Erasmus University Rotterdam

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Bsc Economie en Bedrijfseconomie

The value premium: An emerging markets perspective

Measuring the existence of the value premium in emerging market and their development throughout the two most recent financial crisis

In this paper I study the performance of stocks with a low price-to-book ratio in comparison to stocks with a high price-to-book ratio in emerging markets during the period 2001-2021. The research conducted is performed on stocks from the BRIC countries and both various Ordinary Least Squares (OLS) regressions and event studies are performed. Contrary to prior research, I have discovered that stocks with a higher price-to-book on average outperform stocks with a lower price-to-book when controlling for a CAPM factor, industry and domicile dummy, in the analysed timeframe in emerging markets. Furthermore I have found that the performance of the 'value' portfolios per sector and domicile underperformed in the 12 months after the outbreak of the financial crisis of 2008 and the recent COVID-19 pandemic which deviates from developed market studies for the financial crisis and is in line with the literature regarding the recent COVID-19 pandemic. In conclusion, in this paper the existence of a so called 'value premium' was not found while a significant coefficient was found that points towards the outperformance of high price-to-book ratio stocks.

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Table of Contents

Introduction 1
Hypothesis development 5
Data and descriptive statistics 8
Descriptive Statistics 10
Results 17
Regression results 17
Event study results 23
Methodology 23
Results 24
Conclusion 32
Bibliography 34

Introduction

When one of the most well-known investors Warren Buffet spoke in front Columbia University about what he looked for when parking his money, one of the first things he stated was "a good price for a good company". But is this strategy still applicable with some of the largest and best performing[1] companies as Tesla only making a profit since 2020. Do these "good companies for a good price" still show excessive return, or has the tide shifted and is looking mainly at revenue growth rates the way to go? (Clifford, 2017)

In an analysis done by the informed investor a look is taken at the performance over the recent years of the Russell 1000 value versus the Russell 1000 growth. The Russell 1000 value and growth indices are subindices of the Russell 3000 which represents the largest 3000 stocks in the U.S. These subindices try to capture the 1000 stocks that are the most aligned with the style they represent. Value is measured by the book-to-price ratio and the growth factor is measured by a forecast of the medium term EPS growth and the historic sales growth (FTSE Russell, 2021).

Growth has shown significant outperformance in comparison with the value factor over the last ten years. The gap in performance is explained through the difference in composition of the two indices according to Batnick, with the value portfolio being dominated by financials and healthcare and the growth portfolio being dominated by tech and consumer discretionary stocks (Batnick, 2021).

In one of the most popular papers on this matter written by Fama and French (1998) another analysis is made of the difference in performance between value and growth stocks. In the paper the question is asked if a so called value premium exists for stocks outside of the United States. Fama and French classify value stocks as stocks that show a relatively high ratio of book-to-market (B/M), earnings to price (E/P), or cash flow to price (C/P). In the paper a look is taken at stock markets of 13 major EAFE (Europe, Asia and Far East) countries between 1975 and 1995. The analysis performed finds that even though value stocks outperform during this period, adding a risk factor for relative distress captures this outperformance.

A more recent analysis of the performance of value and growth stock was done by BNP Paribas Asset Management (Carvalho, 2021). In this paper stock returns are taken from the

[1] Best performing as in stock performance

constituents of the most popular developed market index, the MSCI World Index from 1995 till 2020. Taking the differential between the MSCI Value and the MSCI Growth show that growth has been outperforming in recent years.

The second methodology of BNP Paribas Asset Management is based on the three factor model found by Fama and French (1993). In this paper a High Minus Low (HML) factor is introduced as a proxy for the outperformance of value stocks, the so called value premium. The HML factor is constructed by deducting the stock return of the 30% lowest book-to-market value stocks from the return of the 30% highest book-to-market ratio stocks. The performance of this factor in the 23 developed markets tracked by BNP Paribas Asset Management shows that even though the outperformance of value has been deteriorating over recent years, a portfolio of value stocks would still have outperformed a growth portfolio over the analysed period.

Finally, BNP Paribas Asset Management have introduced a two-factor model to analyse the performance of value, in this model the portfolio of stocks is neutral towards market risk (beta neutral) and sector differences (sector neutrality). When keeping these two factors constant value has massively outperformed growth by more than 60% over the period between 1995 and 2020.

The aforementioned papers show a very similar image from which we can conclude three points. Over the long-run a value premium exists in developed markets, during recent years the performance of value has been lacking in comparison to growth and finally, different definitions of value and different restrictions bring very different outcomes.

Even though these studies show a complete and recent analysis of the value factor within developed markets, emerging markets are neglected.

In a recent survey of Vontobel 300 institutional asset managers and discretionary wealth managers are questioned about their allocation in emerging markets. While only a minority of respondents expect to increase their allocation within the upcoming 12 months, a larger shift is expected to take place over the long term. The top two reasons cited for this shift are the potential for higher returns when compared with developed markets and the lower difficulty of finding alpha opportunities when compared with developed markets (Taylor, 2020).

Alpha Research publishes a monthly report which analyses the recommendations from 60+ of the largest asset managers in the world. The recommendations of all asset managers are

compiled into a consensus on asset classes, equity regions, bond classes and equity sectors. Looking at the most recent report shows that asset managers have been increasingly overweight on emerging market equities on a tactical basis compared to their strategic allocation (Alpha Research, 2021).

Looking at the clear evidence from developed markets for the existence of a value premium, the relatively new additions to the existing literature on approaching value (the addition of a sector neutral factor) and the increasing importance of emerging markets within institutional multi-asset portfolio's this paper will try to appropriate the question:

Has a value premium existed in emerging markets over the last 20 years and how has it behaved during the two most recent financial crisis?

To answer this question, a sample of data from stocks listed in emerging market countries between 2001 and 2021 is required. The countries included in the sample will be the BRIC countries, meaning: Brazil, Russia, India and China. Due to the sample of this paper not including all countries generally classified as emerging markets[2] the standard errors will be clustered per domicile to be able to make more broad statements about stocks from emerging markets. The stocks included in the sample will be the constituents of the main indexes of the BRIC countries, namely: the Bovenspa Index, RTS index, NIFTY 50 and FTSE China A50. The variables that will be used in the analysis are the monthly and yearly return, a CAPM factor which will be self-estimated on a rolling 5-year monthly basis and taken from the Eikon Refinitiv database, a price-to-book variable and dummy variables for domicile and sector[3].

The analysis itself will be performed using two different methodologies, a regression analysis and multiple event studies. First a regression analysis is performed to analyse if a price-to-book factor is a significant factor in an asset pricing model for emerging market stocks in the period of 2001 till 2021. From the literature conducted in developed markets the expected finding is a significant negative coefficient for the price-to-book value pointing towards the outperformance of so called 'value stocks' and a significant positive coefficient for the Fama-French High-Minus-Low factor. The event study for the financial crisis is expected to show a slight underperformance during the months before the fall of Lehman brothers and large outperformance afterwards. For the event study during the COVID-19 crisis the value

[2] Classifications made by the largest index providers: S&P Global, MSCI, FTSE-Russell and STOXX
[3] Sector classifications are made based on the GICS Industry Classification

portfolio is expected to show slight underperformance before the start of the COVID-19 pandemic and heavy underperformance after.

The regression performed where the monthly total return is regressed on a price-to-book factor, a CAPM factor and dummy's for both domicile and sector show the unexpected result of a positive significant coefficient for the price to book ratio. This outcome represents the exact opposite of what would be expected from the cited literature. The event study done on the development of the value portfolio's during the financial crisis also shows a different result than expected from the literature, namely the value portfolio underperformed heavily straight after the fall of Lehman Brothers. Finally the value portfolio in emerging markets showed the same development as expected from the cited literature, with the value portfolio underperforming slightly before the COVID-19 crisis and heavily after. To conclude, the findings in this paper lead to the conclusion that the last twenty years have not been the 'value era' for emerging markets, with value being especially vulnerable straight after the outbreak of an economic crisis.

Hypothesis development

For a long time the papers of Sharp (1964), Linner (1965) and Black (1972) have dictated the way academics look at asset pricing models. The models found by these researcher imply that the market portfolio is mean-variance efficient and that the expected return of a given stock is a linear function of the beta (the slope of the regression of the givens stock return on the market return). According to these models this slope is sufficient to describe cross-sectional expected returns.

Stattman (1980) and Rosenberg, Reid and Lanstein (1985) show the empirical existence of the so called 'value premium' anomaly. In these papers it is found that stock return is positively correlated with the ratio of book value of common equity in relation to its market value. This anomaly is also found in 1991 by Chan, Hamao and Lakonishok in Japan. Where the ratio of book value to market value proves to be a strong force for explaining cross-sectional stock returns in Japan.

Later on Fama and French published a paper in 1993 where evidence was found for the period of 1963 till 1990 for U.S. stock indexes that showed that the beta does not help explain cross-sectional stock returns during the said period and that the combination of a size and book value to market variable replace the roles of variables for leverage and earnings-to-price in average stock returns. The earnings-to-price variable was earlier on believed to be a proxy for factors that were previously not taken into account when analysing expected returns, with E/P being believed to be higher for stocks that show higher expected returns and higher risk.

The previously named paper by Fama and French suggests the possibility that the B/M factor captures a risk factor that has been attributed in an earlier stage by Chan and Chen in 1991 to the relative amount of financial / operational distress mostly small firms operate in. The suggestion here is that firms which are judged as having poor prospects by markets have low stock prices and high book-to-market values. Stocks showing these attributes will have higher expected stock-returns in comparison to stocks with strong prospects. Another possible explanation given in the paper by Fama and French is that the BE/ME captures the regression towards the mean observed about irrational market expectations about the prospects of firms.

A more recent analysis is done by Fama and French in 2017 where for the regions of North America, Europe and Asia Pacific it is found that average stock returns increase with the book-to-market (B/M) ratio and profitability of a firm and decrease with the amount of

investments done. For the region of Japan only the book-to-market ratio show strong relation to average stock return.

Relating all of the previous findings to the regions of interest of this paper result into the following hypotheses:

Hypothesis 1: The book-to-market ratio is a significant force in analysing expected average market return.

Hypothesis 2: The book-to-market ratio is a significant force in analysing expected average market return when corrected for market sensitivity.

In a paper by Vardharaj & Fabozzi from 2007 an estimation is made of the impact of allocation policy towards sectors and market segments characterized by style and size. The paper found that when controlling for size one-third of U.S. funds monthly return deviation is related to allocation policy. And for international funds one fourth of return deviation is attributed towards region policy.

Continuing on the importance of asset allocation Xiong, Ibbotson, Idzorek and Chen in 2010 attempted to split up the return of funds into 3 components: Market movements, asset allocation and stock selection. The paper states that the results are solely due to the period being analysed, the peer group and the funds selected due to stock-selection being a zero-sum game. However in the research done asset-allocation is equally as important as stock selection.

The relation between choices in asset allocation and the anomaly of the value premium arises in a paper by de Carvalho, Lu, Soupe and Dugnolle from 2017 where an analysis is done on how to improve the efficiency of capturing factor premiums in equity markets. The paper concludes that information ratios can be increased by aiming for constant volatility over time and hedging the market beta. For the analysis of the value factor neutralization of sector exposures is also of importance.

The compilation of the importance of asset allocation decisions and the importance of sector neutral exposure leads to the following hypothesis.

Hypothesis 3: When controlling for sector exposure the price-to-book variable will still be a significant driver in expected average stock returns.

In a whitepaper published by Bellone and de Carvalho in 2021 an analysis is done on the performance of the robust value investing strategy described above. The analysis concludes that in developed markets the robust value strategy has underperformed since 2018 and significantly since march 2020 when most of the COVID-19 lockdowns occurred in developed markets. In the whitepaper the reason given for this dispersion is a divergence from fundamental factors analysed by a so called value-spread, the observed divergence in at the end of 2020 is of the same magnitude as during the peak of the tech bubble of 2000. Another observation from this white paper is that the value spread peaked around the financial crisis and quickly plunged afterwards, which would indicate a high outperformance of value-stocks right after the financial crisis. A potential reason given here is the flight to safety towards the most resilient stocks.

Applying these findings towards the emerging markets this paper is covering leads to the following hypotheses.

Hypothesis 4: In the months before the start of the financial (sub-prime lending) crisis the value portfolio will underperform and outperform afterwards, with the fall of Lehman Brothers as the indicative start point.

Hypothesis 5: The value portfolio will underperform slightly in the months before the COVID-19 outbreak and this lack of performance will accelerate straight after the finding of a COVID-19 case in the selected domicile.

Data and descriptive statistics

The total yearly and monthly return of the included stocks, the domiciles, the WACC beta and the GICS industry classification are all obtained from the Refinitiv Eikon database. All of the stocks and underlying indices are noted in their local currency. Due to the unavailability of indices data on the Refinitiv Eikon database and the absence of trackers/ETF's that date back to the start of the timeline of this research some modifications had to be made for the indices data. For the FTSE China A50 Index a tracker was used, namely the iShares FTSE China A50 ETF HKD. The data available for this tracker dates back to 01-07-2005, which leads to the fact that the self-estimated rolling 5-year monthly beta is only available from 01-07-2010 onward. For the other indices used: Bovespa, NIFTY 50 and the RTS Index the data is taken from the website Investing.com. The choice for this database as a source for this data is the fact that the data for these indices is not available on the Eikon database and the use of the return of the original index is preferred in comparison to a tracker/ETF.

The timespan for which the data is included is 01-01-2001 till 01-05-2021. Which leads to 256 monthly observations per stock/index and 21 yearly observations per stock/index. For the monthly data this leads to 30921 observations and 1938 yearly observations are included in the analysis.

The price-to-book variable is calculated by dividing the company's latest closing price by its book value per share. Book value per share is calculated by dividing total equity from the latest fiscal period by the current shares outstanding.

In the analysis two different beta's are used. The first one is the WACC beta provided by the Eikon database itself. The Eikon beta states that it uses a methodology based upon the data availability, with the order of preference: 5-year monthly, 3-Year weekly, 2-Year weekly, 180-days daily, 90-days daily. The unfortunate part about this variable is that it is only available from 01-01-2016 onward.

The second way of estimating the beta is the self-estimated rolling 5-year monthly beta. This beta has been estimated by performing a regression of the independent variable, the underlying index return on the dependent variable, the stock return. For each observation the 60 most recent datapoints are used. Due to the use of data, the self-estimated beta's are available from 01-01-2006 onward.

In the yearly beta analysis the first found value for that given year represents the beta for that stock for the given year.

for the creation of the High Minus Low (HML) factor the variables that are used are the yearly total return and the price-to-book ratio per stock in December the year before the performance of the stock is measured. The creation of the factor is done in the same way as the original paper by Eugene F. Fama and Kenneth R. French from 1993 explains, where stocks are classified on a yearly basis based on their price-to-book ratio. The top 30% companies with the highest price-to-book ratio are classified as "growth" and the 30% with the lowest price-to-book ratio are classified as "value". For the calculation of the return each year 100 euro is divided by the amount of stocks that are classified as value or growth (this ranges between 16 and 50 stocks per year), all these stocks together are analysed as the 'value portfolio' and the 'growth portfolio' from which the relative return is tracked. The return is given as the performance of the value portfolio relative to the growth portfolio.

The decision for the form of standard errors used in the regression is based on a paper by Abadie, Athey, Imbens and Woolridge (2017). The sample design of this paper makes it that not all the domiciles about which this paper wished to make inference for are covered. According to the cited paper this would require the clustering of standard errors of the domiciles in order to be able to make an inference about emerging markets as a whole.

Descriptive Statistics

Figure 3.1: Descriptive statistics of the variables used in the monthly regressions

	Obs.	Relative (in %)	Mean	Std. Dev	Min	Max
Self-estimated 5 year beta	20,539		0.084	0.223	-.821	1.20
Brazil dummy	8,045	26.02%				
China dummy	7,083	22.91%				
Communication Services dummy	1,420	4.59%				
Consumer Discretionary dummy	2,998	9.70%				
Consumer Staples dummy	3,048	9.86%				
Energy dummy	3,706	11.99%				
Financials dummy	6,029	19.50%				
Healthcare dummy	905	2.93%				
India dummy	9,536	30.84%				
Industrials dummy	3,065	9.91%				
Information Technology dummy	1,637	5.29%				
Materials dummy	4,469	14.45%				
Real Estate dummy	805	2.60%				
Russia dummy	6,257	20.24%				
Utilities dummy	2,839	9.18%				
Price-to-book monthly	30,667		1.030	186.643	-14254.242	1726.783
Total return monthly (in %)	30,921		1.839	11.954	-82.700	336.046
Eikon beta monthly	10,563		0.965	0.508	-.382	3.364

Connotation: The relative analysis for the dummy's is relative to all GICS sectors combined and the domicile dummy relative value is in comparison with all the domiciles.

Looking at the used data for the monthly stock return leads to a couple observations. The beta value taken from the Eikon database is on average much higher than the self-estimated beta. Also when looking at the sample of the data where both beta's have a value the difference is significant. For this sample, where both a self-estimated and Eikon beta exists the self-estimated value for the beta on average is 0.043 while the beta taken from Eikon shows a value of 0.986. The min and max for the self-estimated are also lower. The implication of this observation could be that even if the self-estimated beta is significant, it will only help to explain a very small portion of the stock return. Another observation made from the data is that the indices are very tilted in the sectors they represent. The real estate and healthcare

sector are heavily underrepresented in these indices while financials, materials and energy are more heavily weighted in the indices. When looking at the classifications Morningstar proposes per sector this means that defensive sectors are underrepresented heavily when compared with cyclical and sensitive sectors (Morningstar, 2021).

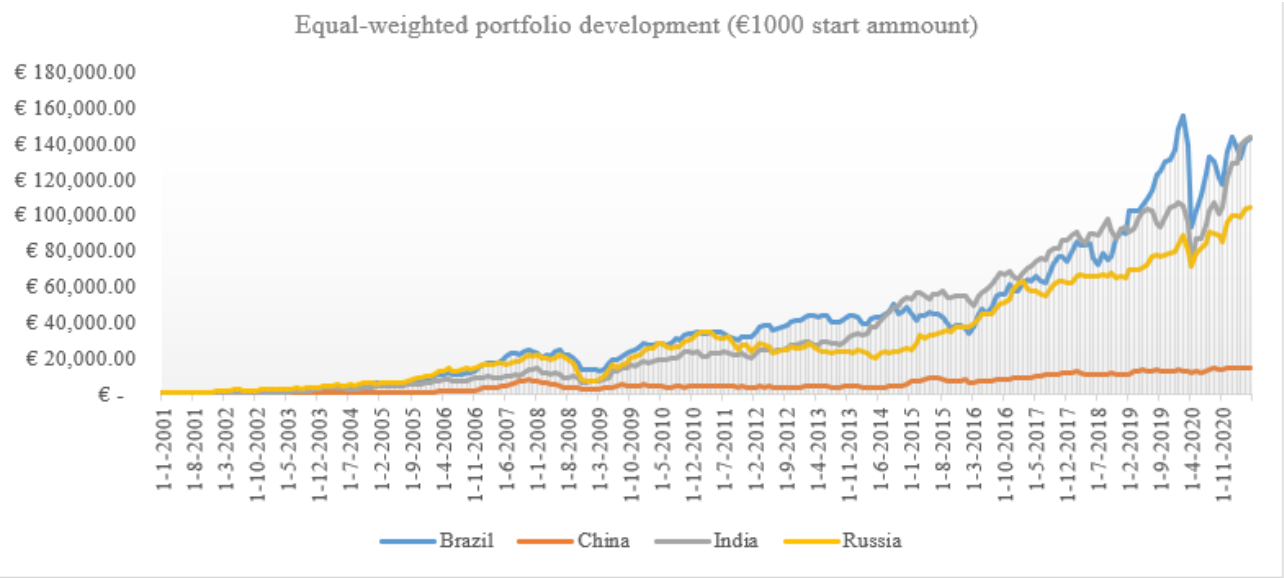
Figure 3.2: Descriptive statistics for the variables used in the yearly regressions

	Obs.	In %	Mean	Std. Dev.	Min	Max
Eikon yearly beta	884		0.962	0.482	-.155	3.364
Self-estimated yearly beta	1,513		0.076	0.218	-.748	1.027
Brazil dummy	462	23.84%				
China dummy	554	28.59%				
Communication Services dummy	72	3.72%				
Consumer Discretionary dummy	185	9.55%				
Consumer Staples dummy	200	10.32%				
Energy dummy	230	11.87%				
Financials dummy	408	21.05%				
Healthcare dummy	72	3.72%				
HML Factor	459		0.0045	0.220	-.258	0.812
India dummy	619	31.94%				
Industrials dummy	182	9.39%				
Information Technology dummy	101	5.21%				
Materials dummy	253	13.05%				
Price-to-book value Yearly	1,938		6.475	84.920	0.006	2732.121
Real Estate dummy	59	3.04%				
Russia dummy	303	15.63%				
Utilities dummy	176	9.08%				
Yearly total return	1,938		0.258	0.609	-.962	5.077

Connotation: The relative analysis for the dummy's is relative to all GICS sectors combined and the domicile dummy relative value is in comparison with all the domiciles.

When looking at the yearly data, nearly the same stylized facts are being found about the yearly stock returns.

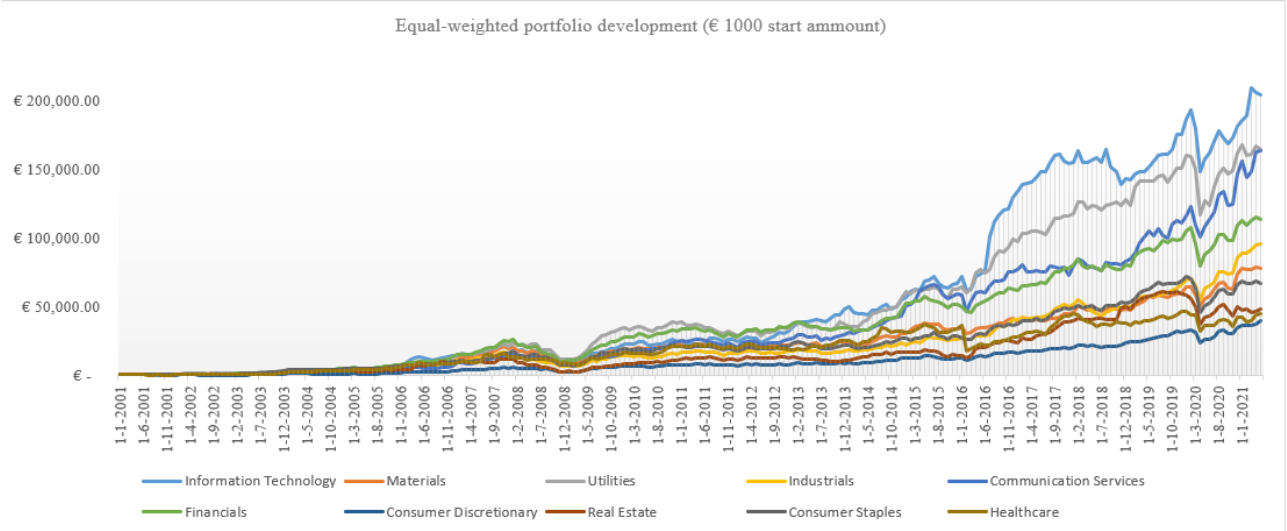
Figure 3.2: Graph of the equal-weighted portfolio development per domicile, €1000 starting amount



Connotation: Per month the average of the stock-return per domicile is taken and used as a growth rate for the portfolio.

The graph of the development of a fictional portfolio per domicile leads us to 2 direct observations. During the 2 most recent crises (the financial crisis and the COVID-19 crisis) the drawdown of Chinese stocks was the least in comparison to other countries. While Brazilian stocks were among the least responsive in the financial crisis they have the largest drawdown in the COVID-19 crisis, something which might be explained by the weighing of financials in comparison with the weighing of sectors that profit from tourism and travel. The performance of Chinese stocks, while being less impacted by crises, has lacked heavily in comparison with other regions.

Figure 3.3: Graph of the equal-weighted portfolio development per GICS sector, €1000 starting amount



Connotation: Per month the average of the stock-return per GICS sector is taken and used as a growth rate for the portfolio

The figure above shows some interesting observations. While the dip in performance during the financial crisis was mostly the same across different sectors, there is a disparity during the more recent COVID-19 crisis. Sectors such as communication services and consumer discretionary have dipped less and have since then recovered. With cyclical sectors such as consumer discretionary and materials having recovered quickly – and barely showed any dip at all for that matter – the result from this analysis leads to a thought that the development of the value premia will also differ during these 2 situations.

Figure 3.4: Return of the HML portfolio over the specified period..

Date	Return	Development of HML Factor
31-12-2002	56.94%	€1,569.39
31-12-2003	81.23%	€ 2,844.17
31-12-2004	15.28%	€ 3,278.69
31-12-2005	1.85%	€ 3,339.34
31-12-2006	0.99%	€ 3,372.44
31-12-2007	15.91%	€ 3,908.99
31-12-2008	19.95%	€ 4,688.85
31-12-2009	58.03%	€ 7,410.00
31-12-2010	2.49%	€ 7,594.70
31-12-2011	-7.24%	€ 7,045.19
31-12-2012	-14.70%	€ 6,009.81
31-12-2013	-22.91%	€ 4,633.06
31-12-2014	2.31%	€ 4,739.86
31-12-2015	3.28%	€ 4,895.11
31-12-2016	46.20%	€ 7,156.43
31-12-2017	-5.66%	€ 6,751.62
31-12-2018	-0.75%	€ 6,700.94
31-12-2019	-6.44%	€ 6,269.11
31-12-2020	-25.78%	€ 4,653.06

Connotation: for the creation of the High Minus Low (HML) factor the variables that are used are the yearly total return and the price-to-book ratio per stock in December the year before the stock returns are analysed. The creation of the factor is done in the same way as the original paper by Eugene F. Fama and Kenneth R. French from 1993 describes. Where stocks are classified on a yearly basis based on their price-to-book ratio. The top 30% companies with the highest price-to-book ratio are classified as "growth" and the 30% with the lowest price-to-book ratio are classified as "value". For the calculation of the return each year 100 euro is divided by the amount of stocks that are classified as value or growth (this ranges between 16 and 50 stocks per year), all these stocks together are analysed as the 'value portfolio' and the 'growth portfolio' from which the relative return is tracked. The return is given as the relative performance of the value portfolio compared to the growth portfolio.

Looking at the performance of the value portfolio in comparison to the growth portfolio some of the most relevant takeaways are that, when classifying the stocks on their price-to-book ratio in the last month of the year before, value portfolios have significantly outperformed following a crisis. In the years after the dot-com bubble, which crashed in the beginning of 2000, the value portfolio performed significantly better. After the financial crisis of 2008 value also performed significantly better. A possible explanation for this fact could be the distrust in IT and growth companies after the dot-com bubble, and the believe in financial

stability and distrust in debt following the financial crisis, however these are possible reasons which have to be inspected more in-depth.

Results

The regressions performed below and the event studies done have the goal to test the hypothesis stated earlier in the paper. The existence of the value premium described as the difference in return between low price-to-book value stocks and high price-to-book value will be tested with the regressions performed. The development and differences in performance of the generated portfolios during the two most recent financial crises will be done with event studies.

The level of the value premium exhibited in the regressions will be based upon the price-to-book value factor, where a significant negative coefficient will point towards the existence of the value premium and vice versa. With the High-Minus-Low factor giving a positive and a negative value during certain times, the interpretation is less clear.

Regression results

Figure 4.1: Regression result of price-to-book ratio's on stock returns

The table presents regression result of price-to-book variables, which are calculated as the market value of the given stock divided by the book value reported in the latest filing. The independent variable in this table is the monthly total stock return for the price-to-book monthly and the yearly total stock return for the price-to-book- yearly variables. The total return is taken as the gain in stock price plus the dividend. The HML factor is calculated on a yearly basis where the included stocks are ranked in the last month before the portfolio is tracked based on their price-to-book ratio. The relative performance of a portfolio consisting of the 30% stocks with the lowest price-to-book (value) versus the 30% stocks with the highest price-to-book (growth) is being taken as the value for that year. Stocks considered value are assigned this value for the HML factor for that year, other classifications get a value of zero.

	(1)	(2)	(3)
	Monthly P/B	Yearly P/B	Yearly HML Factor
Price-to-book monthly	0		
	(0)		
Price-to-book yearly		.000	
		(.000)	
HML-Factor yearly			-.041
			(.1479)
cons	.018***	.257***	.26***
	(.002)	(.017)	(.018)
Observations	30667	1938	1924
R-squared	0	.000	.000

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

As seen in the table above performing a regression of just the price-to-book value on the stock return does not lead to a significant independent variable in any of the performed regressions. The first statistical test performed on the 3 regressions was the Breusch-Pagan Lagrange Multiplier (LM) test in order to test if the variance between entities equals zero. For none of the 3 performed regressions a significant P-value is found, so no indication for a so called panel effect / variance across entities has been found and the data is analysed as a pooled-OLS.

The second analysis performed on the three regressions is the Akaike and Bayesian information criterion. For the yearly regression the values ranges between the 3560 and 3590 for both, the monthly regression shows a AIC of -43160.58 and a BIC of -43143.91.

The final statistical analysis is the Ramsey RESET test for omitted variables. As expected all models reject the null-hypothesis under a P-value of 0.01. Which leads us to the interpretation that there are omitted variables in the data.

The economic interpretation of this outcome is that no price-to-book variable leads us to a complete asset pricing model for expected average returns and the price-to-book variable cannot be used as the sole variable to predict average stock returns.

Figure 4.2: Regression result of price-to-book ratio's and beta's on stock returns

The table presents regression result of price-to-book variables, which are calculated as the market value of the given stock divided by the book value reported in the latest filing. The independent variable in this table is the monthly total stock return for the price-to-book monthly and the yearly total stock return for the price-to-book- yearly variables. The total return is taken as the gain in stock price plus the dividend. The HML factor is calculated on a yearly basis where the included stocks are ranked in the last month before the portfolio is tracked based on their price-to-book ratio. The relative performance of a portfolio consisting of the 30% stocks with the lowest price-to-book (value) versus the 30% stocks with the highest price-to-book (growth) is being taken as the value for that year. Stocks considered value are assigned this value for the HML factor for that year, other classifications get a value of zero. The self-estimated beta is compiled via the OLS method on a rolling 60 datapoint basis. The first reported beta per stock is done when the first 60 datapoints are found and continue to include the most recent 60 datapoints. The self-estimated yearly beta takes the first value found for a given year as the yearly beta. The Eikon beta is extracted from the Refinitiv Eikon database, data for the Eikon beta however is only available from 01-01-2016 onward.

	(1) Monthly P/B	(2) Monthly P/B	(3) Yearly P/B	(4) Yearly HML-Factor	(5) Yearly P/B	(6) Yearly HML-Factor
Price-to-book monthly	.0007**	.0001				
	(.0003)	(0)				
Self-estimated monthly beta	.0026					
	(.0078)					
Eikon monthly beta		.009***				
		(.0027)				
Price-to-book yearly			.0002		.0075	
			(.0001)		(.0051)	
Self-estimated yearly beta			.2583**	.2534**		
			(.0763)	(.0744)		
HML-factor yearly				-.1189		-.3909
				(.1707)		(.2521)
Eikon yearly beta					.0758	.0725
					(.0457)	(.0538)
cons	.0138***	.0079***	.2004***	.2016***	.0989**	.1321***
	(.002)	(.0004)	(.0137)	(.0143)	(.0211)	(.0071)
Observations	20403	10499	1513	1513	884	884
Pseudo R^2	.z	.z	.z	.z	.z	.z

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The first statistical test performed here is again the Breusch-Pagan Lagrange Multiplier (LM) test in order to test if the variance between entities equals zero. First looking at the 2 monthly models gives us a p-value of under 0.05, which makes us reject the null-hypothesis. This outcome gives us reason to believe that there is a panel effect and that we should use a random effect model. For the yearly models, only the model including the HML factor and the Eikon Beta rejects the null-hypothesis at a 5% significance level and is thus evaluated via a random effect model while the other regressions are treated as a pooled-OLS.

The price-to-book variable only shows a significant coefficient in the model with the self-estimated monthly beta and the price-to-book on a monthly basis. Next to this finding, the coefficient for this finding shows a positive value which would imply the outperformance of stocks with a higher price-to-book ratio and the existence of a so called 'growth-premium'.

Next to the findings about the price-to-book variable another interesting observation can be made about the beta variable, with it not showing significant in the monthly model with the price-to-book variable and the self-estimated beta and the model with the yearly eikon data and the HML-factor. With the model only including 2 of the well-known Fama-French factors one would at least expect these two to pose significant.

With model one, two and six being analysed as random effect models it is difficult to say anything about the information criterion for these three models. The other 3 models showed a significant drop in both the AIC and BIC of around 1000 to 1500 points. Given these results we can assume that including the Beta variable into the analysis leads to a more complete model.

The Ramsey RESET test showed a non-significant p-value for the 4^{th} model, which makes it unable to reject the null-hypothesis that the model has omitted variables. As for the 3^{rd} and 4^{th} model the Ramsey RESET test proves significant at a 5% significance level and thus lets us reject the null-hypothesis of the model having no omitted variables.

Figure 4.3: Regression result of price-to-book ratio's, beta's and industry and domicile dummy's on stock returns

The table presents regression result of price-to-book variables, which are calculated as the market value of the given stock divided by the book value reported in the latest filing. The independent variable in this table is the monthly total stock return for the price-to-book monthly and the yearly total stock return for the price-to-book- yearly variables. The total return is taken as the gain in stock price plus the dividend. The HML factor is calculated on a yearly basis where the included stocks are ranked in the last month before the portfolio is tracked based on their price-to-book ratio. The relative performance of a portfolio consisting of the 30% stocks with the lowest price-to-book (value) versus the 30% stocks with the highest price-to-book (growth) is being taken as the value for that year. Stocks considered value are assigned this value for the HML factor for that year, other classifications get a value of zero. The self-estimated beta is compiled via the OLS method on a rolling 60 datapoint basis. The first reported beta per stock is done when the first 60 datapoints are found and continue to include the most recent 60 datapoints. The self-estimated yearly beta takes the first value found for a given year as the yearly beta. The industry dummy is based on the GICS classification per stock where utilities is the reference industry. The domicile dummy is based on the country where the stock is listed.

	(1) Monthly P/B	(2) Monthly P/B	(3) Yearly P/B	(4) Yearly P/B	(5) HML-Factor	(6) HML-Factor
Price-to-book monthly	.0007**	.0007**				
	(.0003)	(.0003)				
Self-estimated monthly beta	.0022	.0016				
	(.0083)	(.0088)				
Price-to-book yearly			.0002*	.0002*		
			(.0001)	(.0001)		
Self-estimated yearly beta			.2708**	.2666**	.2655**	.2606**
			(.0727)	(.0744)	(.0712)	(.0718)
HML-factor yearly					-.1185	-.129
					(.1644)	(.1685)
Cons	.0129***	.0132***	.1716**	.1834**	.1725**	.1846**
	(.0025)	(.0028)	(.0421)	(.05)	(.0427)	(.0502)
Observations	20403	20403	1513	1513	1513	1513
R-squared	.z	.z	.0197	.0208	.0195	.0208
Industry Dummy	YES	YES	YES	YES	YES	YES
Domicile Dummy	NO	YES	NO	YES	NO	YES

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The first statistical test performed on the regressions including the dummy variables is the Breush-Pagan Lagrange Multiplier (LM). Only the first two regressions including the monthly data showed a significant P-value under a 5% significance level which leads to the conclusion

that a panel effect exists in these regressions and we should use a random effect model for these regressions. All of the regressions including the yearly variables do not regress the null-hypothesis of the LM test and are thus treated as pooled-OLS regressions.

The price-to-book variable on a monthly basis still proves significant even when controlling for industry and domicile dummy's, an interesting observation to be mad is that when controlling for domicile the coefficient of the Self-estimated beta drops. For the yearly price-to-book regressions the price-to-book variable proves significant at a 10% significant level, but not at the 5% significance level which is used as the norm in this paper. For all of the yearly regressions however the beta variable does prove significant at a 5% significance level. The connotation made in these regressions again however is that the price-to-book variable shows a positive coefficient, which would lead to the existence of a so called 'growth premium'.

With the models using monthly data showing a panel effect comparing the information criterion proves difficult, however for the models using yearly data the AIC and BIC slightly dropped or represented roughly the same value.

An interesting observation however is the outcome of the Ramsey RESET test for omitted variables. For all of the yearly regressions the null-hypothesis of the model having no omitted variables cannot be rejected.

Event study results

With the event study analysis the development of the value premium will be monitored for the two most recent financial crisis. First of the development of the 'value' portfolio will be tracked in comparison to the 'growth' portfolio between the period of September 2007 and September 2009. The choice for this period is based on 12 months before and after the fall of Lehman Brothers, which happened on the 15th of September 2008.

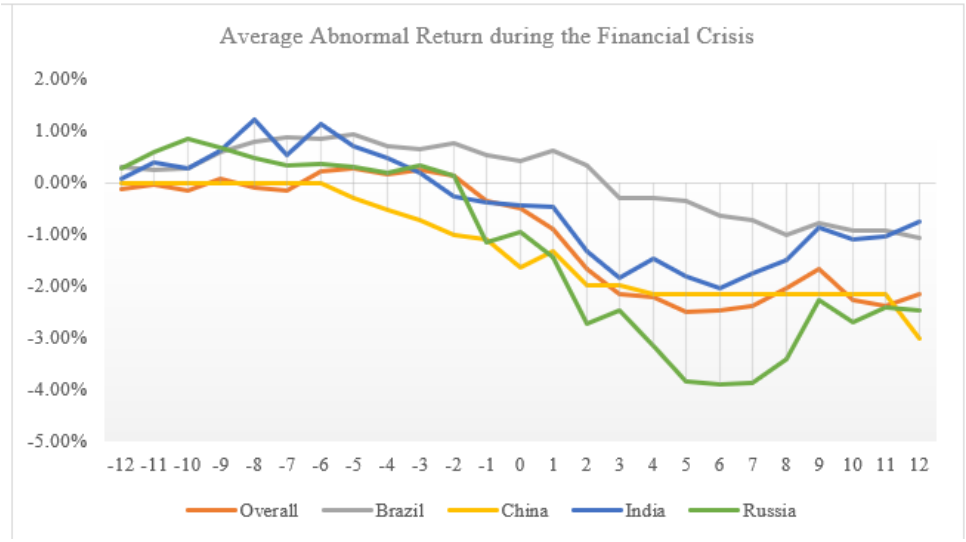
The second period which will be analysed is for a period of 12 months before and after the first COVID-19 infection per country. For China this translates to the period of 1-1-2019 till 1-1-2021 (World Health Organization, 2020). For India this means the period from 1-2-2019 till 1-2-2021 (Unnithan, 2020). For the regions of Brazil and Russia this leads to the period of 1-3-2019 till 1-3-2021 (Ministério da Saúde, 2020) (Medicalxpress, 2020).

Methodology

In order to track the abnormal return of the value portfolio first all included stocks are classified on a monthly basis based upon their price-to-book value. For each month the 30% stocks with the lowest price-to-book are classified as 'value' and the 30% stocks with the highest price-to-book are classified as 'growth'. After classifying the stocks, their average beta and bookmark return on a monthly basis are calculated. Finally the abnormal return is calculated as the outperformance of the 'value' portfolio, corrected for market return, in comparison to the 'growth' portfolio, corrected for market return on a monthly basis. After calculating the abnormal return, the average abnormal return is the sum of each months abnormal return divided by the included amount of months (25 for both event studies).

Results

Figure 4.4: Graph of the average abnormal return per domicile for the value portfolio during the financial crisis of 2008



Connotation: In the graph the average abnormal return is tracked of the HML portfolio adjusted for the benchmark return. The calculation consists of 3 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. Finally the monthly relative return is divided by the amount of included months, which is 25 in this scenario, and added to the previous month return. For China abnormal return data for the periods [-12 : -6], 3, [5 : 8] and [10 :11] is missing due to their not being stocks classified as both 'value' and 'growth' in these months. The value of the previous period is used for these periods.

Looking at the above image tells a quite compelling story. When adjusted for the Capital Asset Pricing Model the value portfolio slightly outperformed in most regions (China not taken into account due to data not existing) in the year before the financial crisis. For most countries and for the overall value portfolio heavy underperformance occurred in the few months surrounding the fall of Lehman Brothers, followed by a stabilisation/revival of the value premium in month 9/10 after the financial crisis. Relating the graph above to the 4th hypothesis shows a different outcome than expected. In developed markets the value spread peaked just before the fall of Lehman Brothers and started to drop rapidly after. In the emerging markets this paper observes, the value portfolio slightly outperforms the growth portfolio in the 12 months before the indicative point of the start of the sub-prime lending crisis and starts to underperform almost straight afterwards. The observation made in this paper thus shows a nearly opposite reaction than developed markets show. A potential reason for this phenomenon could be that the 'search for resilience' as stated in the paper by Benoit Bellone and Raul Leote de Carvalho in the case of emerging markets means a flock of (foreign) investors towards resilient stocks in more economically stable countries.

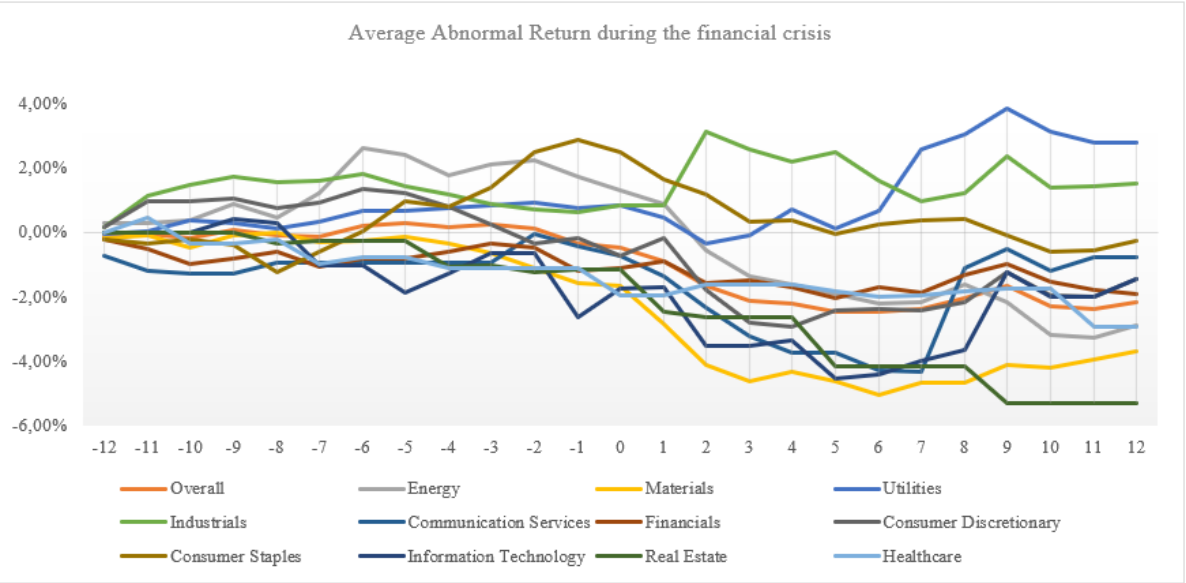
Figure 4.5: Table of two-sided T-tests per domicile for the abnormal return of the value portfolio during the financial crisis

	Std. Dev.	Mean	T	P > | t |
Total Value portfolio	0.076	-2.16%	-.662	0.514
Brazil Value portfolio	0.054	-1.05%	-1.99	0.058*
China Value portfolio	0.085	-6.40%	-2.72	0.012**
India Value portfolio	0.101	-0.75%	-0.183	0.857
Russia Value portfolio	0.130	-2.45%	2.844	0.009***

*Connotation: In the table the abnormal return is evaluated during the month of the fall of Lehman Brothers in September 2008. The performance of the HML portfolio adjusted for the benchmark return is analysed per domicile. The construction of the Value portfolio abnormal return consists of 2 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. For China abnormal return data for the periods [-12 : -6], 3, [5 : 8] and [10 :11] is missing due to their not being stocks classified as both 'value' and 'growth' in these months. The value of the previous period is used for these periods. . * for 10% significance, ** for 5% significance, *** for 1% significance*

While the abnormal return during the month of the fall of Lehman Brothers does not show a significant value for the overall portfolio, significantly lower performance was found in the regions of China, Russia and Brazil. With Russia being significant under a 1% significance level, China under a 5% significance level and Brazil under a 10% significance level. The most important takeaway from this figure is that the abnormal return in India barely differed from the previous and following months, which is also seen in the development of the average abnormal return in figure 4.9.

Figure 4.6: Graph of the average abnormal return during the financial crisis per GICS industry



Conotation: In the graph the average abnormal return is tracked of the HML portfolio adjusted for the benchmark return. The calculation consists of 3 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. Finally the monthly relative return is divided by the amount of included months, which is 25 in this scenario, and added to the previous month return. When an industry does not have data for a given period due to the performance of both classifications not existing the return of the previous month is taken.

The graph shows a quite significant drop in the performance of value stocks right after the fall of Lehman Brothers. Most of the industries follow the path of the overall portfolio with small dispersions happing for across industries. The most notable negative effect is happening in the real estate sector. While most other value portfolio's that experienced a negative drop after the fall of Lehman Brothers sort of stabilised or started to gain traction after around 11 months, the real estate sector continued to underperform. One of the possible explanations for this phenomenon is the existence of the Chinese real estate bubble during the period which pumped up prices heavily and made valuations rise. The fall of this bubble did not happen at the same time as the pop of the housing market bubble in the United States (Chovanec, 2009) (Powell, 2010).

The two sectors which did show good performance of the value portfolio after the fall of Lehman Brothers were industrials and utilities. With industrials showing a strong outperformance only a month after the fall and utilities first showing a small dip and a strong outperformance after. A possible explanation for this phenomenon could be a flight to safety /

value with the possibility for exports, and with that growth deteriorating due to foreign economic conditions.

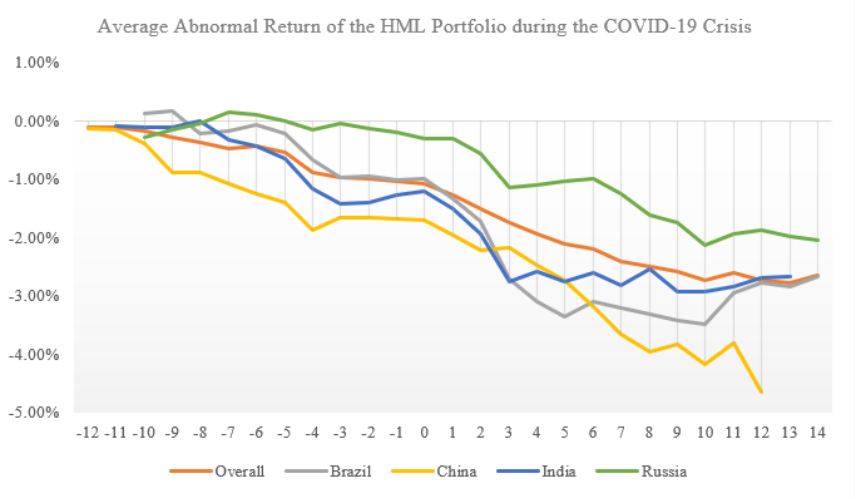
Figure 4.6: Table of two-sided T-tests per GICS industry for the abnormal return of the value portfolio during the financial crisis

	Std. Dev	Mean	T	P > | t |
Overall	0.076	-2.16%	-0.662	0.514
Energy	0.151	-2.88%	-2.480	0.021**
Information Technology	0.268	-1.99%	3.829	0.001**
Materials	0.114	-3.85%	0.794	0.435
Utilities	0.142	2.90%	-0.081	0.936
Industrials	0.169	1.52%	1.214	0.237
Communication Services	0.250	-1.13%	-1.070	0.301
Financials	0.086	-1.91%	2.145	0.042**
Consumer Discretionary	0.148	-1.50%	-3.826	0.001***
Real Estate	0.153	-13.32%	N/A	N/A
Consumer Staples	0.135	-0.24%	-3.683	0.001**
Healthcare	0.127	-5.23%	-4.542	0.001***

*Connotation: In the table the abnormal return is evaluated during the month of the fall of Lehman Brothers in September 2008. The performance of the HML portfolio adjusted for the benchmark return is analysed per domicile. The construction of the Value portfolio abnormal return consists of 2 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. The N/A value for Real Estate originates in the fact that the data was not available for both the value and growth on the zero point. * for 10% significance, ** for 5% significance, *** for 1% significance*

The data for the performance during the month of the fall of Lehman Brothers shows various significant observations. The information technology and financials sector value portfolio show significantly better performance in the month of the fall of Lehman Brothers, with financials being the most remarkable one of course due to the nature of the crisis observed. Multiple sector value portfolio's show a significantly worse performance, namely: Energy, consumer discretionary, consumer staples and healthcare. The shock of the fall of Lehman Brothers was least felt in the value portfolio of the utilities sector.

Figure 4.7: Graph of the average abnormal return per domicile for the value portfolio during the COVID-19 crisis



Connotation: In the graph the cumulative abnormal return is tracked of the HML portfolio adjusted for the benchmark return. The calculation consists of 3 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. Finally the monthly relative return is divided by the amount of included months, which is 25 in this scenario, and added to the previous month return. The starting point, event date and end point are decided by the first reported COVID-19 case per country. This equals to a starting point for China of 1-1-2019, 1-2-2019 for India and 1-3-2019 for Brazil and Russia. From the starting point the subsequent 25 months are tracked while for the overall the first point till the last point is tracked, which equals to 1-1-2019 till 1-3-2021. This leads to a total of 25 datapoints per country and 27 datapoints for the overall. The zero point in the graph is given as the first COVID-19 infection in China.

The graph of the value premium during the COVID-19 pandemic shows a different picture than the graph of the financial crisis. In all countries the underperformance of the value portfolio occurred months before the first domestic discovery of the COVID-19 crisis and even before the first discovery of the virus at all. Nevertheless, the discovery of a domestic case has led to a decrease in performance of the value portfolio. Similarly as seen with the financial crisis of 2008 the relative performance of the value portfolio seems to stabilise during 10-12 months after the first domestic discovery of a COVID-19 case, even though the spread of the virus has been far from stabilised in some of the analysed countries (Worldometer, 2021) (Worldometer, 2021).

When looking at the developments of the value portfolio found in developed markets, the same sort of timeline is found in the analysed developing markets.

The overall portfolio slightly underperforms in the months before the finding of the first COVID-19 case in China and severally starts to underperform in the months following the finding of the first case.

Summarizing the findings do not provide reason to reject the 5th hypothesis.

Figure 4.8: Table of two-sided T-tests per domicile for the abnormal return of the value portfolio during the COVID-19 crisis

	Std. Dev.	Mean	T	P > | t |
Total Value portfolio	0.029	-2.64%	3.166	0.004***
Brazil Value portfolio	0.072	-2.57%	-5.255	0.000***
China Value portfolio	0.067	-4.16%	2.926	0.007***
India Value portfolio	0.070	-1.97%	-4.024	0.000***
Russia Value portfolio	0.047	-2.01%	-4.945	0.000***

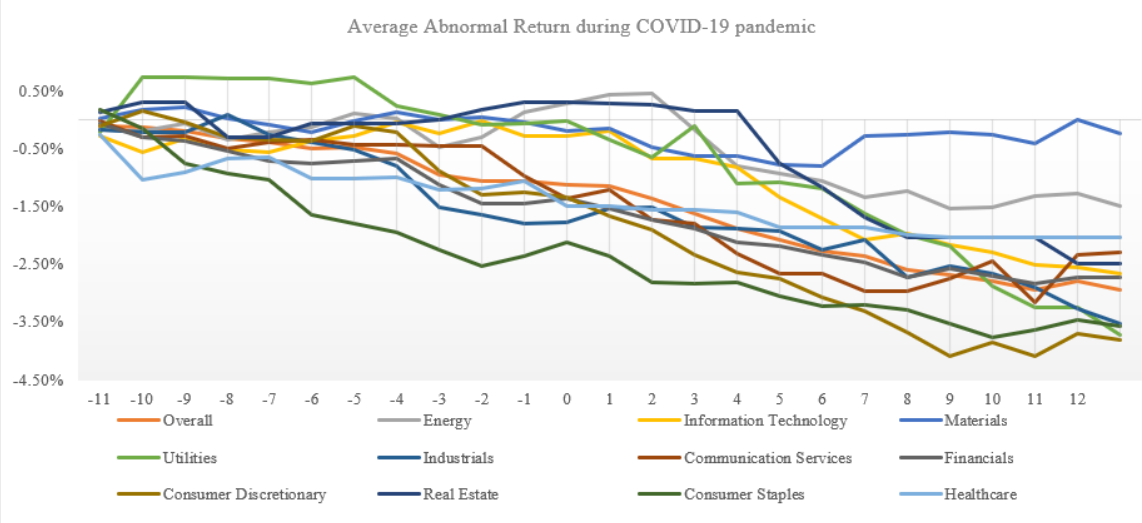
*Connotation: In the table the abnormal return for the value portfolio is evaluated during the COVID-19 crisis. The performance of the HML (Value) portfolio adjusted for the benchmark return is analysed per domicile. The construction of the Value portfolio abnormal return consists of 2 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. The analysed abnormal return is the date on which the first domestic COVID-19 case has been found, which translates to 1-1-2019 for the total and China Value portfolio, 1-2-2019 for the Indian Value portfolio and 1-3-2019 for the Brazilian and Russian portfolio. * for 10% significance, ** for 5% significance, *** for 1% significance*

The above table shows a very clear image. For all of the analysed regions the month of the first domestic COVID-19 case has a significant effect on the relative performance of the value-premium. The interesting observation is that the overall portfolio and the Chinese portfolio show a relatively better performance during the first month of the value portfolio, while the other regions show a significantly worse performance of value stocks during the first month. The observation for China is in contrast with the total performance of the value portfolio, which relatively performed worse than other regions. A potential rationale behind the lag in drop of performance could be the imposed sanctions in China, with the Wuhan lockdown being imposed on the 23rd of January and the most heavy sanctions in the region are being imposed in the two months following the original finding of the COVID-19 virus in the region (AP News, 2021).

Another potential reason for the found disparity in the impact of the finding of a COVID-19 case on the performance of the value portfolio could be the known information about the virus. With other countries having seen what the impact of COVID-19 could be on the population, the impact could be better anticipated and thus implemented into investor expectations earlier.

The found value for the overall portfolio has to be put in the light of the fact that the zero-point has been placed on the 1st of Januari 2020, which equates to the first finding in China. Thus the date is therefore slightly arbitrary and does not give reason for rejecting the 5th hypothesis.

Figure 4.9: Graph of the average abnormal return per GICS industry for the value portfolio during the COVID-19 crisis



Connotation: In the graph the cumulative abnormal return is tracked of the HML portfolio adjusted for the benchmark return. The calculation consists of 3 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. Finally the monthly relative return is divided by the amount of included months, which is 25 in this scenario, and added to the previous month return. The zero point is taken as the date of the first COVID-19 infection in China, 01-01-2020.

While some sector portfolio's showed outperformance after the zero point, during the COVID-19 crisis all of the value portfolio's showed underperformance. With the overall sector portfolio underperforming slightly before the first COVID-19 infection in China and the rate of underperformance accelerating in the first to second month after the first COVID-19 infection. While the domicile value portfolio's showed some sign of stabilising, most GICS portfolio's do not show this tendency. The only sector that diverged from the movement of the other sectors is the materials value sector portfolio, which showed strong performance after around 6 months from the first COVID-19 infection in China. With the materials sector being a more cyclical sector, and sensitive towards the global economy the worries about the impact of the COVID-19 crisis on the global economy could have led towards an influx of capital towards more stable companies in the sector.[4]

[4] Higher valuation are largely impacted by expectations about possible future growth, with the global economy collapsing future growth expectations become slimmer and a flight to quality is possible.

Looking at the development of the graph does not give a reason to reject the fifth hypothesis, where the overall portfolio follows the trend that was expected in the fifth portfolio.

Figure 4.9: Table of two-sided T-tests per GICS industry for the abnormal return of the value portfolio during the COVID-19 crisis

	Std. Dev.	Mean	T	P > | t |
Overall	0.029	-2.64%	1.989	0.057*
Energy	0.065	-1.52%	0.258	0.799
Information Technology	0.059	-3.39%	1.585	0.126
Materials	0.049	0.02%	-1.781	0.087*
Utilities	0.098	-3.26%	1.820	0.081*
Industrials	0.066	-2.99%	0.488	0.630
Communication Services	0.086	-2.57%	0.591	0.561
Financials	0.036	-2.60%	3.736	0.001***
Consumer Discretionary	0.063	-3.29%	2.694	0.012**
Real Estate	0.084	-3.57%	1.190	0.251
Consumer Staples	0.061	-2.88%	2.815	0.009***
Healthcare	0.062	-3.25%	2.043	0.058**

Connotation: In the table the abnormal return for the value portfolio is evaluated during the COVID-19 crisis. The performance of the HML (Value) portfolio adjusted for the benchmark return is analysed per domicile. The construction of the Value portfolio abnormal return consists of 2 steps, first the monthly relative performance of the 30% lowest price-to-book ratio stocks versus the 30% highest price-to-book ratio stocks is calculated. Secondly the average beta and average benchmark return per portfolio is calculated and both portfolios are adjusted for this return on a monthly basis. The analysed abnormal return is the month in which the first Chinese COVID-19 case has been found, 01-01-2020.

The table shows a less clear picture then the analysis per domicile, with only 4 of the 11 sectors having a significantly different performance. When controlling for differences in GICS industry all of the significant deviations are positive, with the value portfolio outperforming the growth portfolio on the given day.

Even though the results from the t-tests are the opposite of what was expected in the hypothesis, the graph from the previous picture does follow the expected development of the value sector portfolio's.

Conclusion

In this paper an analysis is done on the existence of the developed market phenomenon called the 'value premium', where historically speaking average expected stock return is higher for stocks with a high book-to-market ratio in comparison to stocks with a low book-to-market ratio. Next to an analysis of the existence of the phenomenon, two event studies are conducted on the development of the value premium in the light of the two most recent financial crisis namely: the sub-prime lending financial crisis and the COVID-19 crisis.

The regressions that include the price-to-book ratio show a different result than expected from the literature and the stated hypothesis. The monthly price-to-book ratio shows a significant value when controlling for the beta and the industry and domicile dummy's. However the coefficient is positive, which points towards outperformance of so called growth stocks instead of value stocks. The yearly price-to-book factor and the HML factor do not prove significant under the 5% significance level even when controlling for the Beta or the industry and domicile dummy's.

The development of the so called value premium during periods of financial distress also gives different results than expected from the literature. During the financial crisis of 2008 the value portfolio showed slight outperformance in the months before the crisis and heavy underperformance in the months after the fall of Lehman Brothers. The cited literature performed in developed markets however showed significant outperformance of the value portfolio after the start of the crisis.

The development of the value portfolio during the recent COVID-19 pandemic however has been very similar to developed market peers, with only the materials sector value portfolio showing outperformance since around the 6th month after the first COVID-19 infection in China. With the value portfolio slightly underperforming in the months before the start of the COVID-19 pandemic, and heavily underperforming during the COVID-19 pandemic. In the cited literature this phenomenon has been argued to be caused by the highest level of value spread since the tech-bubble of 2000 and will likely compress in the future.

The findings of this paper have to be put in the right context however, with the study showing several limitations. One of the drawbacks of this analysis is the scope of stocks taken into account. Even though the countries analysed make up around 56% of emerging markets[5] this

[5] Brazillian, Chinese, India and Russian stocks make up around 56% of the iShares MSCI Emerging Markets ETF (iShares, 2021)

still does not cover the whole of emerging markets. This has led to the clustering of standard errors in order to be able to make statements about the overall scope intended for this research. Next to the inclusion of countries, only the constituents of the main index per country are tracked, which leads to a large cap bias in the sample of stocks included in the analysis.

Next to the constituents of the research the amount of control variables used could also be increased with proxy factors for size, profitability and amount of investments for example.

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