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Value Investing: Circle of Competence in the Thai Insurance Industry

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Abstract: This study explores the strategy of value investing, specifically for the insurance industry in Thailand. It employs multiple measures of "value," suitable for insurance companies, such as the price-to-earning (PE), price-to-book (PB), and cyclically adjusted price-to-earnings (CAPE). Value premium exists in the Thai insurance industry, and most of the value portfolios constructed from these measures significantly outperform the market, even when adjusting for price volatility and portfolio's β. The cumulative returns are also higher for the value stocks, when compared to the growth stocks, and the Thai stock market. Constructing a value portfolio, using the PE ratio, results in the highest returns and is far better than PB and CAPE. The value anomaly cannot be fully explained by either the capital asset pricing model or the Fama-French three-factor models.

Keywords: value investing, portfolio management, circle of competence, risk management, insurance, property & casualty insurance, life insurance

1 Introduction

Value investing has been popular among institutional and individual investors in Thailand. The idea is originally from Dodd and Graham (1951) and Graham (2003). Various studies, such as Basu (1977), Fama and French (1992, 1993, 1996, 1998, 2006, 2012, 2015), Piotroski (2000), Piotroski and So (2012), Asness, Moskowitz, and Pedersen (2013), Asness et al. (2015), and Novy-Marx (2013, 2015), find that value portfolios outperform growth portfolios. Value stocks are defined as either having a low price-to-book ratio, or a low price-to-earnings ratio. Growth stocks are defined as either having a high PB ratio, or a high PE ratio.

This study puts a new twist on the value investing research. The objective is to focus exclusively on value portfolios constructed using only insurance

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companies. The idea of investing in a particular set of stocks that each investor knows well is well established in the value investing community. This philosophy is called the investor's "circle of competence". To the author's knowledge, this study is the first to formally explore the circle of competence. It also aims to find the best value measure for insurance companies to quantitatively construct a value portfolio. Finally, it intends to explain the value anomaly using existing theoretical and empirical models similar to previous literature.

Notable value investors claim that the value investor does not have to know or understand every company in the market. Investors might be able to implement value investing using some companies or industries that they truly understand. The notion of a circle of competence has been popularized by Warren Buffett and Charlie Munger, two of the most successful value investors. They state that they do not need to invest in companies or industries that they do not understand. For example, in a 1996 letter to shareholders of Berkshire Hathaway, Buffett stated:

> Should you choose, however, to construct your own portfolio, there are a few thoughts worth remembering. Intelligent investing is not complex, though that is far from saying that it is easy. What an investor needs is the ability to correctly evaluate selected businesses. Note that word 'selected': You don't have to be an expert on every company, or even many. You only have to be able to evaluate companies within your circle of competence. The size of that circle is not very important; knowing its boundaries, however, is vital.[1]

In the same spirit as Warren Buffett, Andrew Carnegie, one of the world's wealthiest magnates also emphasized the importance of staying within the circle of competence by saying:

> My advice to young men would be not only to concentrate their whole time and attention on the one business in life in which they engage, but to put every dollar of their capital into it. If there be any business that will not bear extension, the true policy is to invest the surplus in first-class security which will yield a moderate but certain revenue if some other growing business cannot be found. As for myself my decision was taken early. I would concentrate upon the manufacture of iron and steel and be master in that.[2]

Is it true that by focusing on a particular industry, investors can beat the market in the long term? This study explores the performance of value portfolio construction from stocks only in the Thai insurance industry using hand-collected

1 See the 1996 Warren Buffett's Letter to Berkshire Shareholders of Berkshire Hathaway Inc.
2 Carnegie (2012)

data from the Stock Exchange of Thailand.[3] This study is different from the previous traditional value studies in the following ways. First, it studies value investing in only a specific sector, namely the Thai insurance industry. By studying only one sector, it has the benefit of using a more proper and effective way to identify value stocks. In addition, it eliminates heterogeneity among different industries when ranking stocks based on their value measures. As each sector experiences different growth prospects and cycles, and illustrates unlike characteristics, using a particular measure across all sectors seems to be inappropriate to identify value stocks. In addition, this study differentiates from other value premium studies because the insurance industry is a unique sector. The construction of the balance sheet and the earnings statement are quite different from other industries. Therefore, the study needed to take a more careful approach when analyzing the value of investing in the insurance industry by offering various measurements of value.

More specifically, price-to-book (PB) was used as a measure of value. Many value investing gurus claim that it is the most appropriate way to measure the intrinsic value of an insurance company. As the balance sheet of an insurance company consists of financial assets and liabilities, the book value is the remainder of assets and liabilities that belong to equity owners. The PB measure is similar to previous "value" studies. In addition, price-to-earnings (PE) ratio was used, similar to Basu (1977) to capture the value stocks. The cyclically adjusted price-to-earnings (CAPE) was also used, similar to Campbell and Shiller (1988). This is due to the fact that the earnings of an insurance company in a single year might affect the way we pick value stocks. For example, an insurance company might have one particularly bad year, due to a catastrophic event, and the event might create much lower earnings than the true earning power of the company. The company might also be a good underwriter over a long period of time. We can call this kind of company, "good but unlucky." Therefore, this might result in a negative PE ratio for a catastrophic year. If we use only a PE ratio to capture the value stock, some insurers might be

3 The author uses the SETSMART database provided by the Stock Exchange of Thailand. This educational version is only available to some Thai universities for educational purposes. The universities that have the Stock Exchange of Thailand Investment Center (SETIC), which is a learning center for investors, have the right to access the database. The database provides a lot of information for each stock. However, it is in a website style. For example, one page can provide five-year balance sheet of a public company. The database does not provide financial information in a query-able structure like Compustat, CRISP, or NAIC databases. The author of this study, therefore, had to carefully collect insurers' financial variables one-by-one at a time. This process is one of the most time-consuming tasks of this study.

eliminated from the analysis. Hence, average earnings might result in a more appropriate measure of a value stock.

The results are in line with other studies. Constructing value portfolios based on PB, PE, and CAPE3[4] outperform both the market portfolios and the growth portfolios. However, using CAPE5[5] does not result in value premium. In particular, value investing greatly outperforms during the period between the Asian financial crisis and the global financial crisis. Adjusting for volatility yields the same results. This implies that CAPM does not fully capture the value premium, similar to the results of Fama and French (2006). In addition, the Fama-French three-factor model does not capture the value anomaly. This might be due to the fact that the number of stocks in each portfolio is small. Therefore, the dispersion from non-systematic risks (the sample variance of εs is too high to be explained by the market returns). It dominates systematic risk which is represented by β. Therefore, there is no apparent relationship between the returns of the value portfolio and the Fama-French factors. Overall, investors can outperform the market, even adjusting for the volatility, by applying a value investing strategy in the Thai insurance industry. However, investors must choose an appropriate value measure to construct the insurance value portfolio.

This study proceeds as follows. Section 2 explores related theories and empirical findings about value investing. Section 3 outlines the portfolio construction procedures and how the data was collected. Section 4 reports the performance of various portfolios when compared to the market. Section 5 uses CAPM to explain the value anomaly in the Thai insurance industry. Section 6 attempts to explain the anomaly using the Fama-French three-factor model. Lastly, the study concludes with a discussion of the implications of the findings and recommendations for future research.

2 Related Theories and Empirical Findings

Benjamin Graham is the father of value investing. His books; Dodd and Graham (1951), and Graham (2003), propose a value strategy for investing. He states that investors can outperform the general market by constructing a portfolio consisting of a low price-to-book ratio or a low price-to-earnings ratio.

4 CAPE3 is cyclically adjusted price-to-earnings ratio based on three-year earnings.

5 CAPE5 is cyclically adjusted price-to-earnings ratio based on five-year earnings.

By using this strategy, investors have what Benjamin Graham calls margins of safety, which means that the price is below the intrinsic value of the business. Many prominent investors have successfully followed this unique strategy, such as Warren Buffett, Charlie Munger, Irvin Kahn, Walter Schloss, Joel Greenblatt, Christopher Browne, Seth Klarman, and Martin Whitman. For instance, Frazzini, Kabiller, and Pedersen (2013) find that Berkshire Hathaway outperforms any stocks and mutual funds using Sharpe's ratio criteria. This is due to the combination of value, safe, quality investing, plus leverage. In addition to the success of the superinvestors from Graham-and-Doddsville,[6] researchers also find evidence that value portfolios outperform market portfolios and growth portfolios.

Fama and French (1992, 1993, 1998, 2006, 2015) also discover that portfolios of value stocks with a low PB, tend to outperform the market. There are doubts that the capital asset pricing model can capture the anomalies in the stock returns. For example, Fama and French (2006) also find that value stocks outperform the market, but CAPM does not capture the value premium. In addition to stocks, Asness, Moskowitz, and Pedersen (2013) find that value premium exists through many other asset classes.

Focusing on the Thai stock market, Sareewiwatthana (2011, 2012, 2013), in line with Fama and French (1992, 1993, 1998, 2006, 2015), find that portfolios consisting of value stocks significantly outperform the market. Sareewiwatthana (2011) uses various measures, such as PB, PE, and dividend yield to pick value stocks. The study ranks them in order to form value portfolios and defines the low PB, PE, and dividend yield to be value stocks. The study finds that value portfolios significantly outperformed the SET index. Sareewiwatthana (2012) combines growth and the price-to-earnings ratio to form a PEG ratio to capture the value stocks. The study constructs a portfolio with a low PEG ratio and finds that it outperforms the market and also a low-PEG portfolio. Sareewiwatthana (2013) implements Sareewiwatthana (2012) by adding the other ratios, such as return of equity (ROE) and return on asset (ROA). Adding these ratios help value portfolios to outperform the market even better. Overall, the evidence suggests that value investing outperforms the market in the Stock Exchange of Thailand.

Value anomaly can be explained by both a rational and behavioral argument. According to the model in Sharpe (1964), higher (lower) risk stocks should have a higher (lower) expected return. Value stocks occur because

6 Buffett, Warren (2004). "The Superinvestors of Graham-and-Doddsville." Hermes: The Columbia Business School Magazine: 415.

investors require higher than expected returns from riskier stocks. Therefore, the investors get higher than average returns due to the fact that they have to bear more risk in the portfolio. For example, Fama and French (1995) show that lower PB stocks tend to be in a distressed situation and tend to provide a low return on equity. On the other hand, the behavioral finance literature explains that value stocks happen as a result of human behavior. For example, an overreaction by investors to news about a company can result in the stock prices being much lower than their fundamental value, according to Bondt and Thaler (1985), Lakonishok, Shleifer, and Vishny (1994), and Daniel, Hirshleifer, and Subrahmanyam (1998). Noise traders and arbitrageurs can also create the situation where the price and the fundamental value are diverged, according to Shleifer and Vishny (1997). A classic statement that explains the value premium from both schools of thought is from Dodd and Graham (1951):

> In other words, the market is not a weighing machine, on which the value of each issue is recorded by an exact and impersonal mechanism, in accordance with its specific qualities. Rather should we say that the market is a voting machine, whereon countless individuals register choices which are the product partly of reason and partly of emotion.

This statement implies that value investing works because in the short term, stock prices can deviate from their fundamental value. However, over the long term, the price can reflect the intrinsic value. The price can get to be very close or at the true fundamental value. It is the job of value investors to find and get the benefit of this anomaly by buying securities when the price and value are deviated, and then waiting until the prices to go back to the intrinsic value in the long term.

3 Portfolio Construction and Data Collection

This study uses the Stock Exchange of Thailand dataset from January of 1990 until December of 2014, available from the SETSMART database. The Stock Exchange of Thailand (SET) has 521 companies listed in the stock market. The Stock Exchange of Thailand also has the Market for Alternative Investment (MAI) for smaller companies, with 129 companies.[7] All Thai publicly listed insurance companies are listed in the SET. Investors have no limit in

7 See http://www.set.or.th/set/marketstatistics.do

investing in the Thai listed companies, although, foreign ownership is limited at 49 % for financial institutions in Thailand. The Thai insurance industry consists of property and casualty (P&C), and life. According to the Office of Insurance Commission of Thailand,[8] the P&C insurance consists of four main lines of businesses; fire, marine, auto, and miscellaneous. The life insurance industry consists of life, accident, health, industrial life, and group life. Table 1 shows information for both the life and P&C insurance industry in Thailand. It includes net premium written, total assets, number of insurers, number of insurers listed in the Stock Exchange of Thailand, and the number of stocks in the value portfolio for each year.[9]

According to Table 1, there are some interesting findings. Firstly, the number of insurers in the life insurance industry has been far less than the P&C insurers. Therefore, this might be a sign that the competition in the life insurance industry might have been less aggressive than the P&C industry. In addition, the number of both life and P&C jumped from 1996 to 1997. This was due to the fact that the Bank of Thailand tried to make financial institutions more competitive, more open, and wanted to promote the insurance products for Thai people. Hence, the Office of Insurance Commission of Thailand opened up for Thai and foreign investors to get new licenses to operate the life and P&C business. Many obtained new licenses. However, the Asian financial crisis arrived right after the implementation of the new policy. The Office of Insurance Commission of Thailand stopped issuing new licenses, due to insolvency concerns. Therefore, the number of companies has not changed much for life insurers. On the other hand, the number of P&C insurers has decreased from the peak of 80 to 64 due to mergers and acquisitions, and insolvencies.

The net premium written for the life insurance industry has accelerated at a higher rate than the P&C industry from 1997 to 2014. The author suspects that Thai people are more cautious about their financial planning. In addition, the financial planning has been popularized by life insurers, the Stock Exchange of Thailand, and also the Office of Insurance Commission of Thailand. It might also be because the life insurers have offered various new insurance products. The

8 See http://www.oic.or.th/th/industry/statistic/23. The data from 1997 to 2014 is available in electronic version on the website. However, the data from 1990–1997 is only available on paper, which the author had to hand-collect from the library of the Office of Insurance Commission of Thailand. The Office of Insurance Commission of Thailand publishes the Annual Insurance Report of Thailand every year that contains the information.

9 The number of stocks in the value portfolio is derived from the methodology in the following sections.

Table 1: Thai insurance industry information from 1990–2014.

Year	Life NPW (in M Baht)	Life Assets (in M Baht)	# of Life	P&C NPW (in M Baht)	P&C Assets (in M Baht)	# of P&C	# of Stocks	# in Port
1990	19,415	46,008	12	12,080	24,353	67	9	2
1991	23,381	58,935	12	14,170 6	33,275	67	12	3
1992	28,516	73,086	12	18,487	42,855	67	17	4
1993	33,683	102,514	12	28,167	64,587	67	18	4
1994	39,883	119,522	12	34,597	73,719	67	20	5
1995	46,991	138,072	13	41,838	87,892	67	20	5
1996	46,077	145,825	13	48,316	89,212	67	21	5
1997	57,213	164,560	25	44,217	83,152	80	22	5
1998	54,813	185,342	25	37,644	83,898	80	22	5
1999	60,752	192,961	25	35,316	84,388	79	22	5
2000	73,352	217,892	25	37,277	83,891	78	22	5
2001	91,626	290,008	25	39,048	89,258	77	22	5
2002	112,101	351,484	25	42,482	97,317	77	22	5
2003	129,977	417,689	25	49,683	112,825	77	21	5
2004	147,198	491,467	24	57,336	115,823	76	21	5
2005	163,137	620,370	24	63,257	121,027	76	20	5
2006	169,360	703,639	24	72,002	132,693	74	19	4
2007	197,623	775,562	24	77,012	137,156	73	18	4
2008	217,221	846,105	24	80,963	139,448	73	18	4
2009	254,130	995,050	24	84,391	155,344	71	16	4
2010	291,416	1,181,850	24	95,986	195,012	69	17	4
2011	323,755	1,488,142	24	105,506	784,408	69	17	4
2012	384,214	1,716,196	24	131,932	593,801	64	17	4
2013	434,486	1,902,901	24	147,181	474,699	64	17	4
2014	493,567	2,301,198	24	149,212	456,889	64	18	4

Note: This table shows information about the Thai insurance industry. The first column represents the year of the data. The second column is the net premium written by life insurance companies in Thailand. The third column is the total assets of life insurers. The fourth column counts the number of life insurance companies, including a foreign company with a branch in Thailand. The fifth column represents the net premium written by the property and casualty insurers in Thailand including foreign insurers with their branches in Thailand. The sixth column represents the total assets of the property and casualty insurers. The seventh column counts the number of property and casualty insurers. The eighth column counts the number of listed insurers, including life and property, and casualty in the Stock Exchange of Thailand. The last column shows the number of stocks that are in the value portfolio in each year. The last column also represents the number of stocks in the growth portfolio in each year.

channels in which they have sold their product have increased tremendously through their own networks, agents, brokers, and banks. The net premium written and total assets in 2011–2012 for P&C increased significantly. This was

because of the great flood event in Thailand. The author suspects that was the result of more people and companies being very cautious about catastrophic risks than never before. In addition, it might also be due to the increase in premium prices.

To test whether value stocks outperform the general market, the author of this study constructed portfolios of stocks using the following criteria. First, portfolios of insurance companies using the price-to-book ratio were constructed. Second, portfolios were constructed using the price-to-earnings ratio. Third, the cyclically adjusted price-to-earnings ratio was used. All property and casualty, and life insurers within the Thai stock market were used to test the hypothesis. Most of the listed insurance companies are P&C. There have been very few life insurance companies in the market. For example, there are currently two life insurers in the Stock Exchange of Thailand. Therefore, it is impossible to construct the portfolio into life and P&C. The analysis will be based on both life and P&C together. The analysis of separating life and P&C might be possible in another country, like the US, where there are many more life insurance companies in the stock market. Due to this limitation, the study analyzes the insurance companies into a single dataset.

3.1 Value Portfolio from PB Ratio

For each year, the portfolios rebalance in the beginning of January. For PB, the study constructed two portfolios by ordering the PB ratios of all insurers.[10] The LOW PB portfolio was then constructed, consisting of the lowest quartile of stocks with the lowest PB ratios. There were 18 insurers listed in the most recent data. Therefore, one quartile consists of 4.5 companies, which was rounded down to 4 companies. Returns with the adjusted dividend of the portfolio for each month will be collected. As the data does not provide the exact date of the dividend, the dividend yield was divided by 12 and added to the price return to adjust for the total return. The proportion of each position was equally weighted. The HIGH PB portfolio was constructed to capture the growth stocks. This is the same as the LOW PB portfolio, except the portfolio picks the highest quartile of PB. The two portfolios were compared to the SET-index portfolio with adjusted dividends.

10 The PB ratio is defined as price-per-share divided by book value per share.

3.2 Value Portfolio from PE Ratio

The value portfolio was constructed using the PE ratio.[11] For each year, the portfolio was rebalanced in the beginning of January. Two portfolios were constructed by ordering the PE ratios of each insurer. The negative value stocks are not considered in constructing the value portfolio. The LOW PE portfolio was constructed, consisting of the lowest quartile of stocks with the lowest PE ratios. The proportion of each position was equally weighted. Returns were collected for each month, including the dividend of the portfolio. The available period of PE portfolios are different from PB portfolios due to the fact that SETSMART does not have earnings-per-share until 1997. Therefore, the analysis of the PE portfolio starts in the beginning of 1998. The HIGH PE portfolio was also constructed to capture the growth stocks. This is the same as the LOW PE portfolio, except the portfolio picks the highest quartile of PE. The two portfolios were compared to the SET-index portfolio and adjusted with the dividend.

3.3 Value Portfolio from Cyclically Adjusted Price-to-Earnings Ratio

Insurers' earnings are different to other businesses. According to Cummins, Weiss, and Zi (1999) and Nettayanun (2014), there are three main operations within an insurance company. First, it pools and bears underwriting risks. Second, it serves its customers through servicing, related to the incurred loss. Third, it gets some other earnings from the investment of the insurance float, which is the premium that the insurer collects and waits to be paid in the future. The first component can be quite volatile due to catastrophic loss. For example, there was a great flood in Thailand in 2011. Most of the insurers faced underwriting losses. Using a regular PE ratio might not give a complete view of the value of the insurers. Therefore, it might be better to capture value stock via the cyclically adjusted price-to-earnings ratio. The ratio averages the earnings in multiple years, according to Campbell and Shiller (1988). Basically, it is the price divided by average earnings adjusted by inflation for 10 years. Particularly,

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11 PE ratio is defined as price per share divided by earning per share. PE is thought to be a better measure of value as it takes return-on-equity (ROE) into consideration. Since, $PE = \frac{price}{EPS}$, hence $PE = \frac{price}{book} * \frac{book}{EPS}$. This is the same as writing $PE = \frac{PB}{ROE}$. A higher PB increases PE if ROE stays constant. On the other hand, a higher ROE lowers the PE ratio if PB stays constant. Therefore, PE is superior to PB in the sense that it captures both ROE and PB at the same time. However, PB is superior to PE because assets are more stable than earnings.

$$CAPE = \frac{price_{current}}{(eps^{\star}_{t-1} + eps^{\star}_{t-2} + \ \ldots \ + eps^{\star}_{t-10})/10} \quad [1]$$

where $eps^{\star}_{i}$ is earnings adjusted by the inflation rate to the current period from year i. The inflation rates for each year are from the Bank of Thailand.[12] Three and five years were used, instead of 10 years, of CAPE to construct the portfolio, due to starting the analysis from 2002 as earnings data can be found starting in 1997. Using 10 years of CAPE resulted in very short timeframe to test the portfolio performance, from 2007 to 2014, which might not be sufficient to show the value premium. CAPE3 and CAPE5 are used to designate CAPE, using an average of three and five years, respectively. Two portfolios were constructed by ordering the CAPE3 of each insurer. The negative value of CAPE3 stocks were not considered in constructing the value portfolio. The LOW CAPE3 portfolio consisted of the lowest quartile of stocks with the lowest CAPE3 ratios. The proportion of each position were equally weighted. Returns, including the dividend of the portfolio were collected for each month. The HIGH CAPE3 portfolio was also constructed to capture the growth stocks. This is the same as the LOW CAPE3 portfolio, except that the portfolio picks the highest quartile of CAPE3. The same exercise was repeated for CAPE5. All portfolios were compared to the SET-index portfolio, adjusted with dividends.

4 Results

The results of the simulated portfolios from various measures will be discussed in detail. First, there will be an explanation of the results from the portfolio ordering of the PB ratios. Second, the results of the portfolio, using the PE ratio, will be shown. The performance of the last two portfolios use CAPE3 and CAPE5, respectively.

4.1 Portfolios Constructed from Price-to-Book Ratio

According to Table 2, the portfolio that consisted of low PB stocks, outperformed the portfolio consisting of high PB stocks, based on the monthly arithmetic average, the annual geometric average, and the monthly excess average of returns. The low PB portfolio achieved 1.52% arithmetic average return

12 See http://www.bot.or.th/Thai/Statistics/Graph/Pages/Main3.aspx

Table 2: Portfolios constructed from price-to-book ratio.

	LOW PB	SET	HIGH PB
Min (per month)	−30.62 %	−29.59 %	−22.33 %
Max (per month)	74.55 %	33.23 %	46.54 %
Arithematic average (per month)	1.52 %	0.84 %	0.91 %
Geometric average (per year)	14.04 %	8.20 %	5.65 %
Volatility (per month)	10.14 %	8.97 %	7.64 %
$VaR_{95\%}$ (per month)	−8.27 %	−9.57 %	−6.46 %
Average $(R_i - R_f)$ (per month)	1.29 %	0.61 %	0.68 %
Sharpe ratio (per month)	12.75 %	6.82 %	8.90 %
β to SET	−4.50 %		4.25 %
Cumulative return of 1 Baht	23.39	6.62	3.74

Note: This table shows information resulting from the construction of portfolios sorting the price-to-book ratio. The portfolios were rebalanced in the beginning of January every year. The first column, LOW PB, represents the portfolio constructed from the first quartile of PB ratios. The second column, SET, is the market portfolio with the dividends reinvested. The third column, HIGH PB, represents the last quartile of PB ratios. The table shows all statistics from each portfolio. Volatility is the standard deviation of the monthly returns of each portfolio. $VaR_{95\%}$ is the first five percentile of the monthly returns. The Sharpe ratio is defined as $\frac{\overline{r_p - r_f}}{\sigma_p}$. Beta of the portfolio is calculated from $\beta_p = \frac{COV(r_p, r_m)}{\sigma_m^2}$. r_p is the per-month-return of the portfolio p. r_f is the return of risk-free interest rate per month. σ_p is the volatility of portfolio p.

compared to 0.91 % of the high PB portfolio. The low PB stocks give 14.04 % geometric average returns per year compared to 5.65 % of the high PB stocks. However, the low PB stocks have lower minimum monthly returns (−30.62 %) than the high PB stocks (−22.33 %). In addition, low PB stocks have a maximum return (74.55 %) that is higher than the high PB stocks (46.54 %). This can be interpreted as follows. On average, low PB stocks have higher average returns than high PB stocks. However, low PB stocks have wider ranges of returns than the high PB stocks. As expected, the volatility of low PB stocks is higher than the high PB stocks. This is the prediction following the CAPM. Higher volatility leads to higher expected returns from the portfolio.

Adjusting for volatility, low PB stocks have a return of 12.75 % compared to 8.90 % for high PB stocks. The F-test was performed to validate the equality of variances between the low PB and the high PB portfolios. The p-value of the F-test is 1.62×10^{-7} with the F-statistics at 1.82. This implies that the volatility of low PB stocks is different from the high PB stocks. The t-test was performed, assuming unequal variances from F-test, to check whether the means of the two portfolios are the same. The test gives t-statistics at 0.87 and p-value of

0.39. This implies that the means from the two portfolios are not significantly different. β from the low PB stocks is −4.50 % versus 4.25 % for the high PB stocks. In magnitude, low PB stocks tend to have a bigger absolute value of β than high PB stocks. Low PB stocks tend to be more volatile than high PB stocks. This might be explained using a distress situation like Fama and French (1995). Low PB stocks tend to be more distressed than high PB stocks. Therefore, investors require higher than expected returns for low PB stocks than the high PB stocks. The cumulative return of the low PB portfolio outperforms both the market portfolio and the high PB portfolio. The low PB portfolio achieves 23.39 times over 24 years, whereas, the market and the high PB portfolio get 6.62 times and 3.74 times, respectively. In addition, we can see the accumulation over time of the low PB portfolio, the high PB portfolio, and the market portfolio in Figure 1.

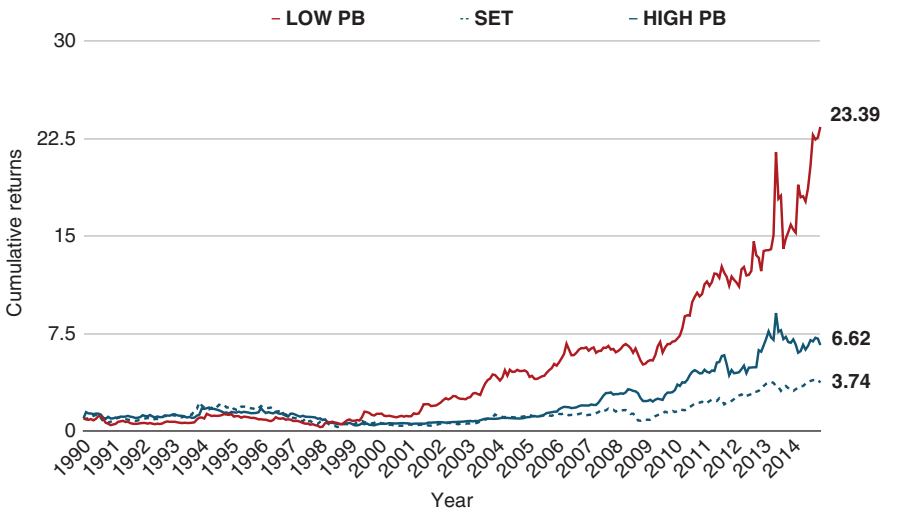

Figure 1: The chart compares the cumulative returns from the portfolios constructed, using the price-to-book (PB) ratio. Each portfolio starts with the amount of one baht and accumulates to the amount stated on the right of each line. The portfolios rebalance every January of each year. The LOW PB column represents the portfolio constructed from the first quartile of PB. The SET is the market portfolio including the dividend reinvested. The HIGH PB represents the portfolio with stocks in the last quartile with the highest PB.

Overall, the results are in line with previous studies. There exists a value premium, not only across all stocks, but in the insurance industry in particular. CAPM seems to be able to explain this value premium in the Thai insurance industry. Even though the low PB ratio has a higher averaged return,

investors face higher volatility by holding these stocks. The portfolio of low PB stocks have a deeper worst month than the high PB stocks. On the other hand, the low PB stocks have the best returns in a single month. However, low PB insurers' stocks cumulatively outperform the high PB insurers' stocks by a wide margin.

4.2 Portfolios Constructed from Price-to-Earning Ratio

The following is the result of the portfolios' returns constructed from the price-to-earnings (PE) ratio. According to Table 3, the portfolio contains stocks with low PE that outperform the portfolio that consists of high PE, based on the monthly arithmetic average, the annual geometric average, and the monthly excess average. The low PE portfolio achieves 3.15% arithmetic average compared to 0.96% of the high PE portfolio. Low PE stocks give 41.21% geometric average per year compared to 10.03% of the high PE stocks. The difference on the geometric average is very wide. The low PE portfolio has the worst return for each month (–21.51%) compared to the high PE stocks (–20.77%). In addition, low PE stocks have a much higher maximum monthly return (68.11%) higher

Table 3: Portfolios constructed from price-to-earning ratio.

	LOW PE	SET	HIGH PE
Min (per month) (%)	–21.51	–29.59	–20.77
Max (per month) (%)	68.11	33.23	38.18
Arithematic average (per month) (%)	3.15	1.29	0.96
Geometric average (per year) (%)	41.21	12.70	10.03
Volatility (per month) (%)	9.73	8.38	6.51
$VaR_{95\%}$ (per month) (%)	–4.96	–8.19	–6.34
Average $(R_i - R_f)$ (per month) (%)	3.04	1.18	0.84
Sharpe ratio (per month) (%)	31.26	14.06	12.97
β to SET (%)	5.43		1.73
Cumulative return of 1 Baht	250.06	6.77	4.62

Note: This table shows information resulting from the construction of portfolios from sorting the price-to-earnings ratio. The portfolios are rebalanced every January. The first column, LOW PE, represents the first quartile of PE ratios. The second column, SET is the market portfolio including dividends reinvested. The third column, HIGH PE, represents the last quartile of PE ratios. The table shows all statistics from each portfolio. Volatility is the standard deviation of the monthly returns of each portfolio. $VaR_{95\%}$ is the first five percentile of the monthly returns. Sharpe ratio is defined as $\frac{\overline{r_p - r_f}}{\sigma_p}$. Beta of the portfolio is calculated from $\beta_p = \frac{COV(r_p, r_m)}{\sigma_m^2}$. r_p is the per-month-return of the portfolio p. r_f is the return of risk-free interest rate per month. σ_p is the volatility of portfolio p.

than the high PE stocks (38.18 %). To summarize, on average, low PE stocks tend to have a higher average than high PE stocks. During the bad months, the two portfolios seem to have similar returns. However, the low PE ratio portfolio has a high return during the best month.

Adjusting for volatility, low PE stocks have a volatility of 9.73 % compared to 6.51 % for the high PE stocks. An F-test was used to validate the equality of variances between the low PE and the high PE portfolios. The p-value of the F-test is 8.58×10^{-9} with the F-statistics at 0.44. This implies that the volatility of low PE stocks is different from the high PE stocks. A t-test was also performed, assuming unequal variances from F-test, to check whether the means of the two portfolios are the same. The test gives t-statistics at 2.68 and p-value of 0.004. This implies that we can reject the null hypothesis that the means from the two portfolios are the same at 0.01 level. β derived from the low PE stocks is 5.43 % versus 1.73 % for the high PE stocks. This is in line with the volatility of each portfolio. Low PE stocks tend to be more volatile than high PE stocks. This is in line with the results constructed using PB ratios. In addition, the low PE stock portfolio has a higher $VaR_{95\%}$, which indicates less than 95 % confidence that the risk of loss in return for a particular month of the low PE portfolio is lower than the high PE portfolio, and the market portfolio. Therefore, these results cannot be fully explained by reasoning that higher price risk should be compensated by higher expected return.

The cumulative return of the low PE portfolio outperforms both the market portfolio and the high PE portfolio. The low PE ratio achieves 250.06 times over 16 years. The market and the high PE portfolio get 6.77 times and 4.62 times, respectively. In addition, figure 2 illustrates the cumulative return and the movement pattern of the low PE portfolio, the high PE portfolio, and the market portfolio.

Overall, the results are in line with previous studies that show a value premium in the Thai insurance industry. Although value premium can be explained by having higher volatility in stock prices, it cannot be explained from the perspective of the minimum return and the value at risk. However, low PE stocks in the insurance industry outperform the high PE stocks by a wide margin in terms of cumulative returns over a period of 16 years.[13]

13 The data of earnings for each stock started in 1997. Therefore, there are only about 16 years to accumulate returns. This is different from the PB case. The PB ratios have been available since 1990. There are 24 years for portfolio construction in the PB case.

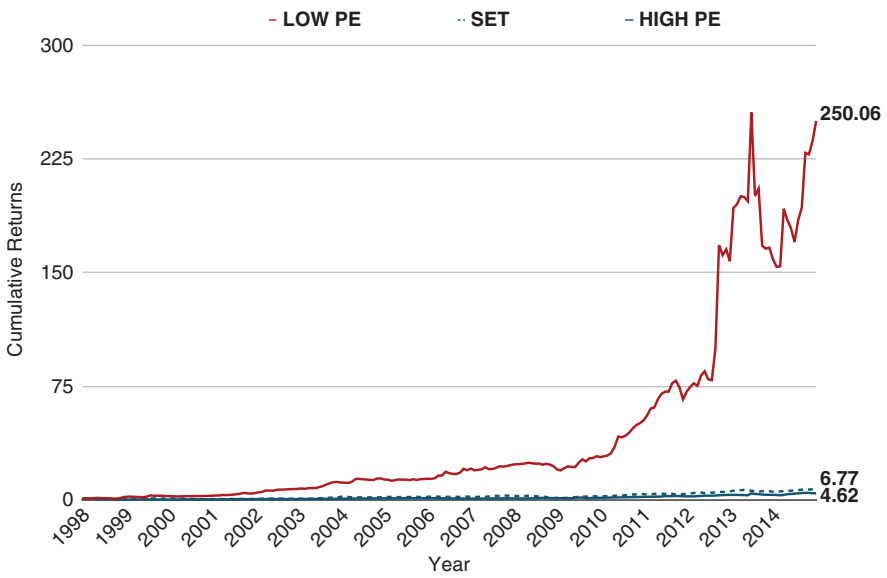

Figure 2: The chart compares cumulative returns from the portfolios constructed using the price-to-earnings (PE) ratio. Each portfolio starts with the amount of one baht and accumulates to the amount stated on the right of each line. The portfolios rebalance every January of each year. The LOW PE represents the portfolio constructed from the first quartile stocks with the lowest PE. The SET is the market portfolio including dividend reinvested. The HIGH PE represents the portfolio using stocks in the last quartile with the highest PE.

4.3 Portfolios Constructed from Three-Year Cyclically Adjusted Price-to-Earnings Ratio

The following are the results from portfolios constructed from the three-year cyclically adjusted price-to-earnings ratio. According to Table 4, a portfolio consisting of stocks with a low level of CAPE3 outperforms a portfolio consisting of high CAPE3, based on the monthly arithmetic average, the annual geometric average, and the excess average. The low CAPE3 portfolio achieves a 2.31% arithmetic average compared to 1.42% for the high CAPE3 portfolio. Low CAPE3 stocks give a 28.31% geometric average per year versus 16.83% for high CAPE3 stocks. The low CAPE3 portfolio has the worst return (−34.14%) for each month and is lower than the high CAPE3 stocks (−22.96%). In addition, low CAPE3 stocks have a much higher best monthly return (59.64%) than the high CAPE3 stocks (33.68%).

Table 4: Portfolios constructed from three-year cyclically adjusted price-to-earnings ratio.

	LOW CAPE3	SET	HIGH CAPE3
Min (per month)	−34.14 %	−29.59 %	−22.96 %
Max (per month)	59.64 %	23.74 %	33.68 %
Arithematic Average (per month)	2.31 %	1.15 %	1.42 %
Geometric Average (per year)	28.31 %	12.30 %	16.83 %
Volatility (per month)	8.90 %	6.96 %	6.50 %
$VaR_{95\%}$ (per month)	−4.55 %	−7.49 %	−5.18 %
Average $(R_i - R_f)$ (per month)	2.23 %	1.07 %	1.34 %
Sharpe Ratio (per month)	25.01 %	15.43 %	20.61 %
β to SET	−1.71 %		3.25 %
Cumulative Return of 1 Baht	32.78	5.07	8.82

Note: This table shows information resulting from the construction of portfolios by sorting the three-year cyclically adjusted price-to-earnings ratio. The portfolios are rebalanced every January. The first column, LOW CAPE3, represents the first quartile of CAPE3 ratios. The second column, SET, is the market portfolio, including dividends reinvested. The third column, HIGH CAPE3, represents the last quartile of CAPE3 ratios. The table shows all statistics from each portfolio. Volatility is the standard deviation of the monthly returns of each portfolio. $VaR_{95\%}$ is the first five percentile of the monthly returns. Sharpe ratio is defined as $\frac{\overline{r_p - r_f}}{\sigma_p}$. Beta of the portfolio is calculated from $\beta_p = \frac{COV(r_p, r_m)}{\sigma_m^2}$. r_p is the per-month-return of the portfolio p. r_f is the return from risk-free interest rate per month. σ_p is the volatility of portfolio p.

Adjusting for volatility, low CAPE3 stocks have a volatility of 8.90 % versus 6.50 % for high CAPE3 stocks. The author performed the F-test to validate the equality of variances between the low CAPE3 and the high CAPE3 portfolios. The p-value of the F-test is 1.56×10^{-5} with the F-statistics at 0.53. This implies that the volatility of low CAPE3 stocks is different from the high CAPE3 stocks. The author performed the t-test, assuming unequal variances from F-test, to check whether the means of the two portfolios are the same. The test gives t-statistics at 1.08 and p-value of 0.28. This implies that the means from the two portfolios are not significantly different. β from the low PE stocks is −1.71 % and 3.25 % for the high CAPE3 stocks. This is in line with the volatility of each portfolio. Even though the volatility of the low CAPE3 stocks is higher than the high CAPE3, the β result is the reverse. This implies that the volatility does not quite explain the value premium when we use CAPE3. The low CAPE3 portfolio outperforms the high CAPE3 under Sharpe ratio. Therefore, the result that higher volatility should be compensated by a higher than expected return cannot be fully explained by the CAPM.

The cumulative return of the low CAPE3 portfolio outperforms both the market portfolio and the high CAPE3 portfolio. The low PE portfolio achieves

32.78 times over 14 years, whereas, the market and the high CAPE3 portfolios achieve 5.07 times and 8.82 times, respectively. In addition, figure 3 illustrates the cumulative return and the movement pattern of the low CAPE3 portfolio, the high CAPE3 portfolio, and the market portfolio.

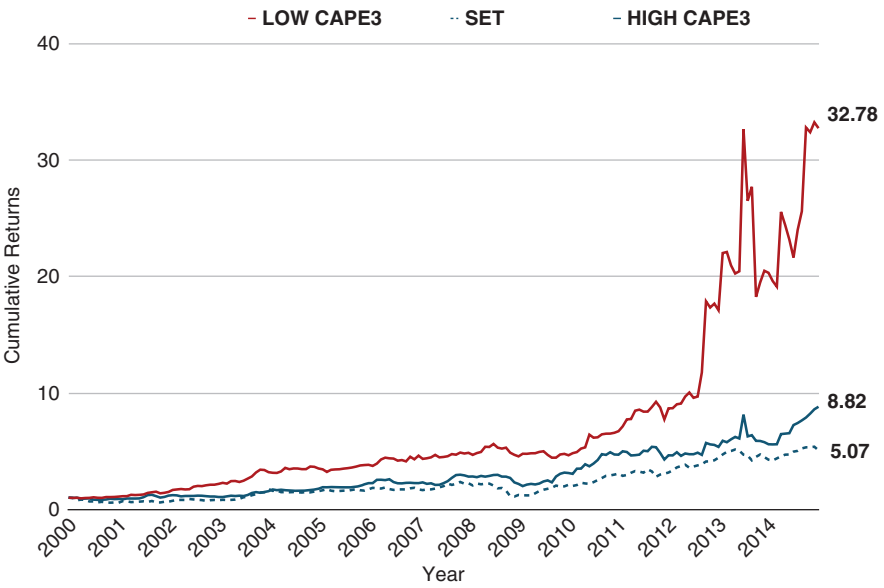

Figure 3: The chart compares cumulative returns from the portfolios constructed using CAPE3. Each portfolio starts with the amount of one baht and accumulates to the amount stated on the right of each line. The portfolios rebalance every January of each year. The HIGH CAPE3 represents the portfolio constructed from the first quartile stocks with the lowest CAPE3 ratios. The SET is the market portfolio including dividend reinvested. The HIGH CAPE3 represents the portfolio using stocks in the last quartile with the highest CAPE3.

Overall, there is a value premium as a result of using CAPE3, although it can be explained by having higher volatility in stock prices. In addition, using the Sharpe ratio, the low CAPE3 stocks still outperform the high CAPE3. Interestingly, both the low and high CAPE3 stocks outperform the market as a whole. This is due to the fact that the insurance industry outperforms the market as a whole during the period used. The setback of this result is due to the shorter time period as we lose about three years of data for averaging the lagged earnings. The results would be more reliable if there were a longer time period.

4.4 Portfolios Constructed from Five-Year Cyclically Adjusted Price-to-Earnings Ratio

These are the results from the portfolios constructed from the five-year cyclically adjusted price-to-earnings ratio (CAPE5). According to Table 5, a portfolio consisting of stocks with a low level of CAPE5, underperforms the portfolio consisting of high CAPE5, based on the monthly arithmetic average, the annual geometric average, and the excess average. The low CAPE5 portfolio achieves a 2.18 % arithmetic average, compared to 2.27 % for the high CAPE5 portfolio. Low CAPE5 stocks give 27.17 % geometric average per year compared to 30.47 % for the high CAPE5 stocks. The low CAPE5 portfolio has the worst monthly return of –26.21 %, which is lower than the high CAPE5 stocks (–14.97 %). However, the low CAPE5 portfolio has a higher maximum return (49.11 %) than the high CAPE5 stocks (30.32 %).

Table 5: Portfolios constructed from five-year cyclically adjusted price-to-earnings ratio.

	LOW CAPE5	SET	HIGH CAPE5
Min (per month)	–26.21 %	–29.59 %	–14.97 %
Max (per month)	49.11 %	19.68 %	30.32 %
Arithematic Average (per month)	2.18 %	1.52 %	2.27 %
Geometric Average (per year)	27.17 %	18.62 %	30.47 %
Volatility (per month)	8.27 %	6.26 %	6.51 %
$VaR_{95\%}$ (per month)	–4.37 %	–6.40 %	–4.56 %
Average $(R_i - R_f)$ (per month)	2.12 %	1.46 %	2.20 %
Sharpe Ratio (per month)	25.57 %	23.32 %	33.83 %
β to SET	–0.01 %		7.46 %
Cumulative Return of 1 Baht	17.89	7.76	24.34

Note: This table shows information resulting from the simulation of portfolios by sorting the five-year cyclically adjusted price-to-earnings ratio. The portfolios are rebalanced every January. The first column, LOW CAPE5, represents the first quartile of CAPE5 stocks. The second column, SET, is the market portfolio return, including dividends reinvested. The third column, HIGH CAPE5, represents the last quartile of CAPE5 stocks. The table shows all statistics from each portfolio. Volatility is the standard deviation of the monthly returns for each portfolio. $VaR_{95\%}$ is the first five percentile of the monthly returns. Sharpe ratio is defined as $\frac{\overline{r_p - r_f}}{\sigma_p}$. Beta of the portfolio is calculated from $\beta_p = \frac{COV(r_p, r_m)}{\sigma_m^2}$. r_p is the per-month-return of the portfolio p. r_f is the return of risk-free interest rate per month. σ_p is the volatility of portfolio p.

Volatility of the low CAPE5 is higher than the high CAPE5, although β of the low CAPE5 stocks is lower than the high CAPE5 in absolute terms. The author performed the F-test to validate the equality of variances between the low

CAPE5 and the high CAPE5 portfolios. The p-value of the F-test is 0.002 with the F-statistics at 0.62. This implies that the volatility of low CAPE5 stocks is different from the high CAPE5 stocks. A t-test was performed, assuming unequal variances from F-test, to check whether the means of the two portfolios are the same. The test gives t-statistics at 0.10 and p-value of 0.92. This implies that the means from the two portfolios are not significantly different. The low CAPE5 stocks underperform in both Sharpe ratio and cumulative return. Hence, there is no value premium using the CAPE5 measure. CAPE10, using the 10-year average saw a similar result. One explanation of this result might be due to the underwriting standard of insurance companies. Using the long-term average of earnings might not reflect the true fundamental value, either going forward or currently embedded in the insurer. Therefore, using earnings data that go too far back in time does not represent the true underlying earning power of the Thai insurance firms. Figure 4 shows the cumulative returns from the low CAPE5, the high CAPE5, and the market portfolios.

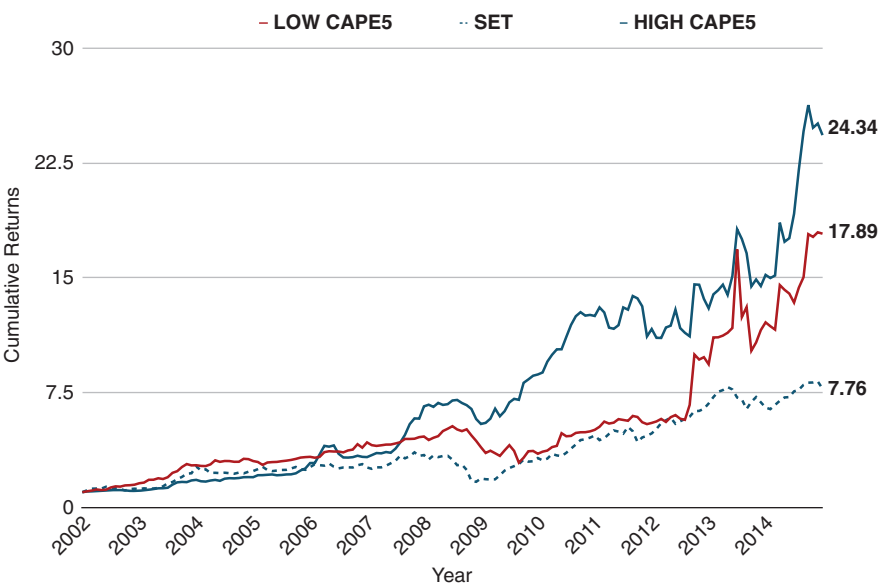

Figure 4: The chart compares cumulative returns from the portfolios constructed using the CAPE5 year ratio. Each portfolio starts with the amount of one baht and accumulates to the amount stated on the right of each line. The portfolios rebalance every January of each year. The LOW CAPE5 represents the portfolio constructed from the first quartile stocks with the lowest CAPE5. The SET is the market portfolio including dividend reinvested. The HIGH CAPE5 represents the portfolio using stocks in the last quartile with the highest CAPE5.

4.5 All Measures

Figure 5 shows the cumulative returns of various value portfolios constructed from different value measures. The timeframe starts in 2002 because CAPE5 was available since that year. All of the value measures outperform the returns of the Thai stock market. According to the figure, the PE ratio outperforms other value measures. Low PB ratio is the worst among various measures but still outperforms the market. Therefore, using a low PE ratio might give the best indicator of value among insurer stocks.

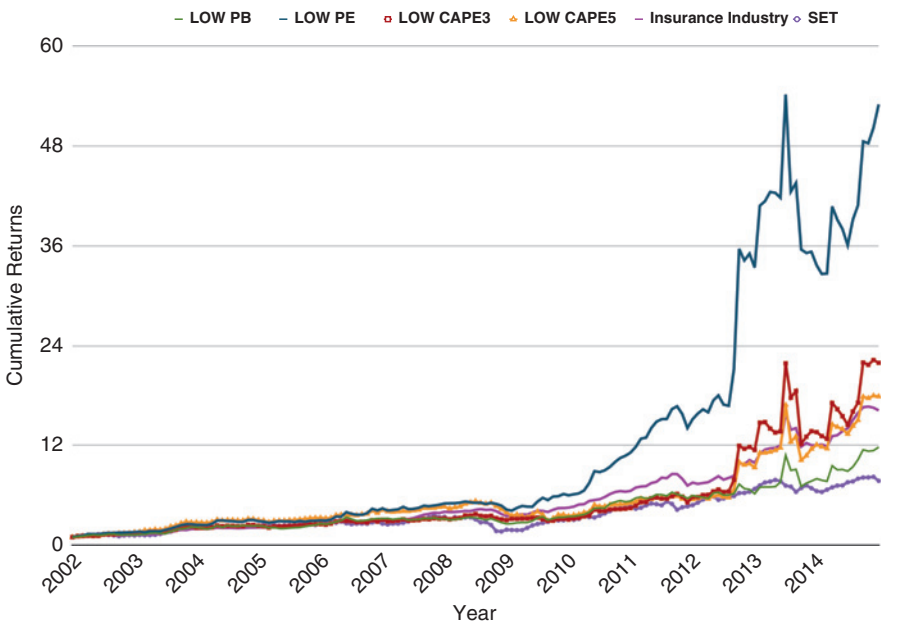

Figure 5: The chart compares cumulative returns from the portfolios constructed using stocks with a low value indicator. Each portfolio starts with the amount of one baht and accumulates to the amount stated on the right of each line. The portfolios rebalance every January of each year. The LOW PB column represents the portfolio constructed from the first quartile of PB ratios. The SET is the market portfolio including dividend reinvested. The LOW PE represents the portfolio constructed from the first quartile stocks with the lowest PE. The LOW CAPE3 represents the portfolio constructed from the first quartile stocks with the lowest CAPE3. The LOW CAPE5 represents the portfolio constructed from the first quartile stocks with the lowest CAPE5. The SET is the market portfolio including dividend reinvested. The Insurance Industry includes the dividend reinvested. The insurance portfolio is constructed using the returns of all insurance companies in the Thai stock market.

4.6 Stability of the Value Strategy with Financial Crises: A Robust Check

This section studies the stability of the value portfolio before and after the financial crises. It captures the performance of the value portfolio, focusing at the pre and post-crisis events. The Thailand stock market experienced some significant drops during the Asian financial crisis of 1997, and the global financial crisis of 2008–2009. According to the SET index data,[14] around the Asian financial crisis, it reached the highest point at 1528.83 in October 1994. Then it tumbled to 214 in August of 1998. Then again, around the global financial crisis, it reached the highest point at 907.28 in October 2007. Then it tumbled to 431.5 in March 2009. Therefore, the study splits the timeframe into three periods. The first period starts in the beginning of 1990 and extends to the end of 1996. The second period starts at the beginning of 1997 and extends to the end of 2008. Finally, the last period starts at the beginning of 2009 and continues until the end of 2014. The criteria to split them is that 1997 and 2009 are the points in which the market seemed to be in panic. The only value measure that is available from 1990 to 2014 is the PB ratio. Therefore, the study focuses the result of value stock using the PB ratio and how it works across all these crises.

Overall, the value investing strategy is mostly a winning strategy over these three periods, according to Table 6. These results are similar when using a dataset from 1990–2014, although, the value premium is not quite apparent in period 1 (from 1990 to 1996). The arithmetic monthly average of low PB stocks is lower than the high PB stocks. The t-test, assuming different variances, gives t-statistics of 0.05 and a p-value of 95.64 %. Therefore, it cannot reject the null hypothesis that the means are equal. However, the low PB portfolio still gives higher geometric average and higher cumulative return than the high PB portfolio. The magnitude of value premium from 1990 to 1996 is not obvious and might be due to the fact that there are only 2 to 3 stocks in the portfolios for the year 1990 and 1991 respectively. This is due to the low number of insurance stocks in the Thai stock exchange. The noises of the returns might be too high to give clear characteristics of the low and the high PB stocks. Hence, it does not show signs of value premium from 1990 to 1996.

On the other hand, an obvious value premium occurs in the period after the Asian financial crisis and before the global financial crisis (1997–2008). The

14 See http://www.set.or.th/en/market/market–statistics.html

Table 6: Portfolios constructed from price-to-book ratio separated by the financial crises.

	LOW PB	SET	HIGH PB
Period 1: 1990–1996			
Min (per month)	−30.90 %	−25.37 %	−18.62 %
Max (per month)	37.56 %	30.00 %	46.54 %
Arithematic Average (per month)	0.45 %	0.63 %	0.54 %
Geometric Average (per year)	6.90 %	2.31 %	0.17 %
Volatility (per month)	10.82 %	9.48 %	9.47 %
Average $(R_i - R_f)$ (per month)	−0.05 %	0.14 %	0.04 %
Sharpe Ratio (per month)	−0.44 %	1.43 %	0.41 %
$VaR_{95\%}$ (per month)	−14.08 %	−14.11 %	−9.74 %
β to SET	11.98 %		0.25 %
Cumulative Return of 1 Baht	1.60	1.17	1.01
Period 2: 1997–2008			
Min (per month)	−28.52 %	−29.59 %	−22.33 %
Max (per month)	75.14 %	33.23 %	22.50 %
Arithematic Average (per month)	1.72 %	0.36 %	0.57 %
Geometric Average (per year)	22.72 %	−0.78 %	6.75 %
Volatility (per month)	10.84 %	10.10 %	6.10 %
$VaR_{95\%}$ (per month)	−10.77 %	−17.22 %	−9.52 %
Average $(R_i - R_f)$ (per month)	1.56 %	0.40 %	0.20 %
Sharpe Ratio (per month)	14.40 %	1.96 %	6.62 %
β to SET	−0.12 %		0.09 %
Cumulative Return of 1 Baht	11.67	0.91	2.19
Period 3: 2009–2014			
Min (per month)	−20.95 %	−14.02 %	−16.41 %
Max (per month)	43.19 %	14.41 %	29.28 %
Arithematic Average (per month)	2.58 %	2.17 %	1.78 %
Geometric Average (per year)	24.47 %	24.58 %	14.32 %
Volatility (per month)	8.53 %	5.20 %	7.83 %
$VaR_{95\%}$ (per month)	−7.30 %	−6.57 %	−10.46 %
Average $(R_i - R_f)$ (per month)	2.53 %	2.13 %	1.73 %
Sharpe Ratio (per month)	29.71 %	40.90 %	22.11 %
β to SET	−16.45 %		−18.21 %
Cumulative Return of 1 Baht	3.72	3.74	2.23

Note: This table shows information resulting from the construction of portfolios sorting the price-to-book ratio. It splits time periods by the occurrences of financial crises. The first period is from 1990 to 1996. The second period is from 1997 to 2008. The last period is from 2009 to 2014. The portfolios were rebalanced in the beginning of January every year. The first column, LOW PB, represents the portfolio constructed from the first quartile of PB ratios. The second column, SET, is the market portfolio with the dividends reinvested. The third column, HIGH PB, represents the last quartile of PB ratios. The table shows all statistics from each portfolio. Volatility is the standard deviation of the monthly returns of each portfolio. $VaR_{95\%}$ is the first five percentile of the monthly returns. The Sharpe ratio is defined as. $\frac{\overline{r_p - r_f}}{\sigma_m}$. Beta of the portfolio is calculated from $\beta_p = \frac{COV(r_p, r_m)}{\sigma_p^2}$. r_p is the per-month-return of the portfolio p. r_f is the return of risk-free interest rate per month. σ_p is the volatility of portfolio p.

value portfolio greatly outperforms the growth portfolio across all performance measures. Although, the t-test assuming different variances, has a p-value of 0.13, we cannot imply that the returns are different. The geometric average is much higher for the value stocks. There is also evidence of value premium from 2009 to 2014. The value and growth stocks seem to underperform the SET index during this period. However, value stocks still outperform the growth stock from 2009 to 2014. Overall, the value investing strategy seems to work well, even controlling for financial crises.

5 Can Value Premium Be Explained by CAPM?

According to the capital asset pricing model (CAPM), higher expectations of returns compensate for higher risk. CAPM uses the price's β to measure the risk of each stock. Value stocks result in higher average returns. Therefore, we should expect to observe higher β for the value portfolio. However, researchers have found the opposite. For example, Fama and French (2006) find that CAPM fails to capture value premium. An examination of whether CAPM can fully capture value premium is explored in this section.

The following model is used in order to explore the relationship between value premium and CAPM:

$$R_p(t) - R_f(t) = \alpha + \beta_{Market}[R_{Market}(t) - R_f(t)] + \varepsilon(t). \quad [2]$$

The excess returns on the left-hand side of eq. [2] are regressed on the excess returns of the Stock Exchange of Thailand returns including dividends. The risk-free rates $R_f(t)$ are obtained from the Bank of Thailand's website. According to Table 7, CAPM does not fully explain the value premium. The CAPM αs are all positive and significant for the low PB, low PE, and the low CAPE3 that exhibits value premium, as discussed in the previous sections. In addition, there is a mixed result, suggesting that value portfolios should have higher βs than the growth portfolios. Using PB and CAPE3 measures, βs in the value portfolios are smaller than the growth portfolios. However, using PE as a measure, the growth portfolio has lower β than the value portfolio. Therefore, if volatility of the portfolio is the measure for risk, we cannot conclude that the value portfolio achieves higher returns than the growth portfolio due to risk. The R^2's are also low in all the cases. Therefore, market excess returns do a poor job in explaining the portfolio's excess returns.

Table 7: CAPM using SET index.

Portfolio	α	β_{SET}	R^2	F-Stat	P-Val	Obs	Year
LOW PB	1.32**	−0.04	0.0013	0.3904	0.5326	298	1990–2014
	[2.24]	[−0.63]					
HIGH PB	0.65	0.05	0.0030	0.8878	0.3468	298	1990–2014
	[1.47]	[0.94]					
LOW PE	2.98***	0.05	0.0022	0.4388	0.5085	203	1998–2014
	[4.33]	[0.66]					
HIGH PE	0.82*	0.02	0.0006	0.1270	0.7220	203	1998–2014
	[1.78]	[0.36]					
LOW CAPE3	2.24***	−0.02	0.0002	0.0269	0.8700	179	2000–2014
	[3.33]	[−0.16]					
HIGH CAPE3	1.30***	0.03	0.2459	0.2459	0.6206	179	2000–2014
	[0.49]	[0.07]					

Note: This table shows information resulting from OLS regressions of the value portfolio excess returns, constructed from PB, PE and CAPE3, based on SET market index excess returns, including dividends. LOW PB is the portfolio containing the lowest quartile of PB. HIGH PB is the portfolio containing stocks with the highest quartile of PB. LOW PE is the portfolio consisting of stocks with the lowest quartile of PE. HIGH PE is a portfolio consisting of stocks with the highest quartile of PE. LOW CAPE3 is a portfolio that contains the lowest quartile of CAPE3 stocks. Lastly, HIGH CAPE3 is a portfolio containing high CAPE3 stocks. α column represents the constant coefficients from all OLS regressions. β_{SET} is the column that contains the coefficients of the SET index excess returns, including dividends. R^2 is the column that represents the R^2 value of each regression. $F-Stat$ is the value of the F-statistics to test whether the β_{SET} should be zero. $P-Val$ is the column that represents the p-value from the F-test. *Obs* is the observation column that represents the number of observations in each particular regression. Year is the column to represent the year for which data was used, due to the availability of PB, PE and CAPE3. The numbers in square brackets are the t-statistics to test whether each coefficient is significantly different from zero. *,**, and *** represent the significant levels of 0.10, 0.05, and 0.01, respectively, from the t-tests.

Table 8 is the same as Table 7 except the Asia market returns are used instead of the SET index's returns. Asia market returns and Asia risk-free rates are from Kenneth French's website. Again, CAPM does not fully explain the value premium. All the α's of the value portfolios are positive and significant. Value portfolios have higher βs than the growth portfolios in absolute terms and in all cases. Therefore, using the Asia market index to capture the portfolio returns has the same results as implied by CAPM. However, R^2's are low for all the cases similar to the previous case when the SET index returns were used. Therefore,

Table 8: CAPM using Asia market index.

Portfolio	α	β_{Asia}	R^2	F-Stat	P-Val	Obs	Year
LOW PB	1.36**	−0.06	0.0012	0.3540	0.5523	293	1990–2014
	2.27	−0.60					
HIGH PB	0.52	0.04	0.0009	0.2732	0.6016	293	1990–2014
	1.23	0.52					
LOW PE	3.06***	−0.11	0.0049	0.9901	0.3209	203	1998–2014
	4.45	−1.00					
HIGH PE	0.81*	−0.05	0.0019	0.3934	0.5312	203	1998–2014
	1.76	−0.63					
LOW CAPE3	2.26***	−0.15	0.0108	1.9360	0.1658	179	2000–2014
	3.39	−1.39					
HIGH CAPE3	1.22***	0.06	0.0031	0.5458	0.4610	179	2000–2014
	2.50	0.74					

Note: This table shows information resulting from OLS regressions of value portfolio excess returns, constructed from PB, PE and CAPE3, based on the Asia market index excess returns from Kenneth French's website. LOW PB is the portfolio containing the lowest quartile of PB. HIGH PB is a portfolio containing stocks with the highest quartile of PB. LOW PE is the portfolio consisting of stocks with the lowest quartile of PE. HIGH PE is a portfolio consisting of stocks with the highest quartile of PE. LOW CAPE3 is a portfolio that contains the lowest quartile of CAPE3 stocks. Lastly, HIGH CAPE3 is a portfolio containing high CAPE3 stocks. The α column represents the constant coefficients from all OLS regressions. β_{Asia} is a column that contains the coefficients of the Asia market excess returns. R^2 is the column that represents the R^2 value of each regression. $F-Stat$ is the value of the F-statistics to test whether the β_{Asia} should be zero. $P-Val$ is the column that represents the p-value from the F-test. *Obs* is the observation column that represents the number of observations in each particular regression. Year is the column that represents the year for which data was used due to the availability of PB, PE and CAPE3. The numbers in square brackets are the t-statistics to test whether each coefficient is significantly different from zero. *,**, and *** represent the significant levels of 0.10, 0.05, and 0.01, respectively, from the t-tests.

Asian market index excess returns do a poor job in explaining the portfolios' excess returns.

Next, the global portfolio returns and global risk-free rates from Kenneth French's website are used to test whether value premium can be explained by the global market index, as shown in Table 9. According to Table αs are all positive and significant for the value portfolio. Therefore, CAPM, using global market returns, does not fully explain the value anomaly. In addition, βs in the value portfolios is not shown to be more than the growth portfolio in all cases in absolute terms. In the PE case, β of the portfolio is lower than the growth

Table 9: CAPM using global market index.

Portfolio	α	β_{Global}	R^2	F-Stat	P-Val	Obs	Year
LOW PB	1.36**	0.10	0.0021	0.602	0.4384	292	1990–2014
	2.28	−0.78					
HIGH PB	0.56	0.02	0.0001	0.02807	0.8671	292	1990–2014
	1.31	−0.17					
LOW PE	2.97***	0.01	0.0000	0.002772	0.9581	203	1998–2014
	4.32	0.05					
HIGH PE	0.84*	−0.13	0.0092	1.867	0.1733	203	1998–2014
	1.83	−1.37					
LOW CAPE3	2.21***	−0.18	0.0091	1.642	0.2018	203	2000–2014
	3.33	−1.28					
HIGH CAPE3	1.27**	0.01	0.0000	0.002312	0.9617	203	2000–2014
	2.60	0.05					

Note: This table shows information resulting from OLS regressions of value-portfolio excess returns constructed from PB, PE and CAPE3, based on global market index excess returns from Kenneth French's website. LOW PB is the portfolio containing the lowest quartile of PB. HIGH PB is a portfolio containing stocks with the highest quartile of PB. LOW PE is the portfolio consisting of stocks with the lowest quartile of PE. HIGH PE is a portfolio consisting of stocks with the highest quartile of PE. LOW CAPE3 is a portfolio that contains the lowest quartile of CAPE3 stocks. Lastly, HIGH CAPE3 is a portfolio containing high CAPE3 stocks. The α column represents the constant coefficients from all OLS regressions. β_{Global} is a column that contains the coefficients of the global market excess returns. R^2 is the column that represents the R^2 value of each regression. $F-Stat$ is the value of the F-statistics to test whether the β_{Global} should be zero. $P-Val$ is the column that represents the p-value from the F-test. *Obs* is the observation column that represents the number of observations in each particular regression. Year is the column to represent the year for which data was used due to the availability of PB, PE and CAPE3. The numbers in square brackets are the t-statistics to test whether each coefficient is significantly different from zero. *,**, and *** represent the significant levels of 0.10, 0.05, and 0.01, respectively, from the t-tests.

portfolio. Therefore, if we use price volatility as a proxy for risks, we cannot conclude that the value portfolio is riskier than the growth portfolio.

According to Tables 7, 8 and 9, it appears that CAPM does not fully explain the value premium. αs are all positive and significant using all of the market's returns. In addition, βs in the value portfolios are not always higher than the growth portfolios, as CAPM predicts. This result is similar to Fama and French (2006) that states that CAPM fails to capture value anomalies. Therefore, a discussion to try to explain the value premium, using the Fama-French three-factor model, will follow in the next section.

6 Can Fama-French Three-Factor Model Explain the Value Anomaly?

Next, the Fama-French three-factor model is used to explain the value premium introduced in Fama and French (1993). In particular, the following equation is regressed:

$$R_p(t) - R_f(t) = \alpha + \beta_{Market}[R_{Market}(t) - R_f(t)] + \beta_{SML}{}^{\star}R_{SML}(t) + \beta_{HML}{}^{\star}R_{HML}(t) + \varepsilon(t). \quad [3]$$

In addition to market excess returns in the CAPM model, the factors are small minus large (SML) and high minus low (HML). These factors use data from Kenneth French's website. SML is the portfolio returns from investing in small stocks and shorting large stocks. HML is the portfolio returns from investing in high book-to-market stocks and shorting low book-to-market stocks. If the Fama-French three-factor model can explain the value anomaly, the author of this study would expect the α to be indifferent from zero. In addition, as the insurance portfolio construction is based on value, it could be expected that the HML factor helps to explain the value anomaly. The Asia and global Fama-French three-factor returns are extracted from Kenneth French's website. The Asia factors exclude Japan, due to the fact that Japan has not exhibited value premium in the market over the past 26 years.

According to Table 10, the Fama-French three-factor model, using the Asia data excluding Japan, still does not capture the value anomaly. The intercept or α is still significantly positive. The R^2 is higher than previous sections from CAPM, although this is what is expected as more variables are added to the regression. Observations are different in each measure (PB, PE, and CAPE3) due to the availability of each measure. The only factor that is significant is from the use of CAPE3. The β_{HML} is positive and significant, which is counterintuitive. β_{HML} should be positive for the low CAPE3 case, as expected.

According to Table 11, using the global Fama-French three-factor model still fails to explain the anomaly of insurance value portfolios. The α's or the intercept of the regression are all positive and significant for the value portfolio. In addition, the growth portfolio has positive and significant α as well. However, the size factor has a positive and significant coefficient for the low PB case. This implies that size factor can partially explain the value premium, although only in the PB case.

Overall, the global and Asia Fama-French three-factor models do not fully explain the value premiums of insurance value portfolios. The explanation of this finding could involve several issues, including the number of stocks in the

Table 10: Asia market Fama-French three-factor model.

Portfolio	α	β_{Asia}	β_{SMB}	β_{HML}	R^2	F-Stat	P-Val	Obs	Year
LOW PB	1.09*	−0.09	0.28	0.60	0.0393	3.9540	0.0087	298	1990–2014
	1.82	−0.93	1.41	3.15					
HIGH PB	0.47	0.03	0.18	0.18	0.0393	3.9540	0.0087	298	1990–2014
	1.08	0.38	1.26	1.33					
LOW PE	2.95***	−0.11	0.00	0.16	0.0080	0.5373	0.6572	203	1998–2014
	4.19	−1.04	0.01	0.79					
HIGH PE	0.77	−0.07	0.25	0.16	0.0196	1.3290	0.2659	203	1998–2014
	1.64	−0.95	1.60	1.16					
LOW CAPE3	2.13***	−0.15	0.17	0.26	0.0187	1.1190	0.3428	179	2000–2014
	3.06	−1.29	0.71	1.02					
HIGH CAPE3	0.94*	0.10	−0.03	0.39**	0.0277	1.6710	0.1750	179	2000–2014
	1.86	1.16	−0.17	2.09					

Note: This table shows information resulting from OLS regressions of value-portfolio excess returns constructed from PB, PE and CAPE3 on the Fama-French three-factor model. Particularly, it uses three factors including Asia market excess returns, SML, and HML factors from Kenneth French's website. LOW PB is the portfolio containing the lowest quartile of PB. HIGH PB is a portfolio containing stocks with the highest quartile of PB. LOW PE is the portfolio consisting of stocks with the lowest quartile of PE. HIGH PE is a portfolio consisting of stocks with the highest quartile of PE. LOW CAPE3 is a portfolio that contains the lowest quartile of CAPE3 stocks. Lastly, HIGH CAPE3 is a portfolio containing high CAPE3 stocks. α column represents the constant coefficients from all OLS regressions. β_{Asia} is a column that contains the coefficients of the Asia market excess returns. β_{SMB} is a column that contains the size factor of the Fama-French three-factor model. β_{HML} is a column that contains the value factor of the Fama-French three-factor model. R^2 is the column that represents the R^2 value of each regression. $F - Stat$ is the value of the F-statistics to test whether the βs should be zero. $P - Val$ is the column that represents the p-value from the F-test. *Obs* is the observation column that represents the number of observations in each particular regression. Year is the column to represent the year for which data was used due to the availability of PB, PE and CAPE3. The numbers in square brackets are the t-statistics to test whether each coefficient is significantly different from zero. *, **, and *** represent the significant levels of 0.10, 0.05, and 0.01, respectively, from the t-tests.

value portfolio and the factors themselves. On average, each value portfolio consists of about four stocks. These stocks can be volatile in comparison to the studies of Fama and French (1993) that contain hundreds of stocks. The noise in the regression is so high that the Fama-French three-factor models fail to find the relationship between portfolio returns and the factors. The implication of this is that if investors concentrate on a few stocks instead of many, they can outperform the market with low portfolio volatility. In addition, as the available Fama-French three-factor models were used, globally and for Asia, they might not be able to provide the explanation within the local market of Thailand.

Table 11: Global Fama-French three-factor model.

Portfolio	α	β_{Global}	β_{SMB}	β_{HML}	R^2	F-Stat	P-Val	Obs	Year
LOW PB	1.20**	−0.07	0.67**	0.36	0.0244	2.4140	0.0668	298	1990–2014
	2.00	−0.48	2.37	1.37					
HIGH PB	0.54	−0.01	0.38*	0.01	0.0120	1.1750	0.3196	298	1990–2014
	1.25	−0.08	1.86	0.07					
LOW PE	2.93***	0.01	0.12	0.07	0.0008	0.0527	0.9840	203	1998–2014
	4.18	0.07	0.35	0.25					
HIGH PE	0.73	−0.13	0.41*	0.16	0.0274	1.8760	0.1349	203	1998–2014
	1.57	−1.32	1.86	0.92					
LOW CAPE3	2.18***	−0.18	0.08	0.03	0.0095	0.5630	0.6401	179	2000–2014
	3.14	−1.27	0.25	0.11					
HIGH CAPE3	1.13**	0.01	0.22	0.17	0.0068	0.4027	0.7512	179	2000–2014
	2.23	0.08	0.91	0.84					

Note: This table shows information resulting from OLS regressions of value-portfolio excess returns constructed from PB, PE and CAPE3 on the Fama-French three-factor model. Particularly, it uses three factors, including global market excess returns, SML, and HML factors from Kenneth French's website. LOW PB is the portfolio containing the lowest quartile of PB. HIGH PB is a portfolio containing stocks with the highest quartile of PB. LOW PE is a portfolio consisting of stocks with the lowest quartile of PE. HIGH PE is a portfolio consisting of stocks with the highest quartile of PE. LOW CAPE3 is a portfolio that contains the lowest quartile of CAPE3 stocks. Lastly, HIGH CAPE3 is a portfolio containing high CAPE3 stocks. α column represents the constant coefficients from all OLS regressions. β_{Global} is a column that contains the coefficients of the global market excess returns. β_{SMB} is a column that contains the size factor of the Fama-French three-factor model. β_{HML} is a column that contains the value factor of the Fama-French three-factor model. R^2 is the column that represents the R^2 value of each regression. $F - Stat$ is the value of the F-statistics to test whether the βs should be zero. $P - Val$ is the column that represents the p-value from the F-test. *Obs* is the observation column that represents the number of observations in each particular regression. Year is a column to represent the year that data is used due to the availability of PB, PE and CAPE3. The numbers in square brackets are the t-statistics to test whether each coefficient is significantly different from zero. *, **, and *** represent the significant levels of 0.10, 0.05, and 0.01, respectively, from the t-tests.

Therefore, it leaves some room for future research to construct a local Fama-French three-factor model to explain this anomaly.

7 Conclusion

The study explores value stocks, specifically for the insurance industry in Thailand. According to the results, we can argue that by focusing on a particular

industry, investors can still outperform the market using a value investing strategy. Similar to previous value studies, this study finds value premiums within the Thai insurance industry. Investing in low value measures, such as PE, PB, CAPE3, and CAPE5, outperforms the market, although value premium does not always occur when looking too far back over many years, for example in the CAPE5 case. Using the traditional PE ratio can be very profitable to beat the market. This result is similar to Basu (1977). Using the value measure by PB ratio does not perform quite as well for insurance stocks, compared to the PE measure. However, the study does not consider size, so we cannot draw a conclusion that is similar to Fama and French (1992) that combines size and value factors, and absorbs the price-to-earnings factor to predict the returns from the stocks.

According to the results, price volatility from CAPM does not fully explain the value premium. Value stocks widely outperform the high PE, PB and CAPE3, even when adjusted for volatility and β. Jensen's α is also higher for the value portfolio. In addition, the Fama-French three-factor model using global and Asia factors does not capture the value anomaly. The author of this study suspects that this is due to the small number of stocks in the portfolio, and also because the factors are not local enough for the Thai market. On the other hand, it shows that investors can achieve superior results by investing in low PB, PE and CAPE3 insurance stocks. It also achieves superior absolute returns with lower portfolio volatility.

Still, this study has some limitations. First, it focuses particularly on the insurance industry. It assumes that investors have a circle of competence that is based on the insurance industry. The study could, therefore be expanded to other industries within the stock market. Second, the number of stocks in the portfolio is arguably small (four, on average). Therefore, this result might be biased toward this limited dataset. One might argue that this is a result from a data snooping problem. However, one might also argue that in order to beat the market, there does not need to be a huge amount of stocks in the portfolio, which is the main point of this study. In addition, the study also uses a long period of time to construct and rebalance the portfolio. The results that show the value portfolio outperforming the growth portfolio seems to be in line with previous studies of the Thai stock market, such as Sareewiwatthana (2011, 2012, 2013).

In addition, there might be other factors in the behavior of investors to explain the value anomaly. The author leaves it to future research to explore these issues. In addition, the paper does not incorporate any quality measures into constructing the portfolios, as in Novy-Marx (2013) or Novy-Marx (2015), although the pure value portfolio can still outperform the market.

Furthermore, circles of competence in other industries should be explored. The obvious choice is the banking industry. There are many aspects in the insurance industry that are similar to the banking industry. Various value measures can still be used for constructing value portfolios as the banking industry also exhibits a cyclical nature. The author suspects that some value measures might not be applicable for non-financial industries. For example, using the CAPE measure might not be appropriate for a growth industry. The intention of using CAPE for this study is because the insurance industry is cyclical. Therefore, researchers who carry out the circle of competence research might have to be cautious when choosing appropriate value measures. After all, the practice of investing in the things that an investor understands, or within a circle of competence, has begun.

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