	(0.815)	-0.290	(0.466)	-0.207	(0.603)
P/B	0.676	(0.097)*	-0.185	(0.354)	0.075	(0.656)	0.080	(0.443)	0.369	(0.292)
P/C	-1.311	(0.903)	0.436	(0.235)	-0.645	(0.857)	1.048	(0.097)*	-0.637	(0.857)
Difference in average monthly Treynor (x100) (t-statistic in parentheses)										
P/E	0.378	(0.273)	-0.374	(-0.151)	-0.637	(-0.256)	0.125	(0.059)	-1.010	(-0.747)
P/B	0.401	(0.278)	0.854	(0.337)	-0.312	(-0.122)	0.137	(0.067)	-0.115	(-0.850)
P/C	-0.720	(-0.451)	0.061	(0.025)	-0.900	(-0.361)	0.431	(0.211)	-0.830	(-0.747)
Difference in median monthly Treynor (x100) (Mann-Whitney p-value in parentheses)										
P/E	0.171	(0.443)	0.092	(0.535)	-1.514	(0.557)	0.502	(0.489)	-1.128	(0.580)
P/B	-0.539	(0.443)	1.374	(0.333)	-0.337	(0.512)	-0.386	(0.535)	0.987	(0.398)
P/C	0.145	(0.668)	-0.253	(0.420)	-3.118	(0.747)	-0.334	(0.443)	-0.285	(0.603)

Germany

	2007		2008		2009		2010		Average 2007-2010	
Market (DAX Xetra)										
Average monthly return (%)	0.080		-3.810		2.140		1.830		0.060	
Median monthly return (%)	1.775		-2.367		3.676		1.139		1.056	
Standard deviation (%)	6.153		6.603		7.517		3.724		4.078	
Risk-free rate (EURIBOR 1M)										
Average monthly return (%)	4.120		4.250		0.810		0.570		2.440	
Median monthly return (%)	4.109		4.399		0.633		0.548		2.422	
Standard deviation (%)	0.335		0.647		0.446		0.161		0.164	
Value portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average monthly portfolio return (%)										
Low P/E	3.600	(1.627)	-4.260	-(4.011)	3.470	(4.505)	1.330	(0.725)	1.035	(1.352)
Low P/B	0.260	(1.309)	-5.220	-(3.613)	0.620	-(0.492)	4.360	(4.302)	0.005	-(0.890)
Low P/C	1.940	(2.225)	-3.190	-(1.306)	2.820	(3.552)	3.240	(3.557)	1.203	(1.883)
Beta										
Low P/E	0.919		1.252		1.151		0.691		0.920	
Low P/B	0.551		1.178		1.167		1.456		1.226	
Low P/C	0.105		0.935		1.089		1.203		1.080	
Standard deviation (%)										
Low P/E	8.706		8.961		9.625		2.772		4.347	
Low P/B	7.490		8.812		10.230		6.615		5.442	
Low P/C	8.059		6.966		8.501		5.344		4.612	
Jensen's Alpha (%)										
Low P/E	3.200	(2.067)	1.580	(0.847)	1.130	(0.999)	-0.110	-(0.164)	0.790	(1.285)
Low P/B	-1.630	-(0.317)	0.030	(1.400)	-1.740	-(2.100)	1.960	(0.880)	0.480	(0.382)
Low P/C	-2.060	(2.235)	0.090	(0.167)	0.560	(0.306)	1.160	(0.631)	1.330	(1.389)
Treynor										
Low P/E	-0.560	-(2.525)	-6.800	-(6.721)	2.310	(3.048)	1.100	(0.257)	-1.520	-(0.689)
Low P/B	-7.010	-(4.062)	-8.300	-(0.645)	-0.160	-(1.027)	2.600	(2.578)	-1.980	-(3.709)
Low P/C	2.090	-(1.950)	-7.960	-(5.883)	1.840	(2.846)	2.220	(2.454)	-1.150	-(0.610)

Growth portfolios	2007		2008		2009		2010		Average 2007-2010	
Average monthly portfolio return (%)										
High P/E	0.530	(0.919)	-4.070	-(1.040)	1.910	(1.530)	2.450	(2.166)	0.205	(1.248)
High P/B	1.020	(0.283)	-3.000	-(1.821)	1.760	(3.557)	0.930	(1.613)	0.178	(0.612)
High P/B	-0.480	(0.921)	-2.920	-(2.158)	-2.290	-(0.051)	1.210	(0.827)	-1.120	-(1.360)
Beta										
High P/E	0.851		1.112		0.948		0.826		0.959	
High P/B	0.761		0.438		0.919		0.869		0.820	
High P/B	0.892		1.113		0.670		0.468		0.784	
Standard deviation (%)										
High P/E	5.425		8.961		7.439		4.078		4.300	
High P/B	6.764		6.330		7.280		3.872		3.801	
High P/B	5.549		7.921		8.034		2.254		3.774	
Jensen's Alpha (%)										
High P/E	-0.150	-(0.054)	0.640	(1.013)	-0.160	-(0.605)	0.840	(0.586)	-0.050	(0.697)
High P/B	-0.030	-(1.615)	-3.720	-(3.597)	-0.280	(0.183)	-0.720	-(0.746)	-0.310	-(1.340)
High P/B	-0.990	-(0.787)	1.800	(2.163)	-3.990	-(3.450)	0.050	(0.009)	-1.690	-(1.150)
Treynor										
High P/E	-4.220	-(0.412)	-7.480	-(5.107)	1.160	(1.137)	2.280	(1.930)	-2.330	-(0.980)
High P/B	-4.070	-(5.417)	-16.550	-(13.475)	1.030	(3.133)	0.420	(1.078)	-2.760	-(5.016)
High P/B	-5.150	-(4.087)	-6.440	-(5.637)	-4.630	-(1.817)	1.380	(0.052)	-4.530	-(3.146)

Value minus Growth	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Difference in average monthly return (%) (t-statistic in parentheses)										
P/E	3.073	(1.038)	-0.192	(-0.053)	1.559	(0.444)	-1.119	(-0.786)	0.830	(0.470)
P/B	-0.762	(-0.261)	-2.215	(-0.707)	-1.134	(-0.313)	3.421	(1.546)*	-0.171	(-0.089)
P/C	2.423	(0.858)	-0.272	(-0.089)	5.102	(1.511)*	2.025	(1.209)	2.320	(1.349)*
Difference in median monthly return (%) (Mann-Whitney p-value in parentheses)										
P/E	0.708	(0.420)	-2.972	(0.668)	2.975	(0.292)	-1.441	(0.829)	0.142	(0.354)
P/B	1.026	(0.375)	-1.792	(0.782)	-4.049	(0.844)	2.689	(0.107)	-1.501	(0.603)
P/C	1.304	(0.170)	0.852	(0.512)	4.063	(0.097)*	2.730	(0.172)	3.243	(0.097)
Difference in median monthly Jensen's Alpha (%) (t-statistic in parentheses)										
P/E	3.349	(1.673)*	0.935	(0.499)	1.149	(0.345)	-0.949	(-1.150)	0.737	(0.878)
P/B	-1.607	(-0.799)	3.746	(2.243)**	-1.463	(-0.907)	2.683	(2.146)**	0.794	(0.957)
P/C	3.076	(2.135)**	-1.708	(-1.300)	4.548	(2.381)**	1.130	(1.173)	3.023	(4.262)***
Difference in median monthly Jensen's Alpha (%) (Mann-Whitney p-value in parentheses)										
P/E	2.121	(0.097)*	-0.166	(0.466)	1.603	(0.143)	-0.750	(0.937)	0.588	(0.143)
P/B	1.298	(0.375)	4.997	(0.013)**	-2.283	(0.708)	1.627	(0.015)**	1.720	(0.156)
P/C	3.022	(0.011)**	-1.996	(0.913)	3.754	(0.008)***	0.622	(0.201)	2.540	(0.006)***
Difference in average monthly Treynor (x100) (t-statistic in parentheses)										
P/E	3.656	(1.093)	0.682	(0.215)	1.288	(0.948)	-1.175	(-0.642)	0.803	(0.430)
P/B	-2.933	(-0.619)	8.520	(1.761)**	-1.192	(-0.348)	2.179	(1.190)	0.772	(0.419)
P/C	3.089	(1.071)	-1.521	(-0.505)	6.467	(1.564)*	0.842	(0.441)	3.390	(1.841)**
Difference in median monthly Treynor (x100) (Mann-Whitney p-value in parentheses)										
P/E	1.591	(0.354)	-1.615	(0.489)	1.911	(0.312)	-1.669	(0.799)	0.291	(0.292)
P/B	0.793	(0.489)	7.024	(0.087)*	-4.160	(0.844)	1.501	(0.156)	1.307	(0.185)
P/C	2.140	(0.156)	-0.246	(0.646)	4.663	(0.118)	1.940	(0.253)	2.536	(0.143)

France

	2007		2008		2009		2010		Average 2007-2010	
Market (CAC-40)										
Average monthly return (%)	-1.180		-4.110		1.910		0.280		-0.780	
Median monthly return (%)	-0.904		-1.699		3.734		0.381		0.378	
Standard deviation (%)	5.011		6.223		6.515		5.251		3.502	
Risk-free rate (EURIBOR 1M)										
Average monthly return (%)	4.120		4.250		0.810		0.570		2.440	
Median monthly return (%)	4.109		4.399		0.633		0.548		2.422	
Standard deviation (%)	0.335		0.647		0.446		0.161		0.164	
Value portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average monthly portfolio return (%)										
Low P/E	1.870	(1.085)	-4.430	-(1.980)	3.660	(3.918)	0.380	-(1.124)	0.370	(0.295)
Low P/B	1.260	(1.833)	-6.380	(4.199)	N/A	N/A	N/A	N/A	-2.560	-(0.984)
Low P/C	1.740	(2.031)	-5.640	-(3.222)	2.500	(3.019)	0.680	-(0.348)	-0.180	-(0.322)
Beta										
Low P/E	1.241		1.417		1.162		0.555		-0.931	
Low P/B	1.214		1.571		N/A		N/A		-1.233	
Low P/C	1.103		1.431		0.961		0.490		-0.705	
Standard deviation (%)										
Low P/E	8.628		10.228		7.837		4.411		4.622	
Low P/B	7.964		10.946		N/A		N/A		7.472	
Low P/C	6.595		9.681		6.740		4.055		3.886	
Jensen's Alpha (%)										
Low P/E	4.330	(2.618)	3.170	(2.877)	1.580	(1.577)	-0.030	(0.362)	-0.860	-(0.141)
Low P/B	3.570	(1.524)	2.500	(2.662)	N/A	N/A	N/A	N/A	-1.690	-(1.865)
Low P/C	3.460	(2.614)	2.070	(2.821)	0.630	(1.066)	0.260	(0.890)	-1.320	-(0.553)
Treynor										
Low P/E	-1.810	-(2.299)	-6.120	-(0.467)	2.450	(2.789)	-0.340	-(2.758)	2.220	(2.357)
Low P/B	-2.360	-(2.019)	-6.770	-(5.210)	N/A	N/A	N/A	N/A	5.470	(4.215)
Low P/C	-2.160	-(2.008)	-6.910	-(5.348)	1.750	(2.671)	0.230	-(1.555)	3.710	(3.977)

Growth portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average monthly portfolio return (%)										
High P/E	-1.300	-(0.303)	-4.210	-(1.817)	3.380	(3.141)	1.700	(0.604)	-0.108	(0.279)
High P/B	-0.960	-(1.128)	-4.270	-(2.424)	N/A	N/A	N/A	N/A	-2.615	-(2.695)
High P/B	-0.810	(0.126)	-2.640	-(2.520)	4.090	(4.760)	1.270	(0.660)	0.478	(0.428)
Beta										
High P/E	0.980		1.339		1.003		0.672		0.999	
High P/B	1.143		1.315		N/A		N/A		1.229	
High P/B	0.963		1.124		1.152		0.749		0.997	
Standard deviation (%)										
High P/E	5.288		8.896		6.955		4.176		4.143	
High P/B	6.519		8.791		N/A	N/A	N/A	N/A	5.574	
High P/B	5.563		7.315		8.189		4.464		4.330	
Jensen's Alpha (%)										
High P/E	-0.220	(0.062)	2.740	(2.644)	1.470	(1.094)	1.330	(1.583)	0.210	(0.547)
High P/B	0.970	-(0.180)	2.470	(2.002)	N/A	N/A	N/A	N/A	0.440	(1.226)
High P/B	0.170	-(0.453)	2.510	(3.171)	2.010	(0.981)	0.920	(0.341)	0.500	(1.211)
Treynor										
High P/E	-5.530	-(4.867)	-6.320	-(0.466)	2.560	(2.137)	1.680	(0.285)	1.630	(1.439)
High P/B	-4.440	-(4.680)	-6.480	-(5.114)	N/A	N/A	N/A	N/A	3.910	(3.915)
High P/B	-5.120	-(3.854)	-6.130	-(6.084)	2.840	(3.360)	0.940	(0.220)	0.940	(1.009)

Value minus Growth	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Difference in average monthly return (%) (t-statistic in parentheses)										
P/E	3.169	(1.085)	-0.222	(-0.057)	0.281	(0.093)	-1.322	(-0.754)	0.478	(0.267)
P/B	2.216	(0.746)	-2.110	(0.570)	N/A	N/A	N/A	N/A	0.052	(0.019)
P/C	2.553	(1.029)	-3.004	(-0.858)	-1.593	(-0.520)	-0.589	(-0.338)	-0.658	(-0.393)
Difference in median monthly return (%) (Mann-Whitney p-value in parentheses)										
P/E	1.388	(0.170)	-0.164	(0.535)	0.777	(0.398)	-1.728	(0.870)	0.016	(0.443)
P/B	2.962	(0.235)	-1.775	(0.625)	N/A	N/A	N/A	N/A	1.712	(0.398)
P/C	1.905	(0.185)	-0.703	(0.765)	-1.738	(0.625)	-1.008	(0.625)	-0.749	(0.580)
Difference in median monthly Jensen's Alpha (%) (t-statistic in parentheses)										
P/E	4.551	(2.491)**	0.431	(0.243)	0.110	(0.129)	-1.355	(-1.176)	-1.075	(-0.763)
P/B	2.592	(1.473)*	0.027	(0.016)	N/A	N/A	N/A	N/A	-2.124	(-1.240)
P/C	3.292	(2.480)**	-0.441	(-0.341)	-1.382	(-1.211)	-0.662	(-0.607)	-1.818	(-1.351)*
Difference in median monthly Jensen's Alpha (%) (Mann-Whitney p-value in parentheses)										
P/E	2.556	(0.026)**	0.233	(0.443)	0.483	(0.354)	-1.222	(0.843)	-0.687	(0.815)
P/B	1.344	(0.071)*	0.660	(0.535)	N/A	N/A	N/A	N/A	-3.091	(0.930)
P/C	3.067	(0.007)***	-0.350	(0.489)	0.085	(0.782)	-0.549	(0.646)	-1.764	(0.913)
Difference in average monthly Treynor (x100) (t-statistic in parentheses)										
P/E	3.716	(1.444)*	0.192	(0.067)	-0.107	(-0.038)	-2.025	(-0.697)	0.586	(0.363)
P/B	2.085	(0.819)	-0.288	(-0.103)	N/A	N/A	N/A	N/A	1.567	(0.790)
P/C	2.964	(1.218)	-0.785	(-0.286)	-1.091	(-0.375)	-0.706	(-0.240)	2.769	(1.642)**
Difference in median monthly Treynor (x100) (Mann-Whitney p-value in parentheses)										
P/E	2.571	(0.097)*	-0.006	(0.512)	0.652	(0.398)	-3.043	(0.844)	0.917	(0.398)
P/B	2.662	(0.201)	-0.096	(0.443)	N/A	N/A	N/A	N/A	0.300	(0.292)
P/C	1.845	(0.143)	0.737	(0.625)	-0.689	(0.603)	-1.775	(0.646)	2.060	(0.097)*

China

	2007		2008		2009		2010		Average 2007-2010	
Market (Hang Seng)										
Average monthly return (%)	1.280		-4.740		3.470		1.300		0.330	
Median monthly return (%)	2.062		-5.574		2.436		1.968		0.223	
Standard deviation (%)	8.616		10.049		7.365		3.737		3.905	
Risk-free rate (HIBOR 1M)										
Average monthly return (%)	4.190		1.810		0.130		0.200		1.580	
Median monthly return (%)	4.246		1.781		0.089		0.186		1.576	
Standard deviation (%)	0.837		1.056		0.082		0.121		0.462	
Value portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average monthly portfolio return (%)										
Low P/E	3.180	(4.023)	-5.140	-(1.792)	3.270	(3.411)	2.890	(2.425)	1.050	(1.002)
Low P/B	3.020	(3.736)	-5.570	-(2.088)	4.000	(3.502)	2.280	(2.356)	0.933	(0.903)
Low P/C	2.630	(5.287)	-3.440	-(1.804)	3.010	(2.413)	1.580	(1.153)	0.945	(1.496)
Beta										
Low P/E	0.815		1.197		1.256		1.019		0.910	
Low P/B	0.820		1.228		1.597		1.339		1.040	
Low P/C	0.974		0.868		0.808		0.641		0.859	
Standard deviation (%)										
Low P/E	7.622		13.103		9.413		4.200		4.100	
Low P/B	7.470		13.363		11.974		5.616		4.671	
Low P/C	8.973		9.113		6.069		3.141		3.787	
Jensen's Alpha (%)										
Low P/E	1.360	(0.933)	0.890	(0.739)	-1.050	-(1.283)	1.560	(2.134)	0.610	(0.623)
Low P/B	1.210	(1.316)	0.670	(0.363)	-1.450	-(1.710)	0.600	(0.969)	0.660	(1.215)
Low P/C	1.270	(0.913)	0.430	(0.390)	0.190	(0.191)	0.680	(1.267)	0.440	(0.249)
Treynor										
Low P/E	-1.240	-(0.677)	-5.800	-(3.319)	2.500	(2.652)	2.640	(2.220)	-0.580	-(0.633)
Low P/B	-1.430	-(0.613)	-6.000	-(3.477)	2.430	(2.143)	1.560	(1.478)	-0.620	-(1.047)
Low P/C	-1.590	(0.832)	-6.050	-(3.422)	3.570	(2.887)	2.160	(0.151)	-0.740	-(0.199)

Growth portfolios	2007		2008		2009		2010		Average 2007-2010	
Average monthly portfolio return (%)										
High P/E	2.510	(3.744)	-5.550	-(2.907)	5.600	(5.938)	2.170	(1.406)	1.183	(1.090)
High P/B	2.210	(4.240)	-4.890	-(3.895)	4.660	(2.866)	1.260	(0.448)	0.810	(0.336)
High P/B	1.860	(2.545)	-6.680	-(4.621)	5.870	(5.750)	2.620	(1.313)	0.918	(0.767)
Beta										
High P/E	0.904		1.198		1.160		1.225		1.059	
High P/B	1.059		1.089		1.220		1.026		1.120	
High P/B	0.852		1.297		1.267		1.377		1.005	
Standard deviation (%)										
High P/E	8.296		13.032		9.303		5.080		4.311	
High P/B	9.479		11.558		9.480		4.236		4.537	
High P/B	7.955		14.286		10.461		5.642		4.587	
Jensen's Alpha (%)										
High P/E	0.940	(0.205)	0.490	(0.821)	1.600	(1.524)	0.620	(1.305)	0.930	(0.846)
High P/B	1.090	(1.076)	0.430	(0.088)	0.460	-(0.007)	-0.070	-(0.237)	0.630	(0.459)
High P/B	0.090	-(0.566)	0.010	-(0.619)	1.510	(1.174)	0.900	(1.489)	0.580	(0.357)
Treynor										
High P/E	-1.860	-(0.689)	-6.140	-(3.581)	4.720	(5.050)	1.610	(1.008)	-0.380	-(1.021)
High P/B	-1.870	-(0.317)	-6.150	-(4.262)	3.710	(2.283)	1.040	(0.069)	-0.690	-(1.133)
High P/B	-2.860	-(2.138)	-6.540	-(4.929)	4.530	(4.474)	1.760	(0.680)	-0.670	-(1.397)

Value minus Growth	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Difference in average monthly return (%) (t-statistic in parentheses)										
P/E	0.672	(0.207)	0.413	(0.077)	-2.327	(-0.609)	0.716	(0.376)	-0.131	(-0.076)
P/B	0.810	(0.232)	-0.673	(-0.132)	-0.657	(-0.149)	1.020	(0.502)	0.126	(0.067)
P/C	0.831	(0.240)	3.231	(0.660)	-2.859	(-0.819)	-1.039	(-0.557)	0.041	(0.024)
Difference in median monthly return (%) (Mann-Whitney p-value in parentheses)										
P/E	0.280	(0.420)	1.115	(0.466)	-2.527	(0.708)	1.019	(0.398)	-0.088	(0.443)
P/B	-0.503	(0.557)	1.806	(0.443)	0.636	(0.580)	1.908	(0.375)	0.567	(0.512)
P/C	2.743	(0.253)	2.817	(0.420)	-3.335	(0.709)	-0.160	(0.750)	0.729	(0.466)
Difference in median monthly Jensen's Alpha (%) (t-statistic in parentheses)										
P/E	0.413	(0.409)	0.406	(0.182)	-2.670	(-2.273)**	0.945	(1.161)	-0.318	(-0.407)
P/B	0.116	(0.127)	0.238	(0.119)	-1.913	(-1.913)**	0.673	(0.744)	0.026	(0.030)
P/C	1.188	(1.054)	0.422	(0.212)	-1.327	(-0.948)	-0.228	(-0.256)	-0.142	(-0.158)
Difference in median monthly Jensen's Alpha (%) (Mann-Whitney p-value in parentheses)										
P/E	0.727	(0.333)	-0.008	(0.466)	-2.807	(0.974)	0.829	(0.170)	-0.223	(0.708)
P/B	0.240	(0.443)	0.275	(0.535)	-1.702	(0.956)	1.206	(0.130)	0.755	(0.489)
P/C	1.479	(0.170)	1.001	(0.333)	-0.984	(0.799)	-0.222	(0.646)	-0.108	(0.603)
Difference in average monthly Treynor (x100) (t-statistic in parentheses)										
P/E	0.621	(0.181)	0.341	(0.073)	-2.213	(-0.700)	1.028	(0.611)	-0.206	(-0.120)
P/B	0.443	(0.132)	0.149	(0.032)	-1.287	(-0.413)	0.519	(0.306)	0.068	(0.040)
P/C	1.207	(0.349)	0.490	(0.107)	-0.964	(-0.300)	0.398	(0.218)	-0.670	(-0.037)
Difference in median monthly Treynor (x100) (Mann-Whitney p-value in parentheses)										
P/E	0.012	(0.420)	0.262	(0.512)	-2.398	(0.747)	1.213	(0.272)	0.388	(0.580)
P/B	-0.296	(0.557)	0.785	(0.420)	-0.141	(0.668)	1.409	(0.420)	0.857	(0.557)
P/C	2.970	(0.253)	1.508	(0.512)	-1.586	(0.625)	0.826	(0.489)	1.198	(0.466)

United Kingdom

	2007		2008		2009		2010		Average 2007-2010	
Market (FTSE-100)										
Average monthly return (%)	-0.450		-2.900		1.860		1.280		-0.050	
Median monthly return (%)	-0.873		-2.603		2.440		2.389		0.338	
Standard deviation (%)	3.796		6.176		5.161		4.741		2.726	
Risk-free rate (LIBOR U.K. 1M)										
Average monthly return (%)	5.130		2.370		0.320		0.280		2.030	
Median monthly return (%)	5.319		2.489		0.281		0.260		2.087	
Standard deviation (%)	0.441		0.993		0.104		0.040		0.334	
Value portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average monthly portfolio return (%)										
Low P/E	0.890	(0.951)	-3.030	-(1.900)	4.890	(6.062)	1.720	(0.872)	1.118	(1.672)
Low P/B	0.120	(1.062)	-3.400	-(2.288)	4.570	(4.390)	2.550	(2.592)	0.960	(0.892)
Low P/C	1.020	(1.778)	-2.790	-(1.586)	5.490	(6.310)	2.090	(1.031)	1.453	(1.273)
Beta										
Low P/E	1.022		1.300		1.063		0.707		1.000	
Low P/B	1.003		1.384		1.022		1.439		1.342	
Low P/C	1.074		1.200		1.198		0.886		1.199	
Standard deviation (%)										
Low P/E	4.073		8.581		6.135		3.703		3.075	
Low P/B	4.119		8.764		6.552		6.971		3.793	
Low P/C	4.221		7.820		7.193		4.554		3.443	
Jensen's Alpha (%)										
Low P/E	1.460	(1.502)	1.460	(1.989)	2.930	(2.457)	0.740	(0.572)	1.170	(1.308)
Low P/B	0.590	(0.774)	1.530	(2.100)	2.680	(1.506)	0.830	(0.625)	1.720	(1.413)
Low P/C	1.870	(1.695)	1.170	(0.892)	3.320	(2.180)	0.930	(0.631)	1.920	(1.871)
Treynor										
Low P/E	-4.150	-(4.128)	-4.150	-(2.780)	4.300	(5.481)	2.050	(0.702)	-0.910	-(0.522)
Low P/B	-4.990	-(4.095)	-4.170	-(3.253)	4.160	(4.060)	1.580	(1.622)	-0.790	-(1.223)
Low P/C	-3.830	-(3.298)	-4.300	-(3.798)	4.310	(5.027)	2.050	(0.887)	-0.480	-(0.542)

Growth portfolios	2007		2008		2009		2010		Average 2007-2010	
Average monthly portfolio return (%)										
High P/E	-0.090	(0.772)	-1.780	-(0.629)	3.250	(3.661)	2.540	(1.622)	0.980	(0.890)
High P/B	-0.450	(0.812)	-4.160	-(2.904)	3.950	(4.549)	2.520	(1.641)	0.465	(0.597)
High P/B	-0.590	(0.615)	-2.300	-(0.235)	2.610	(3.761)	2.350	(2.069)	0.518	(0.523)
Beta										
High P/E	0.985		1.067		0.674		0.940		1.053	
High P/B	1.143		1.224		0.821		0.693		1.075	
High P/B	0.807		0.990		0.694		0.920		0.941	
Standard deviation (%)										
High P/E	4.405		6.948		4.334		4.772		3.116	
High P/B	4.789		8.555		5.385		3.624		3.358	
High P/B	4.057		6.592		4.116		4.710		2.899	
Jensen's Alpha (%)										
High P/E	0.280	(0.899)	1.480	(1.865)	1.890	(1.982)	1.320	(0.904)	1.140	(1.097)
High P/B	0.800	(1.307)	-0.070	(0.779)	2.360	(1.717)	1.550	(1.368)	0.670	(1.280)
High P/B	-1.220	-(0.471)	0.550	-(0.219)	1.220	(2.011)	1.150	(1.622)	0.440	(0.193)
Treynor										
High P/E	-5.300	-(4.618)	-3.890	-(3.006)	4.340	(5.040)	2.410	(1.451)	-0.990	-(1.300)
High P/B	-4.880	-(4.020)	-5.330	-(3.676)	4.410	(5.065)	3.240	(1.993)	-1.450	-(1.239)
High P/B	-7.090	-(5.826)	-4.720	(3.064)	3.290	(5.002)	2.250	(1.967)	-1.600	-(1.558)

Value minus Growth	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Difference in average monthly return (%) (t-statistic in parentheses)										
P/E	0.978	(0.565)	-1.246	(-0.391)	1.638	(0.756)	-0.816	(-0.468)	0.139	(0.110)
P/B	0.568	(0.312)	0.755	(0.214)	0.626	(0.256)	0.033	(0.015)	0.496	(0.339)
P/C	1.603	(0.899)	-0.495	(-0.168)	2.880	(1.204)	-0.254	(-0.134)	0.934	(0.719)
Difference in median monthly return (%) (Mann-Whitney p-value in parentheses)										
P/E	0.178	(0.292)	-1.271	(0.625)	2.400	(0.218)	-0.750	(0.688)	0.782	(0.489)
P/B	0.250	(0.354)	0.616	(0.443)	-0.159	(0.398)	0.950	(0.489)	0.295	(0.602)
P/C	1.163	(0.156)	-1.351	(0.466)	2.549	(0.118)	-1.038	(0.557)	0.750	(0.272)
Difference in median monthly Jensen's Alpha (%) (t-statistic in parentheses)										
P/E	1.184	(1.552)*	-0.017	(-0.014)	1.041	(0.977)	-0.583	(-0.866)	0.028	(0.051)
P/B	-0.210	(-0.272)	1.602	(1.230)	0.319	(0.220)	-0.718	(-1.185)	1.051	(1.780)**
P/C	3.092	(3.726)***	0.615	(0.562)	2.104	(1.767)**	-0.219	(-0.301)	1.470	(2.791)***
Difference in median monthly Jensen's Alpha (%) (Mann-Whitney p-value in parentheses)										
P/E	0.602	(0.156)	0.124	(0.375)	0.475	(0.201)	-0.332	(0.782)	0.211	(0.420)
P/B	-0.533	(0.765)	1.322	(0.218)	-0.212	(0.489)	-0.742	(0.882)	0.133	(0.130)
P/C	2.166	(0.000)***	1.112	(0.235)	0.170	(0.170)	-0.991	(0.747)	1.679	(0.007)***
Difference in average monthly Treynor (x100) (t-statistic in parentheses)										
P/E	1.147	(0.709)	-0.261	(-0.092)	-0.045	(-0.018)	-0.363	(-0.172)	0.086	(0.071)
P/B	-0.114	(-0.072)	1.163	(0.411)	-0.254	(-0.096)	-1.656	(-0.802)	0.658	(0.549)
P/C	3.092	(1.875)**	0.414	(0.147)	1.021	(0.419)	-0.200	(-0.095)	1.124	(0.935)
Difference in median monthly Treynor (x100) (Mann-Whitney p-value in parentheses)										
P/E	0.490	(0.292)	0.227	(0.625)	0.441	(0.398)	-0.648	(0.603)	0.778	(0.489)
P/B	0.075	(0.557)	1.322	(0.312)	-1.005	(0.625)	-0.371	(0.844)	0.002	(0.667)
P/C	2.528	(0.030)**	0.734	(0.489)	0.025	(0.420)	-1.079	(0.545)	1.016	(0.201)

Global

Value portfolios	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Average (Median) monthly portfolio return (%)										
Low P/E	1.640	(2.249)	-3.710	-(3.333)	3.770	(4.833)	0.770	(0.403)	0.618	(0.688)
Low P/B	1.410	(2.401)	-4.480	-(2.595)	3.690	(2.514)	1.640	(1.308)	0.565	(0.750)
Low P/C	1.270	(2.351)	-4.410	-(3.505)	4.130	(4.374)	1.090	-(0.190)	0.520	(0.309)
Beta										
Low P/E	1.344		1.194		0.867		0.384		0.863	
Low P/B	1.418		1.252		1.102		0.535		1.022	
Low P/C	1.338		1.131		0.928		0.348		0.930	
Standard deviation (%)										
Low P/E	5.811		8.634		5.611		3.179		3.488	
Low P/B	5.916		9.058		7.813		3.711		3.903	
Low P/C	5.778		8.034		5.977		3.295		3.805	
Jensen's Alpha (%)										
Low P/E	3.540	(3.237)	1.540	(1.815)	2.220	(1.879)	0.100	(0.716)	0.620	(0.644)
Low P/B	3.630	(4.454)	1.120	(0.955)	-2.310	-(3.654)	0.760	(0.572)	0.820	-(1.250)
Low P/C	3.140	(2.644)	0.550	(0.484)	-1.940	-(3.077)	0.470	(0.599)	0.630	(0.728)
Treynor										
Low P/E	-1.850	-(1.539)	-3.980	-(3.486)	4.650	(5.366)	1.680	-(0.181)	-0.850	-(0.845)
Low P/B	-1.920	-(1.545)	-4.420	-(2.740)	3.270	(2.232)	2.840	(2.230)	-0.770	-(1.453)
Low P/C	-2.140	-(1.688)	-4.830	-(4.085)	4.350	(5.014)	2.780	-(0.863)	-0.890	(0.621)

Growth portfolios	2007		2008		2009		2010		Average 2007-2010	
Average monthly portfolio return (%)										
High P/E	0.260	(0.091)	-3.170	-(0.883)	3.080	(3.055)	1.500	(1.523)	0.418	(0.494)
High P/B	0.020	(1.130)	-4.010	-(2.527)	3.550	(4.636)	1.100	(1.302)	0.165	-(0.139)
High P/B	0.010	(0.035)	-3.400	-(0.122)	3.250	(3.036)	1.350	(0.313)	0.303	(0.026)
Beta										
High P/E	1.158		1.012		0.782		0.477		0.834	
High P/B	1.104		1.111		0.859		0.453		0.921	
High P/B	1.130		1.053		0.969		0.473		0.885	
Standard deviation (%)										
High P/E	4.558		7.291		5.231		3.160		3.204	
High P/B	4.578		7.676		5.448		3.185		3.341	
High P/B	4.214		7.871		6.582		3.178		3.283	
Jensen's Alpha (%)										
High P/E	1.330	(1.002)	1.160	(1.264)	1.520	(1.110)	0.700	(0.814)	0.500	(0.517)
High P/B	0.840	(1.159)	0.850	(0.916)	-1.800	-(2.848)	0.330	(0.751)	0.260	(0.331)
High P/B	0.940	(0.065)	1.150	(0.291)	-2.030	-(3.213)	0.550	(0.930)	0.450	(0.520)
Treynor										
High P/E	-3.340	-(2.193)	-4.170	-(2.018)	4.040	(3.812)	2.890	(3.077)	-1.020	-(0.936)
High P/B	-3.720	-(2.162)	-4.550	-(3.589)	4.030	(5.350)	2.150	(2.642)	-1.280	-(0.647)
High P/B	-3.650	-(2.739)	-4.220	-(1.684)	3.260	(3.077)	2.590	(0.439)	-1.100	-(1.087)

Value minus Growth	**2007**		**2008**		**2009**		**2010**		**Average 2007-2010**	
Difference in average monthly return (%) (t-statistic in parentheses)										
P/E	1.376	(0.645)	-0.537	(-0.165)	0.696	(0.314)	-0.731	(-0.565)	0.200	(0.146)
P/B	1.384	(0.641)	-0.476	(-0.139)	0.141	(0.051)	0.546	(0.387)	0.398	(0.268)
P/C	1.265	(0.613)	-1.017	(-0.313)	0.875	(0.341)	-0.258	(-0.195)	0.217	(0.150)
Difference in median monthly return (%) (Mann-Whitney p-value in parentheses)										
P/E	1.585	(0.235)	-2.453	(0.489)	1.778	(0.420)	-1.169	(0.646)	0.194	(0.398)
P/B	1.108	(0.170)	-0.068	(0.580)	-2.212	(0.557)	0.590	(0.443)	0.889	(0.646)
P/C	1.996	(0.201)	-3.383	(0.603)	1.702	(0.398)	-0.503	(0.688)	0.053	(0.353)
Difference in median monthly Jensen's Alpha (%) (t-statistic in parentheses)										
P/E	2.209	(1.822)**	0.429	(0.301)	0.697	(0.568)	-0.601	(-0.681)	0.125	(0.194)
P/B	2.792	(2.399)**	0.271	(0.197)	-0.511	(-0.215)	0.432	(0.477)	0.556	(0.825)
P/C	2.200	(2.029)**	-0.600	(-0.407)	0.085	(0.037)	0.189	(0.056)	0.179	(0.255)
Difference in median monthly Jensen's Alpha (%) (Mann-Whitney p-value in parentheses)										
P/E	2.224	(0.063)*	0.551	(0.398)	0.781	(0.292)	-0.098	(0.728)	1.277	(0.398)
P/B	3.295	(0.023)**	0.039	(0.420)	-0.806	(0.688)	-0.179	(0.398)	0.290	(0.253)
P/C	1.997	(0.030)**	0.194	(0.580)	0.136	(0.466)	-0.033	(0.512)	0.208	(0.354)
Difference in average monthly Treynor (x100) (t-statistic in parentheses)										
P/E	1.485	(0.947)	0.184	(0.064)	0.614	(0.195)	-1.207	(-0.393)	0.175	(0.119)
P/B	1.800	(1.151)	0.131	(0.047)	-0.763	(-0.278)	0.694	(0.243)	0.516	(0.356)
P/C	1.513	(0.991)	-0.606	(-0.208)	1.088	(0.402)	-0.078	(-0.082)	0.205	(0.138)
Difference in median monthly Treynor (x100) (Mann-Whitney p-value in parentheses)										
P/E	0.655	(0.185)	-1.467	(0.466)	1.554	(0.466)	-3.258	(0.668)	0.903	(0.375)
P/B	0.617	(0.143)	0.039	(0.489)	-3.118	(0.603)	-0.413	(0.412)	-0.806	(0.253)
P/C	1.051	(0.170)	-2.401	(0.580)	1.937	(0.375)	-1.302	(0.646)	-0.162	(0.312)

Appendix 3 | Statistics on price-multiples

United States

Value portfolios	**2007**	**2008**	**2009**	**2010**	**Avg. 2007-2010**
F-statistic b/t groups	0.070	0.107	0.030	0.084	0.052
Significance b/t groups	0.993	0.899	0.970	0.919	0.949
Return P/B	0.899	-2.484	1.859	1.946	0.555
Difference in average return (%) (t-statistic in parentheses)					
- P/E	0.115 (0.066)	1.393 (0.442)	-0.540 -(0.260)	0.724 (0.370)	0.423 (0.346)
- P/C	0.207 (0.120)	0.774 (0.282)	-0.305 -(0.139)	-0.061 -(0.025)	0.154 (0.109)
Return P/B	0.822	0.534	2.504	0.023	1.571
Difference in median return (%) (Mann-Whitney p-value in parentheses)					
- P/E	0.249 (0.443)	1.962 (0.398)	0.044 (0.580)	0.662 (0.312)	0.626 (0.354)
- P/C	-0.438 (0.489)	1.498 (0.375)	-0.077 (0.535)	0.018 (0.512)	0.104 (0.466)
Growth portfolios	**2007**	**2008**	**2009**	**2010**	**Avg. 2007-2010**
F-statistic b/t groups	0.160	0.279	0.030	0.028	0.024
Significance b/t groups	0.984	0.758	0.905	0.972	0.976
Return P/B	0.375	-3.888	3.660	1.550	0.424
Difference in average return (%) (t-statistic in parentheses)					
- P/E	-0.032 -(0.186)	-1.698 -(0.665)	0.648 (0.236)	-0.134 -(0.065)	-0.304 -(0.212)
- P/C	-0.280 -(0.161)	-1.398 -(0.550)	0.594 (0.209)	0.337 (0.168)	-0.187 -(0.131)
Return P/B	1.138	-0.587	4.862	2.306	1.085
Difference in median return (%) (Mann-Whitney p-value in parentheses)					
- P/E	0.586 (0.535)	0.087 (0.728)	0.989 (0.312)	0.378 (0.557)	-0.268 (0.603)
- P/C	0.549 (0.489)	0.575 (0.535)	-0.615 (0.374)	0.196 (0.443)	0.231 (0.489)

Germany

Value portfolios	2007		2008		2009		2010		Avg. 2007-2010	
F-statistic b/t groups	0.511		0.178		0.298		1.054		0.216	
Significance b/t groups	0.605		0.837		0.744		0.360		0.807	
Return P/B	0.258		-5.216		0.622		4.357		0.005	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	-3.342	-(1.008)	-0.955	-(0.263)	-2.851	-(0.703)	3.029	(1.463) *	-0.103	-(0.512)
- P/C	-1.686	-(0.531)	-0.202	-(0.623)	-2.195	-(0.572)	1.121	(0.456)	-1.195	-(0.580)
Return P/B	1.309		-3.613		-0.492		4.302		0.889	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	-0.318	(0.512)	0.398	(0.668)	-4.997	(0.830)	3.577	(0.107)	-2.242	(0.765)
- P/C	-0.916	(0.625)	-2.307	(0.799)	-4.044	(0.829)	0.745	(0.398)	-2.773	(0.815)
Growth portfolios	**2007**		**2008**		**2009**		**2010**		**Avg. 2007-2010**	
F-statistic b/t groups	0.198		0.081		1.179		0.636		0.436	
Significance b/t groups	0.821		0.923		0.320		0.536		0.650	
Return P/B	1.019		-3.003		1.758		0.935		0.177	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	0.492	(0.197)	1.066	(0.337)	-0.157	-(0.052)	-1.512	-(0.931)	-0.028	-(0.017)
- P/C	1.496	(0.592)	-0.082	-(0.280)	4.045	(1.292)	-0.276	-(0.213)	1.296	(0.838)
Return P/B	0.283		-1.821		3.557		1.613		0.611	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	-0.636	(0.603)	-0.782	(0.535)	2.027	(0.375)	-0.553	(0.815)	-0.636	(0.580)
- P/C	-0.638	(0.412)	0.337	(0.489)	4.068	(0.071)	0.786	(0.489)	1.971	(0.253)

France

Value portfolios	2007		2008		2009	2010	Avg. 2007-2010	
F-statistic b/t groups	0.021		0.110		N/A	N/A	0.951	
Significance b/t groups	0.979		0.896		N/A	N/A	0.397	
Return P/B	1.256		-0.639		N/A	N/A	-2.565	
Difference in average return (%) (t-statistic in parentheses)								
- P/E	-0.617	-(0.182)	-1.958	-(0.453)	N/A	N/A	-2.936	-(1.518)
- P/C	-0.485	-(0.162)	-0.743	-(0.176)	N/A	N/A	-2.384	-(0.982)
Return P/B	1.833		-4.199		N/A	N/A	-0.984	
Difference in median return (%) (Mann-Whitney p-value in parentheses)								
- P/E	0.749	(0.512)	-2.219	(0.668)	N/A	N/A	-1.279	(0.870)
- P/C	-0.198	(0.534)	-0.977	(0.535)	N/A	N/A	-0.662	(0.765)
Growth portfolios	**2007**		**2008**		**2009**	**2010**	**Avg. 2007-2010**	
F-statistic b/t groups	0.022		0.147		N/A	N/A	1.452	
Significance b/t groups	0.978		0.864		N/A	N/A	0.249	
Return P/B	-0.960		-4.273		N/A	N/A	-2.616	
Difference in average return (%) (t-statistic in parentheses)								
- P/E	0.337	(0.139)	-0.066	-(0.018)	N/A	N/A	-2.510	-(1.252)
- P/C	-0.148	-(0.060)	-1.636	-(0.495)	N/A	N/A	-3.094	-(1.518)
Return P/B	-1.128		-2.424		N/A	N/A	-2.695	
Difference in median return (%) (Mann-Whitney p-value in parentheses)								
- P/E	-0.825	(0.466)	-0.608	(0.625)	N/A	N/A	-2.975	(0.870)
- P/C	-1.254	(0.603)	0.096	(0.668)	N/A	N/A	-3.123	(0.913)

China

Value portfolios	**2007**		**2008**		**2009**		**2010**		**Avg. 2007-2010**	
F-statistic b/t groups	0.015		0.104		0.035		0.260		0.003	
Significance b/t groups	0.986		0.901		0.965		0.773		0.997	
Return P/B	3.016		-5.567		4.003		2.281		0.933	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	-0.161	-(0.052)	-0.430	-(0.080)	0.732	(0.166)	-0.605	-(0.299)	-0.116	-(0.065)
- P/C	0.384	(0.114)	-2.122	-(0.455)	0.992	(0.256)	0.700	(0.377)	-0.011	-(0.007)
Return P/B	3.736		-2.088		3.502		2.356		0.336	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	-0.287	(0.603)	-0.297	(0.580)	0.091	(0.512)	-0.069	(0.625)	-0.666	(0.512)
- P/C	-1.551	(0.603)	-0.284	(0.603)	1.089	(0.512)	1.204	(0.312)	-0.116	-(0.503)
Growth portfolios	**2007**		**2008**		**2009**		**2010**		**Avg. 2007-2010**	
F-statistic b/t groups	0.020		0.058		0.051		0.229		0.022	
Significance b/t groups	0.980		0.944		0.950		0.797		0.978	
Return P/B	2.206		-4.894		4.657		1.261		0.806	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	-0.300	-(0.082)	0.658	(0.131)	-0.941	-(0.245)	-0.911	-(0.477)	-0.373	-(0.207)
- P/C	0.407	(0.114)	1.782	(0.336)	-1.213	-(0.298)	-1.362	-(0.668)	-0.096	-(0.052)
Return P/B	4.239		-3.895		2.866		0.448		0.903	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	-0.496	(0.512)	-0.988	(0.512)	-3.072	(0.646)	-0.959	(0.688)	-0.188	(0.603)
- P/C	1.695	(0.354)	0.726	(0.466)	-2.882	(0.688)	-0.865	(0.765)	0.135	(0.443)

United Kingdom

Value portfolios	2007		2008		2009		2010		Avg. 2007-2010	
F-statistic b/t groups	0.164		0.016		0.058		0.075		0.063	
Significance b/t groups	0.849		0.984		0.943		0.928		0.940	
Return P/B	0.124		-3.401		4.574		2.552		0.962	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	-0.765	-(0.458)	-0.375	-(0.106)	-0.314	-(0.121)	0.830	(0.364)	-0.156	-(0.111)
- P/C	-0.892	-(0.524)	-0.607	-(0.179)	-0.912	-(0.325)	0.461	(0.192)	-0.488	-(0.330)
Return P/B	1.062		-2.288		4.390		2.592		0.597	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	0.112	(0.728)	-0.388	(0.554)	-1.672	(0.668)	1.720	(0.398)	-1.075	(0.557)
- P/C	-0.716	(0.728)	-0.702	(0.557)	-1.920	(0.708)	1.561	(0.292)	-0.676	(0.688)
Growth portfolios	**2007**		**2008**		**2009**		**2010**		**Avg. 2007-2010**	
F-statistic b/t groups	0.040		0.341		0.250		0.007		0.099	
Significance b/t groups	0.961		0.714		0.780		0.993		0.906	
Return P/B	-0.445		-4.157		3.946		2.252		0.466	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	-0.385	-(0.191)	-2.377	-(0.747)	0.699	(0.350)	-0.020	-(0.012)	-0.514	-(0.389)
- P/C	0.143	(0.079)	-1.857	-(0.596)	1.341	(0.685)	1.742	(0.102)	-0.050	-(0.039)
Return P/B	0.812		-2.904		4.548		1.641		0.902	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	0.040	(0.535)	-2.275	(0.782)	0.887	(0.333)	0.019	(0.535)	0.002	(0.668)
- P/C	0.197	(0.398)	-2.669	(0.646)	0.788	(0.354)	-0.428	(0.489)	0.369	(0.512)

Global

Value portfolios	2007		2008		2009		2010		Avg. 2007-2010	
F-statistic b/t groups	0.012		0.030		0.015		0.203		0.002	
Significance b/t groups	0.998		0.971		0.985		0.818		0.998	
Return P/B	1.405		-4.484		3.692		1.644		0.564	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	-0.235	-(0.980)	-0.773	-(0.214)	-0.080	-(0.288)	0.876	(0.621)	-0.053	-(0.035)
- P/C	0.132	(0.055)	-0.071	-(0.020)	-0.434	-(0.153)	0.555	(0.388)	0.046	(0.029)
Return P/B	2.406		-2.595		2.514		1.308		-0.139	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	-0.089	(0.466)	0.741	(0.557)	-2.318	(0.603)	1.268	(0.312)	-0.827	(0.557)
- P/C	0.055	(0.466)	0.910	(0.466)	-2.223	(0.625)	1.500	(0.333)	-0.394	(0.489)
Growth portfolios	**2007**		**2008**		**2009**		**2010**		**Avg. 2007-2010**	
F-statistic b/t groups	0.013		0.039		0.021		0.049		0.018	
Significance b/t groups	0.987		0.962		0.979		0.952		0.983	
Return P/B	0.022		-4.007		3.554		1.097		0.166	
Difference in average return (%) (t-statistic in parentheses)										
- P/E	-0.243	-(0.130)	-0.835	-(2.732)	0.470	(0.219)	-0.404	-(0.311)	-0.251	-(0.188)
- P/C	0.014	(0.008)	-0.609	-(0.192)	0.304	(0.123)	-0.250	-(0.193)	-0.135	-(0.100)
Return P/B	1.299		-2.527		4.636		1.302		0.705	
Difference in median return (%) (Mann-Whitney p-value in parentheses)										
- P/E	0.388	(0.646)	-1.644	(0.603)	1.581	(0.420)	-0.270	(0.625)	0.256	(0.646)
- P/C	0.944	(0.443)	-2.405	(0.668)	1.599	(0.512)	0.989	(0.557)	0.442	(0.535)

APPENDIX 4 | REGRESSION RESULTS

United States

	Rp - Rf = *a* p + *B* p(Rm - Rf) + e(p)						Rp - Rf = *a* p + *B* p(Rm - Rf) + *c* p(V-G) + e(p)							
Rp - Rf	*a*	*B*	*t(a)*	*t(B=1)*	R^2	*s(e)*	*a*	*B*	*c*	*t(a)*	*t(B=1)*	*t(c)*	R^2	*s(e)*
Low P/E	0.002	0.986	0.572	13.873	0.807	0.0276	0.006	0.968	0.717	2.995	26.709	11.497	0.951	0.0141
Low P/B	0.006	0.919	1.495	14.188	0.814	0.0251	0.007	1.057	0.601	3.383	28.402	10.656	0.947	0.0135
Low P/C	0.006	1.046	1.969	20.081	0.898	0.0202	0.006	0.996	0.504	3.137	28.434	7.768	0.956	0.0134
High P/E	0.008	0.961	3.176	22.222	0.915	0.0168	0.006	0.968	-0.283	2.995	26.709	-4.540	0.942	0.0141
High P/B	0.008	1.149	2.636	22.853	0.919	0.0195	0.007	1.057	-0.400	3.379	28.374	-7.087	0.962	0.0136
High P/C	0.007	0.947	2.198	18.351	0.880	0.0200	0.006	0.996	-0.496	3.137	28.431	-7.633	0.948	0.0134

Germany

	Rp - Rf = *a* p + *B* p(Rm - Rf) + e(p)						Rp - Rf = *a* p + *B* p(Rm - Rf) + *c* p(V-G) + e(p)							
Rp - Fp	*a*	*B*	*t(a)*	*t(B=1)*	R^2	*s(e)*	*a*	*B*	*c*	*t(a)*	*t(B=1)*	*t(c)*	R^2	*s(e)*
Low P/E	0.011	1.056	1.526	10.921	0.722	0.0478	0.004	1.003	0.719	0.854	16.785	8.747	0.897	0.0294
Low P/B	0.004	1.173	0.538	13.235	0.792	0.0438	0.000	0.971	0.620	-0.038	17.741	9.772	0.933	0.0251
Low P/C	0.012	1.037	2.376	15.058	0.831	0.0340	0.000	0.925	0.426	-0.061	18.990	7.517	0.925	0.0229
High P/E	0.001	0.983	0.212	14.885	0.828	0.0326	0.004	1.003	-0.281	0.851	16.782	-3.147	0.864	0.0294
High P/B	-0.002	0.848	-0.480	12.604	0.775	0.0332	0.000	0.972	-0.380	-0.037	17.749	-5.997	0.875	0.0251
High P/C	-0.017	0.773	-2.745	9.303	0.653	0.0411	0.000	0.925	-0.574	-0.060	18.990	-10.146	0.894	0.0229

France

	Rp - Rf = *a* p + *B* p(Rm - Rf) + e(p)						Rp - Rf = *a* p + *B* p(Rm - Rf) + *c* p(V-G) + e(p)							
Rp - Fp	*a*	*B*	*t(a)*	*t(B=1)*	R^2	*s(e)*	*a*	*B*	*c*	*t(a)*	*t(B=1)*	*t(c)*	R^2	*s(e)*
Low P/E	0.015	1.105	1.909	10.645	0.711	0.0487	0.010	1.085	0.871	2.257	18.386	9.880	0.909	0.0276
Low P/B	0.036	1.510	2.034	7.663	0.727	0.0549	-0.042	-0.006	1.016	-18.596	-0.168	50.082	0.998	0.0051
Low P/C	0.008	1.050	1.156	12.028	0.759	0.0409	0.012	1.042	0.773	2.963	18.845	8.356	0.905	0.0259
High P/E	0.009	1.082	2.085	18.122	0.877	0.0280	0.010	1.085	-0.129	2.259	18.385	-1.462	0.883	0.0277
High P/B	-0.041	0.018	-25.032	1.003	0.044	0.0051	0.020	1.293	-0.201	2.083	11.600	-1.832	0.866	0.0299
High P/C	0.014	1.040	3.170	17.862	0.874	0.0273	0.012	1.042	-0.226	2.966	18.842	-2.444	0.889	0.0259

China

	Rp - Rf = *a* p + *B* p(Rm - Rf) + e(p)						Rp - Rf = *a* p + *B* p(Rm - Rf) + *c* p(V-G) + e(p)							
Rp - Fp	*a*	*B*	*t(a)*	*t(B=1)*	R^2	*s(e)*	*a*	*B*	*c*	*t(a)*	*t(B=1)*	*t(c)*	R^2	*s(e)*
Low P/E	0.008	1.086	1.570	17.301	0.867	0.03623	0.009	1.112	0.469	2.052	20.682	4.302	0.906	0.03083
Low P/B	0.008	1.191	1.443	17.126	0.864	0.04011	0.007	1.126	0.732	1.606	22.312	6.755	0.933	0.02858
Low P/C	0.004	0.858	1.232	20.247	0.899	0.02445	0.005	0.914	0.152	1.449	18.296	1.973	0.907	0.02372
High P/E	0.010	1.141	1.874	17.479	0.869	0.03768	0.009	1.112	-0.531	2.052	20.682	-4.869	0.914	0.03083
High P/B	0.006	1.102	1.382	21.100	0.906	0.03013	0.007	1.126	-0.268	1.606	22.312	-2.478	0.918	0.02858
High P/C	0.009	1.227	1.307	15.696	0.843	0.04510	0.005	0.914	-0.848	1.449	18.296	-11.017	0.957	0.02372

United Kingdom

	Rp - Rf = *a* p + *B* p(Rm - Rf) + e(p)						Rp - Rf = *a* p + *B* p(Rm - Rf) + *c* p(V-G) + e(p)							
Rp - Fp	*a*	*B*	*t(a)*	*t(B=1)*	R^2	*s(e)*	*a*	*B*	*c*	*t(a)*	*t(B=1)*	*t(c)*	R^2	*s(e)*
Low P/E	0.014	1.108	3.407	16.939	0.862	0.02676	0.012	1.040	0.535	3.570	19.261	5.189	0.914	0.02140
Low P/B	0.016	1.269	3.890	20.095	0.898	0.02584	0.014	1.234	0.215	3.427	18.614	1.547	0.903	0.02546
Low P/C	0.018	1.151	4.450	17.659	0.871	0.02666	0.011	1.045	0.524	3.668	21.852	7.055	0.939	0.01857
High P/E	0.010	0.980	2.536	15.707	0.843	0.02551	0.012	1.040	-0.465	3.570	19.261	-4.514	0.892	0.02140
High P/B	0.007	1.105	1.462	13.739	0.804	0.03290	0.014	1.234	-0.785	3.427	18.614	-5.643	0.885	0.02546
High P/C	0.005	0.949	1.185	15.270	0.835	0.02541	0.011	1.045	-0.476	3.668	21.852	-6.413	0.914	0.01857

Global

	Rp - Rf = *a* p + *B* p(Rm - Rf) + e(p)						Rp - Rf = *a* p + *B* p(Rm - Rf) + *c* p(V-G) + e(p)							
Rp - Fp	*a*	*B*	*t(a)*	*t(B=1)*	R^2	*s(e)*	*a*	*B*	*c*	*t(a)*	*t(B=1)*	*t(c)*	R^2	*s(e)*
Low P/E	0.007	0.900	1.264	10.499	0.706	0.03621	0.004	0.853	1.014	0.972	12.843	5.728	0.830	0.02784
Low P/B	0.008	1.036	1.425	11.029	0.726	0.03966	0.002	0.898	1.156	0.400	13.453	7.435	0.875	0.02704
Low P/C	0.006	0.931	1.198	11.103	0.728	0.03541	0.005	0.920	0.638	1.055	12.870	4.293	0.807	0.03016
High P/E	0.004	0.854	0.998	13.094	0.788	0.02754	0.004	0.853	0.014	0.972	12.843	0.077	0.788	0.02784
High P/B	0.003	0.916	0.637	14.314	0.817	0.02703	0.002	0.898	0.156	0.400	13.453	0.992	0.821	0.02704
High P/C	0.004	0.913	0.819	12.156	0.763	0.03173	0.005	0.920	-0.362	1.055	12.870	-2.432	0.790	0.03016