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Common Financial Ratios and Value Investing in Thailand

Paiboon Sareewiwatthana[1]

Abstract

This study tests the stock selection concept of Value Investing in the Securities Exchange of Thailand during 2002-2012. Five financial ratios commonly used by value investors to identify stocks which provide the margin of safety are tested. The results show that portfolios with selected stocks yield higher returns than the market average. The best performance is from using price to earnings ratio. Risk, however, increases in consistent with the higher returns. It is also found that decreasing the number of stocks tends to yield better returns. In conclusion, the results of this study support the validity of value investing in the Thai stock market.

JEL classification Numbers: G11, G32.
Keywords: Value investing, Financial Ratios, the Stock Exchange of Thailand.

1 Introduction

Lately, value investing (VI) concept has been widely accepted. Investors around the world search for stocks together with a high level of profitability and for the discount called margin of safety when the stock market prices fall below the intrinsic values. However, many practitioners and scholars remain skeptic about its actual, systematic practicality.
Although there have been research studies supporting the validity of VI, the concept has not been much researched in Thailand. This study tries to fill the research gap by testing. Simple methods to choose stocks using financial ratios are tested to verify the validity of VI. The information is publicized and can be easily accessed.
This report proceeds as follows. The first section introduces the review and summary of related literatures. Then the research methodology and data used are discussed. Empirical results found in the study are then analyzed and presented. Lastly, conclusions,

[1]School of Business, National Institute of Development Administration, Bangkok, Thailand.

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implications, and limitations together with recommendations for further study are presented.

2 Literature Review

Graham[1] introduced value investing and contended that stocks which passed a set of criteria were worth the investment as they would produce above average returns. Basu[2] studied on the subject and discovered that stocks with low Price/Earnings ratio (PE) had tendency to produce more returns than stocks with higher PE. Oppenheimer[3] conducted a research study on portfolios created according to Graham's criteria and showed that their returns satisfactorily exceeded the market. Chan, Hamao and Lakonishok[4] conducted a study and concluded that investment using Book to Market, Earnings to Price, and Cash Flow to Price ratios had potential to produce above average returns in Japan.

Fama and French[5] employed various value investing approaches in their examination of stock returns. They discovered that, in almost every country, value stocks produced more average returns than growth stocks which were categorized on the basis of similar risk levels. Piotroski[6] conducted a research study on selecting value stocks based on their past financial statements. He found that stocks which fulfilled the nine criteria apparently produced above average returns. Greenblatt[7] in his book "The Little Book That Beats the Market" reported that a simple stock selection rules based on return on capital and the EBIT to Enterprise Value (BV/MV) produced above average returns.

In Thailand, limited research has been conducted on value investment strategies until recently. Supattarakul and Jongjaroenkamol[8] found that during 1996-2008 the level of future shareholder returns was related to PB ratio, and the rate of growth of future net profit was related to PE ratio. Sareewiwatthana[9] studied the stock selection methodology in the Stock Exchange of Thailand during 1996-2010 based on PE, PB, ROE, and found that the strategy could generate abnormal returns. Maneesilasan[10] conducted a study on PEG ratio and showed that this strategy could generate higher returns than the market. Sareewiwatthana[11] showed that PEG ratio was effective in generating higher returns than the average return throughout the analysis over 1999-2010.Panyagometh[12] compared equally weighted value stock portfolios with Mean-Variance portfolio optimization weighted value stock portfolios and market capitalization weighted value stock portfolios in the Thai stock market and concluded that the portfolio management theory could be applied together with value investing to yield higher returns.

3 Data and Methodology

According to the value investing principle, stocks of which the intrinsic value provides the margins of safety are worth the investment. The following indicators are the basic financial ratios believed to signal stocks' margin of safety. They are Price to Book Value (PB), Price to Earnings per Share ratio (PE), Dividend Yield (DY), Return on Equity (ROE), and Return on Assets (ROA)[1]. For stock investors, these five indicators are easily accessed or computed from the disclosed annual financial statements.

3.1

This study used the above five indicators separately to select stocks for investment and evaluates which strategy could produce the higher average returns than the market. SET TRI index was used as a proxy for market returns. The data were from the Securities Exchange of Thailand over the year 2002 to 2012. The five indicators were calculated from the annual financial statements disclosed by the end of February of the following year. Annual returns will be evaluated together with standard deviations. Sharpe ratios[2] will be evaluated to compared the performance.

3.1.1
Testing whether PE, PB, DY, ROE, and ROA can be used to select stocks for the winning portfolios.

3.1.1.1
Select 30 stocks with the best indicator: for PE and PB, the lower the better and for DY, ROE, and ROA, the higher the better.

3.1.1.2
Form five portfolios each with 30 selected stocks. Each year from 2002-2013, invest evenly in each stock at the beginning of March and liquidate the holding at the end of February in the following year. Test if there is any significant difference between the portfolio returns and the market return and identify the best indicators which can select the stocks for the highest returns.

3.1.1.3
Results from using ROE and ROA, both indicating the firm's profitability, are compared. Compare the returns from using ROE to ROA. The one with better screening power will be used in the later hypothesis testing.

3.2

Testing whether combining two indicators can be used to select stocks for the winning portfolios. This research applied Greenblatt's modification method as follows:

3.2.1
Rank stocks according to:
Price to Book Value (PB) - from low to high.
Price/Earnings per Share ratio (PE) - from low to high.
Dividend Yield (DY) - from high to low.
Return on Equity (ROE) - from high to low.
Return on Assets (ROA) - from high to low.
Then assign scores to the rankings.

3.2.2
Pair two indicators together to perform the six separated tests:
PB+PE, PB+ROE (or ROA), PB+DY, PE+ROE (or ROA), PE+DY, and ROE (or ROA)+DY.

3.2.3
For each test, combine stock's scores from the rankings. Select 30 stocks with the lowest scores for investment.
At the beginning of each year, create a portfolio with 30 Stocks. Invest evenly in each stock. Calculate returns at the year-end. Renew the process, creating a new portfolio with 30 stocks in the beginning of the next year.
Repeat the method above using different pairs of screening indicators.

3.3

Testing whether the combination of three indicators can be used to select stocks for the winning portfolios.

3.3.1
Repeat the process as 3.2.1-3.2.3 but using three indicators. The tested portfolios will consist of 30 stocks screened by PB+PE+ROE (OR ROA), PB+PE+DY, PB+ROE+DY, and PE+ROE+DY.

3.4

Testing whether combining four indicators can be used to select stocks for the winning portfolios.

3.4.1
Repeat the process as 3.2.1-3.2.3 but using four indicators. The tested portfolios will consist of 30 stocks screened by PB+PE+ROE (OR ROA)+DY.

3.5

Test the effect of different number of selected stocks. Repeat the process in 3.2.1-3.2.3 by selecting only 10 stocks and 20 stocks accordingly. Compare the results to those from 30 stocks.

4 Empirical Results

4.1 Select 30 Stocks using a Single Ratio as Suggested in 3.1

4.1.1 Results from using low PB

Table 1: Returns from the low PB portfolios compared to the market

PB				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	59.73%	17.08%	3.199	0.17%	18.08%	-0.271	59.56%*
2003	176.92%	31.45%	5.521	106.57%	25.68%	4.023	70.35%*
2004	5.47%	16.46%	0.059	6.96%	13.91%	0.177	-1.49%
2005	7.94%	14.06%	0.224	4.52%	15.48%	-0.017	3.42%
2006	-10.93%	20.83%	-0.779	-4.70%	15.96%	-0.627	-6.23%
2007	-0.56%	17.27%	-0.292	29.91%	21.22%	1.198	-30.47%
2008	-27.80%	32.22%	-1.002	-46.40%	36.22%	-1.404	18.60%*
2009	128.28%	32.29%	3.852	75.03%	22.55%	3.155	53.25%*
2010	49.11%	28.60%	1.577	44.05%	16.71%	2.396	5.06%
2011	20.67%	21.76%	0.771	22.96%	23.02%	0.828	-2.28%
2012	81.07%	14.32%	5.413	38.07%	12.00%	2.874	43.01%*

*statistically significant

4.1.2 Results from using low PE

Table 2: Returns from the low PE portfolios compared to the market

PE				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	71.45%	22.62%	2.934	0.17%	18.08%	-0.271	71.28%*
2003	202.95%	29.10%	6.862	106.57%	25.68%	4.023	96.39%*
2004	-8.99%	14.14%	-0.954	6.96%	13.91%	0.177	-15.95%
2005	-3.79%	13.07%	-0.656	4.52%	15.48%	-0.017	-8.31%
2006	14.55%	16.68%	0.554	-4.70%	15.96%	-0.627	19.25%*
2007	11.60%	15.12%	0.470	29.91%	21.22%	1.198	-18.31%
2008	-36.26%	34.57%	-1.178	-46.40%	36.22%	-1.404	10.14%*
2009	131.70%	22.89%	5.584	75.03%	22.55%	3.155	56.67%*
2010	66.99%	18.93%	3.327	44.05%	16.71%	2.396	22.93%*
2011	50.85%	23.20%	2.024	22.96%	23.02%	0.828	27.89%
2012	72.56%	15.43%	4.470	38.07%	12.00%	2.874	34.50%*

*statistically significant

4.1.3 Results from using high ROE

Table 3: Returns from the high ROE portfolios compared to the market

ROE				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	23.79%	23.36%	0.801	0.17%	18.08%	-0.271	23.63%*
2003	227.99%	30.85%	7.284	106.57%	25.68%	4.023	121.42%*
2004	-6.54%	24.45%	-0.451	6.96%	13.91%	0.177	-13.50%
2005	2.74%	15.30%	-0.134	4.52%	15.48%	-0.017	-1.78%
2006	6.39%	17.30%	0.063	-4.70%	15.96%	-0.627	11.09%*
2007	26.15%	21.31%	1.016	29.91%	21.22%	1.198	-3.76%
2008	-39.95%	35.68%	-1.245	-46.40%	36.22%	-1.404	6.45%*
2009	78.71%	18.81%	3.977	75.03%	22.55%	3.155	3.69%
2010	50.32%	18.83%	2.459	44.05%	16.71%	2.396	6.27%
2011	45.94%	25.13%	1.673	22.96%	23.02%	0.828	22.98%
2012	48.29%	13.89%	3.218	38.07%	12.00%	2.874	10.23%

*statistically significant

4.1.4 Results from using high ROA

Table 4: Returns from the high ROA portfolios compared to the market

ROA				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	22.29%	16.82%	1.024	0.17%	18.08%	-0.271	22.12%*
2003	120.28%	24.18%	4.839	106.57%	25.68%	4.023	13.71%
2004	-13.42%	18.43%	-0.972	6.96%	13.91%	0.177	-20.38%
2005	1.12%	14.87%	-0.247	4.52%	15.48%	-0.017	-3.40%
2006	9.66%	15.88%	0.274	-4.70%	15.96%	-0.627	14.36%*
2007	17.60%	15.70%	0.835	29.91%	21.22%	1.198	-12.31%
2008	-37.82%	34.52%	-1.225	-46.40%	36.22%	-1.404	8.59%*
2009	84.70%	19.44%	4.157	75.03%	22.55%	3.155	9.68%
2010	42.85%	15.81%	2.457	44.05%	16.71%	2.396	-1.20%
2011	11.29%	22.54%	0.328	22.96%	23.02%	0.828	-11.67%
2012	60.75%	11.22%	5.096	38.07%	12.00%	2.874	22.69%

*statistically significant

4.1.5 Results from using high DY

Table 5: Returns from the high DY portfolios compared to the market

DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	10.21%	10.46%	0.491	0.17%	18.08%	-0.271	10.05%*
2003	57.15%	21.36%	2.523	106.57%	25.68%	4.023	-49.42%
2004	-2.61%	11.97%	-0.593	6.96%	13.91%	0.177	-9.57%
2005	-3.79%	14.53%	-0.590	4.52%	15.48%	-0.017	-8.30%
2006	6.44%	15.74%	0.072	-4.70%	15.96%	-0.627	11.14%*
2007	16.28%	16.04%	0.735	29.91%	21.22%	1.198	-13.63%
2008	-25.32%	36.26%	-0.821	-46.40%	36.22%	-1.404	21.08%*
2009	87.85%	19.31%	4.349	75.03%	22.55%	3.155	12.83%
2010	53.34%	14.39%	3.429	44.05%	16.71%	2.396	9.29%
2011	21.12%	18.51%	0.931	22.96%	23.02%	0.828	-1.83%
2012	47.05%	12.26%	3.544	38.07%	12.00%	2.874	8.98%

*statistically significant

Table 1-5 show that all portfolios consisted of select 30 stocks screened by one of the five indicators yield better returns than the market. The results are summarized in Table 6.

Table 6: Portfolio's returns compared to the market returns

Indicator	Average return	No. of years better than the market	Statistically Significant
PB	33.47%	7 out of 11	5 out of 7
PE	38.96%	8 out of 11	7 out of 8
ROE	30.23%	8 out of 11	4 out of 8
ROA	22.02%	6 out of 11	3 out of 6
DY	20.38%	6 out of 11	3 out of 6

The study has shown that PE is the most powerful among five indicators used to select stocks during the period 2002-2012, providing the annual geometric return of 38.96 percent. In addition, the result from comparing ROE to ROA as indicators signal that using ROE can provide a better return and thus ROE should be used as proxy for profitability in selecting stocks for investment.

Furthermore, as presented in Table 7 below, the tests show that the number of stocks selected does matter in the way that the 10 stocks portfolios consistently outperform the 20 and 30 stocks portfolios.

Table 7: Average returns of portfolios with 10, 20, and 30 selected stocks

Indicator	10 stocks	20 stocks	30 stocks
PB	37.86%	36.71%	33.47%
PE	47.04%	41.12%	38.96%
ROE	36.03%	31.72%	30.23%
ROA	15.41%	19.14%	22.02%
DY	16.88%	18.47%	20.38%

4.2 Select 30 stocks using two ratios as stated in 3.2

4.2.1 Results from using low PB+low PE

Table 8: Returns from the low PB+low PE portfolios compared to the market

PB - PE				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	70.20%	21.91%	2.972	0.17%	18.08%	-0.271	70.04%*
2003	113.34%	24.50%	4.492	106.57%	25.68%	4.023	6.77%
2004	3.14%	11.74%	-0.115	6.96%	13.91%	0.177	-3.82%
2005	0.41%	11.72%	-0.373	4.52%	15.48%	-0.017	-4.10%
2006	10.98%	16.89%	0.336	-4.70%	15.96%	-0.627	15.68%*
2007	4.51%	12.47%	0.002	29.91%	21.22%	1.198	-25.40%
2008	-29.91%	30.26%	-1.136	-46.40%	36.22%	-1.404	16.49%*
2009	142.29%	26.18%	5.286	75.03%	22.55%	3.155	67.26%*
2010	43.24%	23.80%	1.648	44.05%	16.71%	2.396	-0.81%
2011	61.39%	22.26%	2.582	22.96%	23.02%	0.828	38.43%
2012	50.22%	17.07%	2.732	38.07%	12.00%	2.874	12.16%

*statistically significant

4.2.2 Results from using PB+ROE

Table 9: Returns from the low PB+high ROE portfolios compared to the market

PB - ROE				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	69.40%	21.13%	3.045	0.17%	18.08%	-0.271	69.24%*
2003	127.20%	22.64%	5.473	106.57%	25.68%	4.023	20.63%
2004	-11.78%	13.52%	-1.204	6.96%	13.91%	0.177	-18.74%
2005	-2.87%	13.41%	-0.571	4.52%	15.48%	-0.017	-7.39%
2006	7.95%	19.93%	0.133	-4.70%	15.96%	-0.627	12.65%*
2007	20.29%	15.89%	0.995	29.91%	21.22%	1.198	-9.62%
2008	-30.76%	33.10%	-1.064	-46.40%	36.22%	-1.404	15.64%*
2009	116.73%	26.05%	4.332	75.03%	22.55%	3.155	41.70%*
2010	61.28%	18.86%	3.036	44.05%	16.71%	2.396	17.22%
2011	51.42%	22.86%	2.079	22.96%	23.02%	0.828	28.46%
2012	44.21%	14.26%	2.848	38.07%	12.00%	2.874	6.14%

*statistically significant

4.2.3 Results from using PB+DY

Table 10: Returns from the low PB+high DY portfolios compared to the market

PB - DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	36.69%	12.32%	2.566	0.17%	18.08%	-0.271	36.52%*
2003	59.37%	17.02%	3.298	106.57%	25.68%	4.023	-47.20%
2004	4.95%	11.99%	0.038	6.96%	13.91%	0.177	-2.01%
2005	-8.14%	14.61%	-0.885	4.52%	15.48%	-0.017	-12.66%
2006	11.03%	14.28%	0.401	-4.70%	15.96%	-0.627	15.73%*
2007	11.75%	14.05%	0.517	29.91%	21.22%	1.198	-18.15%
2008	-21.62%	31.84%	-0.819	-46.40%	36.22%	-1.404	24.78%*
2009	115.79%	23.53%	4.756	75.03%	22.55%	3.155	40.76%*
2010	39.26%	13.65%	2.582	44.05%	16.71%	2.396	-4.79%
2011	13.54%	17.71%	0.544	22.96%	23.02%	0.828	-9.42%
2012	63.65%	15.34%	3.915	38.07%	12.00%	2.874	25.59%*

*statistically significant

4.2.4 Results from using PE+ROE

Table 11: Returns from the low PE+high ROE portfolios compared to the market

PE - ROE				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	45.64%	18.12%	2.239	0.17%	18.08%	-0.271	45.47%*
2003	200.41%	25.88%	7.619	106.57%	25.68%	4.023	93.84%*
2004	-10.19%	20.24%	-0.726	6.96%	13.91%	0.177	-17.15%
2005	-1.29%	15.23%	-0.399	4.52%	15.48%	-0.017	-5.81%
2006	15.65%	16.57%	0.624	-4.70%	15.96%	-0.627	20.35%*
2007	23.70%	18.88%	1.018	29.91%	21.22%	1.198	-6.21%
2008	-35.36%	36.54%	-1.090	-46.40%	36.22%	-1.404	11.04%*
2009	98.13%	21.43%	4.399	75.03%	22.55%	3.155	23.11%*
2010	84.27%	19.62%	4.091	44.05%	16.71%	2.396	40.22%*
2011	3.11%	27.30%	-0.029	22.96%	23.02%	0.828	-19.85%
2012	46.33%	11.31%	3.780	38.07%	12.00%	2.874	8.27%

*statistically significant

4.2.5 Results from using PE+DY

Table 12: Returns from the low PE+high DY portfolios compared to the market

PE - DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	25.86%	12.22%	1.702	0.17%	18.08%	-0.271	25.70%*
2003	71.41%	17.39%	3.919	106.57%	25.68%	4.023	-35.16%
2004	1.95%	10.32%	-0.247	6.96%	13.91%	0.177	-5.01%
2005	-7.06%	11.73%	-1.009	4.52%	15.48%	-0.017	-11.57%
2006	16.48%	14.52%	0.770	-4.70%	15.96%	-0.627	21.18%*
2007	19.11%	15.50%	0.943	29.91%	21.22%	1.198	-10.79%
2008	-20.35%	33.03%	-0.751	-46.40%	36.22%	-1.404	26.05%*
2009	115.13%	23.97%	4.641	75.03%	22.55%	3.155	40.11%*
2010	52.04%	16.30%	2.947	44.05%	16.71%	2.396	7.99%
2011	12.74%	20.89%	0.423	22.96%	23.02%	0.828	-10.22%
2012	57.77%	12.97%	4.179	38.07%	12.00%	2.874	19.71%*

*statistically significant

4.2.6 Results from using ROE+DY

Table 13: Returns from the high ROE+high DY portfolios compared to the market

ROE - DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	19.31%	10.26%	1.388	0.17%	18.08%	-0.271	19.14%*
2003	62.46%	14.26%	4.151	106.57%	25.68%	4.023	-44.11%
2004	-3.32%	12.97%	-0.602	6.96%	13.91%	0.177	-10.28%
2005	2.53%	14.08%	-0.160	4.52%	15.48%	-0.017	-1.99%
2006	6.74%	11.39%	0.126	-4.70%	15.96%	-0.627	11.44%*
2007	23.08%	15.85%	1.173	29.91%	21.22%	1.198	-6.83%
2008	-26.99%	36.73%	-0.856	-46.40%	36.22%	-1.404	19.41%*
2009	107.00%	19.90%	5.182	75.03%	22.55%	3.155	31.97%*
2010	53.25%	14.15%	3.479	44.05%	16.71%	2.396	9.19%
2011	22.92%	18.20%	1.046	22.96%	23.02%	0.828	-0.04%
2012	45.82%	10.91%	3.871	38.07%	12.00%	2.874	7.76%

*statistically significant

Table 8-13 demonstrate that portfolios of 30 selected stocks, using the combined rankings of two indicators yield better returns than the market returns over the period of 2002-2012. As shown in Table 14 below, the best performance is from using PB+PE, yielding 34.34% per year.

Table 14: Summary of portfolio returns

Indicator	Average return	No. of years better than the market	Statistically Significant
PB+PE	34.34%	7 out of 11	4 out of 7
PB+ROE	32.79%	8 out of 11	4 out of 8
PB+DY	24.77%	5 out of 11	5 out of 5
PE+ROE	31.16%	7 out of 11	6 out of 7
PE+DY	26.39%	6 out of 11	5 out of 6
ROE+DY	23.81%	6 out of 11	4 out of 6

4.3 Select 30 Stocks using Three Ratios as Suggested in 3.3

4.3.1 Results from using PB+PE+ROE

Table 15: Returns from the PB+PE+ROE portfolios compared to the market

PB - PE - ROE				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	66.27%	17.60%	3.478	0.17%	18.08%	-0.271	66.11%*
2003	127.50%	22.88%	5.430	106.57%	25.68%	4.023	20.93%
2004	-9.76%	11.51%	-1.239	6.96%	13.91%	0.177	-16.72%
2005	0.77%	13.49%	-0.298	4.52%	15.48%	-0.017	-3.75%
2006	9.82%	18.31%	0.247	-4.70%	15.96%	-0.627	14.52%*
2007	18.75%	15.38%	0.927	29.91%	21.22%	1.198	-11.16%
2008	-35.42%	31.90%	-1.250	-46.40%	36.22%	-1.404	10.98%*
2009	116.73%	26.05%	4.332	75.03%	22.55%	3.155	41.70%*
2010	67.62%	19.21%	3.311	44.05%	16.71%	2.396	23.57%*
2011	50.29%	23.02%	2.016	22.96%	23.02%	0.828	27.33%
2012	48.19%	13.43%	3.322	38.07%	12.00%	2.874	10.12%

*statistically significant

4.3.2 Results from using PB+ROE+DY

Table 16: Returns from the PB+ROE+DY portfolios compared to the market

PB - ROE - DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	28.92%	9.44%	2.526	0.17%	18.08%	-0.271	28.75%*
2003	60.90%	16.50%	3.493	106.57%	25.68%	4.023	-45.67%
2004	2.95%	10.15%	-0.152	6.96%	13.91%	0.177	-4.01%
2005	-1.71%	11.73%	-0.554	4.52%	15.48%	-0.017	-6.23%
2006	16.15%	12.27%	0.883	-4.70%	15.96%	-0.627	20.84%*
2007	19.63%	16.43%	0.921	29.91%	21.22%	1.198	-10.28%
2008	-18.79%	33.08%	-0.703	-46.40%	36.22%	-1.404	27.61%*
2009	121.80%	25.07%	4.704	75.03%	22.55%	3.155	46.78%*
2010	60.71%	16.08%	3.526	44.05%	16.71%	2.396	16.65%
2011	14.50%	20.11%	0.527	22.96%	23.02%	0.828	-8.46%
2012	63.50%	15.69%	3.819	38.07%	12.00%	2.874	25.43%*

*statistically significant

4.3.3 Results from using PB+PE+DY

Table 17: Returns from the PB+PE+DY portfolios compared to the market

PB - PE - DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	34.30%	9.78%	2.989	0.17%	18.08%	-0.271	34.14%*
2003	53.61%	16.52%	3.049	106.57%	25.68%	4.023	-52.96%
2004	6.74%	10.49%	0.214	6.96%	13.91%	0.177	-0.22%
2005	-2.96%	11.77%	-0.658	4.52%	15.48%	-0.017	-7.47%
2006	14.13%	12.68%	0.696	-4.70%	15.96%	-0.627	18.83%*
2007	17.79%	11.96%	1.112	29.91%	21.22%	1.198	-12.12%
2008	-23.00%	31.42%	-0.874	-46.40%	36.22%	-1.404	23.40%*
2009	111.32%	24.23%	4.433	75.03%	22.55%	3.155	36.29%*
2010	45.57%	13.97%	2.976	44.05%	16.71%	2.396	1.52%
2011	15.99%	17.78%	0.680	22.96%	23.02%	0.828	-6.97%
2012	65.98%	15.40%	4.051	38.07%	12.00%	2.874	27.92%*

*statistically significant

4.3.4 Results from using PE+ROE+DY

Table 18: Returns from the PE+ROE+DY portfolios compared to the market

PE - ROE - DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	18.24%	10.22%	1.288	0.17%	18.08%	-0.271	18.07%*
2003	77.89%	20.10%	3.713	106.57%	25.68%	4.023	-28.68%
2004	-2.42%	9.06%	-0.763	6.96%	13.91%	0.177	-9.38%
2005	0.25%	14.46%	-0.313	4.52%	15.48%	-0.017	-4.27%
2006	6.78%	13.59%	0.109	-4.70%	15.96%	-0.627	11.48%*
2007	21.93%	16.86%	1.034	29.91%	21.22%	1.198	-7.98%
2008	-25.00%	33.44%	-0.881	-46.40%	36.22%	-1.404	21.41%*
2009	108.85%	23.02%	4.560	75.03%	22.55%	3.155	33.83%*
2010	53.81%	15.94%	3.124	44.05%	16.71%	2.396	9.75%
2011	19.56%	22.18%	0.707	22.96%	23.02%	0.828	-3.39%
2012	48.87%	11.82%	3.831	38.07%	12.00%	2.874	10.81%

*statistically significant

Table 15-18 demonstrate that portfolios of 30 selected stocks, using the combined rankings of three indicators, yield better than the market returns over the period of 2002-2012 in the Securities Exchange of Thailand. As shown in Table 19 below, the best performance is derived from using PB+PE+ROE, yielding 33.21% per year.

Table 19: Summary of portfolio returns

Indicator	Average return	No. of years better than the market	Statistically Significant
PB+PE+ROE	33.21%	8 out of 11	5 out of 8
PB+ROE+DY	28.52%	6 out of11	5 out of 6
PB+PE+DY	26.35%	6 out of 11	5 out of 6
PE+ROE+DY	24.85%	6 out of 11	4 out of 6

4.4 Select Stocks using Four Indicators as Suggested in 3.4

Table 20: Returns from the PB+PE+ROE+DY portfolios compared to the market

PB - PE - ROE - DY				Market Return			Return Differential
Year	**Return**	**SD**	**Sharpe**	**Return**	**SD**	**Sharpe**	
2002	25.66%	12.45%	1.654	0.17%	18.08%	-0.271	25.49%*
2003	74.65%	16.89%	4.226	106.57%	25.68%	4.023	-31.92%
2004	7.18%	8.43%	0.318	6.96%	13.91%	0.177	0.22%
2005	-7.03%	12.38%	-0.955	4.52%	15.48%	-0.017	-11.55%
2006	16.17%	14.20%	0.765	-4.70%	15.96%	-0.627	20.87%*
2007	20.30%	16.44%	0.961	29.91%	21.22%	1.198	-9.61%
2008	-21.18%	31.92%	-0.803	-46.40%	36.22%	-1.404	25.23%*
2009	125.33%	25.21%	4.818	75.03%	22.55%	3.155	50.31%*
2010	63.30%	17.43%	3.401	44.05%	16.71%	2.396	19.25%
2011	13.65%	20.16%	0.484	22.96%	23.02%	0.828	-9.31%
2012	55.84%	13.01%	4.017	38.07%	12.00%	2.874	17.77%*

*statistically significant

Table 21: Summary of portfolio returns

Indicator	Average return	No. of years better than the market	Statistically Significant
PB+PE+ROE+ DY	28.44%	7 out of 11	5 out of 7

4.5

This study has performed tests to evaluate the effects of the reduction in the number of stocks invested in as suggested in 3.5. As in Table 22, the results from using multiple indicators reveal that for two and three indicators, returns increase when the number of stocks decline. However, it is not the case for four indicators.

Table 22: Summary of the best portfolio returns

Indicator	10 stocks	20 stocks	30 stocks
PB+PE	40.51%	40.39%	34.34%
PB+PE+ROE	37.75%	35.56%	33.21%
PB+PE+ROE+DY	24.63%	28.71%	28.44%

All in all, the evidences from this study lead to a conclusion that financial ratios such as PB, PE, ROE, DY commonly used to signal margin of safety for value investment, can be utilized to select stocks for investment. Portfolios with low PE stocks, low PB+low PE stocks, and low PB+low PE+ high ROE stocks are the best among the tested portfolios.

5 Conclusions and Implications

This study has tested the stock selection concept of Value Investing. Using financial ratios derived from company annual reports in the Securities Exchange of Thailand, five ratios - price to earnings per share, price to book value, return on equity, return on assets, and dividend yield were used as indicators to screen stocks for investment during 2002-2012.The results show that portfolio of 30 low PE stocks yield the highest return,

Utilizing the modified Greenblatt's Magic Formula method, when sets of two, three and four indicators screening rules were used, the results indicate that all portfolios consistently outperform the average market during the period 2002-2012.Using two and three indicators respectively, the portfolios with low PE+ low PB stocks and with low PE+lowPB+high ROE stocks yield the highest returns for investments Portfolio with low PE+ low PB+highROE+highDY stocks yield the same result. However, the risk-return tradeoff is somewhat inconclusive.

This study also found that, when the number of stocks decreases, from 30 to 20 and then to 10 stocks, the tested portfolios yield higher returns, with the exception of using four indicators. The highest returns are from 10 stocks. At the same time, when the number of stocks declines, the risks evidently increase.

Thus, the results of this study show that the concept of value investing by selecting stocks using common financial ratios could be used in the Thai stock market.

Nonetheless, this study encounters some limitations. Firstly, the data used are limited because of the small and thin characteristics of the Thai stock market. In addition, the time period covered in the study is rather short. This research would provide better results if a longer period of time could be tested. Secondly, the financial ratios used in this study are limited to five easily accessed ratios. The use of other ratios might yield different results. Thirdly, this study's results are based on annual portfolio adjustment while different time intervals could yield different results.

Thus, recommendations for further studies are as follows. Firstly, more sophisticated financial ratios can be used to further test the conclusion observed in this study. Such ratios may not be easily obtained and commonly used compared to the ones in this study, but may yield better returns. Secondly, the time interval to adjust the portfolios can be modified. Since, there are quarterly financial reports, quarterly and semi-annually adjustments can be studied to see that shorter holding periods could lead to better portfolio performance.

In conclusion, despite the limitations, the empirical results found in this study imply that the Thai stock market is inefficient, so that abnormal returns could be obtained by using such basic screening rules as used in this study. Individual and institutional long term investors might adopt this stock-selecting approach for their effective investments.

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Appendix

The following five financial ratios are the most commonly

Price to Book Value (PB) shows a ratio of stock price to book value. The lower the ratio, the better the stock in term of its intrinsic value compared to its market price.

Price to Earnings per Share ratio (PE) shows stock price to earnings per share. This demonstrates a prospective stock's intrinsic value. The lower the PE, the more its intrinsic value exceeds its price.

Dividend Yield (DY) shows how much a company pays out in dividends compared to its market price. To calculate the dividend yield, divide the annual dividend by the current stock price. A high dividend yield indicates high return on long-term investment.

Return on Equity (ROE) is the amount of net income returned as a percentage of shareholders equity. To calculate the ROE, divide the net income by shareholder's equity. ROE largely measures a corporation's profitability. The higher the ROE, the more profitable a corporation is.

Return on Assets (ROA) is the amount of net income returned as a percentage of total assets. To calculate the ROA, divide the net income by total assets. ROA also measures a corporation's profitability. The higher the ROA, the more profitable a corporation is.

Sharpe ratio

Sharpe ratio is a ratio developed by William F. Sharpe[13] that is used in analyzing the risk-adjusted returns. This makes it possible to compare returns on investment to make sure that the excess return is not due to increased risk.The higher Sharpe ratio indicates the higher investment efficiency. The value can be obtained as follows:

$$Sharpe\ Ratio = \frac{r_p - r_f}{\sigma_p}$$

r_p = portfolio's expected rate of return
r_f = rate of return on a risk-free asset(based on a10-year government bond in this case)
σ_p = standard deviation of the portfolio's rates of return