Investment Strategy: Evidence from Thailand's SET50 Index

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Abstract

The research aimed to suggest an appropriate portfolio from Thailand's SET50 Index for investment. The study focused on the return and risk analysis of each common stock, in addition to the relationship of the return and risk among each common stock and the stock market in SET50 Index. Moreover, the Capital Asset Pricing Model (CAPM) was employed to calculate an appropriate required return on each common stock and then compared with its actual return to classify it as undervalued or overvalued. The risk of each common stock was assessed by using standard deviation and beta coefficient (β). The suggested investment strategy is to classify common stocks into two groups: 1) high return and high risk and 2) high return and low risk. Then, the optimal weight of investment was conducted to find out a well-diversified portfolio. The daily market prices of common stocks listed in SET50 Index were collected for three years during September 10, 2012 – 2015.

This research revealed that the groups of common stocks providing high return and high risk were True Corporation Public Company Limited (TRUE), Pruksa Real Estate Public Company Limited (PS), Central Pattana Public Company Limited (CPN), TPI Polene Public Company Limited (TPIPL), and Airports of Thailand Public Company Limited (AOT). Meanwhile, the groups of common

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stocks providing high return and low risk consisted of Delta Electronics (Thailand) Public Company Limited (DELTA), Bumrungrad Hospital Public Company Limited (BH), Siam Makro Public Company Limited (MAKRO), BTS Group Holdings Public Company Limited (BTS), and Hemaraj Land and Development Public Company Limited (HEMRAJ). The optimal portfolio included TRUE, PS, CPN, TPIPL, AOT, DELTA, BH, MAKRO, BTS, and HEMRAJ with its weight of 0.001, 0.001, 0.0394, 0.0218, 0.0348, 0.1249, 0.1239, 0.1965, 0.3156, and 0.1429, respectively. Besides, the optimal portfolio provided the return of 0.1242%, standard deviation of 0.9966%, and beta coefficient (β) of 0.656, which was lower than the SET50 market.

Keywords: SET50 Index, Capital Asset Pricing Model (CAPM), Beta Coefficient

1. Introduction

A question in researchers' minds is what the good criteria to select common stock are and how to perform a good diversified portfolio in the Stock Exchange of Thailand (SET), especially in SET50 Index. This problem pushed researchers to use financial models and financial quantitative analysis for selecting an appropriate portfolio for investors. According to Nilapornkul, Yuttasri, and Suaysom (2016), they included two key factors: risk and return, which have commonly been used as criteria for decision making in stock investment. Thus, both factors were focused in this research. More importantly, this research aimed to provide useful information to suggest investors before making decision to invest in the stock market.

This research aimed to respond to five key objectives as follows:

1. To analyze the return and risk of each common stock listed in SET50 Index (the Index of first fifty of large market capitalization on the SET)

2. To analyze required return comparing by using the Capital Asset Pricing Model (CAPM)

3. To classify each common stock into two groups: undervalued and overvalued groups

4. To analyze an appropriate investment proportion of each common stock to perform an optimal portfolio

Research Scope

This research concentrated on common stocks listed in SET50 Index. The index is calculated from the stock prices of the top 50 listed companies on the SET in terms of large market capitalization, high liquidity, and compliance with requirements regarding the distribution of shares to minor shareholders. The data were daily closed price for three years during September 10, 2012 – 2015, and these data were retrieved from SETSMART.

2. Literature Review

2.1 Theory and Empirical Study

Researchers reviewed prior literature related to four major aspects: SET50 Index, the Capital Asset Pricing Model (CAPM), portfolio theory, and risk preference theory. The details of each aspect were explained in the following.

1. SET50 Index

SET50 Index is similar to SET index. However, this Index includes 50 securities, which have large market capitalization and high trading liquidity regularly. The formula and calculation method are the same as the SET Index calculation, but the base date is August 16, 1995 (SET, 2016). In addition, the SET50 Index calculation always reselects 50 common stocks for every six months. The formula is shown below:

$$\text{SET50 Index} = \frac{\text{Total market price of selected 50 common stocks for Today}}{\text{Market price of selected 50 common stocks on August 16, 1995}} \times 100$$

The change of SET50 Index reflects the changes of the total market values of the selected 50 common stocks in the same direction. For example, if SET50 Index increases, this implies that the market prices of most common stocks also increase. The 50 common stocks currently listed in SET50 Index were shown in table 1.

Table 1: Companies' Names Listed in SET50 Index (As of September 2015)

No.	Corporation Name	Symbol
1	Advance Info Service Public Company Limited	ADVANC
2	Airport of Thailand Public Company Limited	AOT
3	Banpu Public Company Limited	BANPU
4	Bank of Ayudhya Public Company Limited	BAY
5	Bangkok Bnak Public Company Limited	BBL
6	The Bangchak Petroleum Public Company Limited	BCP
7	BEC World Public Company Limited	BEC
8	Bangkok Dusit Medical Services Public Company Limited	BGH
9	Bunrungrad Hospital Public Company Limited	BH
10	Big C Supercenter Public Company Limited	BIGC
11	Berli Jucker Public Company Limited	BJC
12	Bangkok Life Assurance Public Company Limited	BLA
13	BTS Group Holdings Public Company Limited	BTS
14	CP All Public Company Limited	CPALL
15	Charoen Pokphand Foods Public Company Limited	CPF
16	Central Pattana Public Company Limited	CPN
17	Dynasty Ceramic Public Company Limited	DCC
18	Delta Electronics (Thailand) Public Company Limited	DELTA
19	Total Access Communication Public Company Limited	DTAC
20	Electricity Generating Public Company Limited	EGCO
21	ESSO (Thailand) Public Company Limited	ESSO
22	GLOW Energy Public Company Limited	GLOW
23	Hemaraj Land and Development Public Company Limited	HEMRAJ

Table 1: Companies' Names Listed in SET50 Index (As of September 2015) (Cont.)

No.	Corporation Name	Symbol
24	Home Product Center Public Company Limited	HMPRO
25	Shin Corporation Public Company Limited	INTUCH
26	IRPC Public Company Limited	IRPC
27	Indorama Ventures Public Company Limited	IVL
28	Kasikorn Bank Public Company Limited	KBANK
29	Krung Thai Bank Public Company Limited	KTB
30	Land and Houses Public Company Limited	LH
31	Siam Makro Public Company Limited	MAKRO
32	Minor International Public Company Limited	MINT
33	Pruksa Real estate Public Company Limited	PS
34	PTT Public Company Limited	PTT
35	PTT Exploration and production Public Company Limited	PTTEP
36	PTT Global Chemical Public Company Limited	PTTGC
37	Ratchaburi Electricity Generating Holding Public Company Limited	RATCH
38	Robinson Department Store Public Company Limited	ROBINS
39	The Siam Commercial Bank Public Company Limited	SCB
40	The Siam Cement Public Company Limited	SCC
41	Siam City Cement Public Company Limited	SCCC
42	Supalai Public Company Limited	SPALI
43	Thanachart Capital Public Company Limited	TCAP
44	Thai Airways International Public Company Limited	THAI
45	Tisco Financial Group Public Company Limited	TISCO
46	TMB Bank Public Company Limited	TMB
47	Thai Oil Public Company Limited	TOP
48	TPI Polene Public Company Limited	TPIPL
49	True Corporation Public Company Limited	TRUE
50	Thai Union Frozen Products Public Company Limited	TUF

Source: The Stock Exchange of Thailand (SET)

2. The Capital Asset Pricing Model: CAPM

Sharpe (1964) and Lintner (1965) created the capital asset pricing model (CAPM), resulting in receiving a Nobel Prize for Sharpe in 1990. This model has been widely practically

used to estimate required return for investors' decision and to perform the security portfolios. A major aspect of CAPM is beta coefficient (β), which measures systematic risk impacting on stocks' required returns. The securities market risk has beta coefficient of 1.0 and individual companies or securities are calculated relative to the market's beta (Nilapornkul & Suwankhajit, 2017). Thus, a beta above 1.0 implies a higher risk than the market average; in contrast, a beta below 1.0 reflects less risk than the market average. The CAPM formula was shown and explained in section 3 on research methodology.

3. Portfolio theory

Harry Markowitz (1959) created the portfolio model under the assumption that investors are risk averse, who concern the mean returns and the variance of those returns for a specific period. As a result, investors always choose "mean-variance-efficient" portfolios, leading to call the Markowitz approach as a "mean-variance model." The key concept of this theory indicates that an appropriate portfolio should provide the minimum variance, given expected portfolio return; or it should provide the maximize return, given expected variance. One more major issue of this theory is that an appropriate portfolio should be well diversified, reflecting risk minimization. The portfolio theory was analyzed in section 3 on research methodology.

4. Risk preference theory

According to Daniel and Amos (1979), risk preference theory classifies the attitude of investors toward risk related to investment into three types:

1) Risk-seeking preference: A person who is willing to take higher risks to achieve above-average returns. This allows investors to make decision to invest when the higher risk is worth above means.

2) Risk-averse preference: A person who is reluctant to take on a risk is called a risk aversion. This kind of personality almost always chooses the safer investment instead of taking a chance on the probability of failure.

3) Risk-neutral preference: An individual with risk-neutral preference does not care about the risks involved in the decision making. A risk-neutral individual will choose the assets with the highest possible gains or returns.

3. Data and Methodology

This research was a quantitative research, which employed secondary data collected from SETSMART. The collected data were daily market price of common stocks in SET50 Index during September 10, 2012 – 2015. Therefore, there were 50 listed companies which were included in this research.

Researchers analyzed the data to perform an optimal portfolio based on 7 steps as follows.

1. Calculated daily natural log return of each security listed in SET50 Index (R_i) by using a formula below:

$$R_i = \ln\left(\frac{P_t+D_t}{P_{t-1}}\right)\times 100$$

Where: P_t = Closed price of security i at day t

P_{t-1} = Closed price of security i at prior day t

D_t = Dividend per share of security i at day t

2. Calculated daily natural log return of the SET50 market by using a formula below:

$$R_m = \ln\left(\frac{\text{SET Index}_t}{\text{SET Index}_{t-1}}\right)\times 100$$

Where: SET Index_t = SET 50 Index at day t

SET Index_{t-1} = SET 50 Index at prior day t

3. Calculated beta coefficient (β) of each common stock in SET50 Index by calculating covariance first and then calculating beta coefficient. Both formulas for calculating covariance and beta coefficient were shown below.

(Covariance: COV)

$$COV_{i,m} = \frac{\sum_{i=1}^{n}(R_m-\overline{R}_m)(R_i-\overline{R}_i)}{n}$$

(Beta coefficient: β)

$$\beta_i = \frac{COV_{i,m}}{\sigma_m^2}$$

Where: $COV_{i,m}$ = The variance between each security's daily return and the return of the stock market

R_m = Daily stock market return

$\overline{R}_m$ = Average daily stock market return

R_i = Each daily security return

$\overline{R}_i$ = Average daily security return

σ_m^2 = Standard deviation of market return

4. Calculated expected return of each common stock by using the CAPM as shown in a formula below:

$$E(R_i) = R_f + [E(R_m) - R_f]\beta_i$$

Where: $E(R_i)$ = Expected rate of return

R_f = Risk free rate (this study employed government bond 3 years)

$E(R_m)$ = Expected return of stock market

β_i = Beta coefficient of each security

5. Compared between actual return and required return (from step 4 above) and then classified common stock into two groups: undervalued and overvalued common stock groups.

6. Selected the undervalued group to further process and then classified it again into two groups: 1) high return and low risk group and 2) high return and high risk group. However, researchers selected only top five common stocks of each group.

7. Calculated an optimal weight of investment of each common stock to perform an appropriate portfolio, which provided minimum risk or maximum diversification by using Markowitz's portfolio theory and then calculated portfolios' return, standard deviation, and beta coefficient as shown below:

(Portfolios' return)

$$R_p = \sum_{i=1}^{n} W_i R_i$$

Where: W_i = Proportion of investment in security i

R_i = Rate of return of security i

(Portfolios' standard deviation: σ_p)

$$\sigma_p = \sum_{i=1}^{n} \sum_{j=1}^{n} W_i W_j COV_{ij}$$

Where $W_i W_j$ = Proportion of investment in security i and j respectively

COV_{ij} = Covariance between rates of return of security i and j

(Portfolios' beta coefficient)

$$\beta_p = \sum_{i=1}^{n} W_i \beta_i$$

Where: W_i = Proportion of investment in security i

β_i = Beta coefficient of security i

4. Research Results

This section presented four major findings consisting of value of common stock assessed by employing the CAPM, correlation selection, classifying portfolio groups, and performing investment strategy. The details of each issue were discussed in the following paragraphs.

1. Value of common stock assessed by the CAPM

After assessing intrinsic value and actual price of each common stock, researchers compared and classified them into two types: undervalued and overvalued common stock groups. The former group occurred when intrinsic value was lower than market actual price whereas the latter one existed when intrinsic value was higher than market actual price. Due to SET50 Index, each common stock was classified into two common stock groups as shown in table 2 below.

Table 2: Results of Actual Return and Expected Return of Each Stock and its Position

Symbol	Actual return	Expected return	Position	Symbol	Actual return	Expected return	Position
IVL	0.03%	0.00%	Overvaluation	TRUE	0.04%	0.15%	Undervaluation
BJC	0.03%	-0.03%	Overvaluation	PS	0.03%	0.09%	Undervaluation
LH	0.03%	0.02%	Overvaluation	CPN	0.03%	0.09%	Undervaluation
IRPC	0.03%	0.02%	Overvaluation	TPIPL	0.03%	0.15%	Undervaluation
SCB	0.03%	0.00%	Overvaluation	KTB	0.03%	0.03%	Undervaluation
ESSO	0.02%	-0.07%	Overvaluation	AOT	0.03%	0.22%	Undervaluation
THAI	0.02%	-0.06%	Overvaluation	MINT	0.03%	0.12%	Undervaluation
KBANK	0.02%	0.02%	Overvaluation	HMPRO	0.02%	0.06%	Undervaluation
SPALI	0.02%	0.02%	Overvaluation	DVANC	0.02%	0.03%	Undervaluation
OBINS	0.02%	-0.04%	Overvaluation	BCP	0.02%	0.08%	Undervaluation
PTTEP	0.02%	-0.07%	Overvaluation	TMB	0.02%	0.08%	Undervaluation
PTTGC	0.02%	0.01%	Overvaluation	INTUCH	0.02%	0.03%	Undervaluation
BANPU	0.02%	-0.09%	Overvaluation	GLOW	0.02%	0.06%	Undervaluation
BEC	0.02%	-0.03%	Overvaluation	SCC	0.02%	0.07%	Undervaluation
CPF	0.02%	-0.05%	Overvaluation	BH	0.02%	0.17%	Undervaluation

Table 2: Results of Actual Return and Expected Return of Each Stock and its Position (Cont.)

Symbol	Actual return	Expected return	Position	Symbol	Actual return	Expected return	Position
PTT	0.02%	-0.02%	Overvaluation	BIGC	0.02%	0.03%	Undervaluation
DTAC	0.02%	-0.01%	Overvaluation	CPALL	0.02%	0.07%	Undervaluation
TOP	0.02%	-0.02%	Overvaluation	BLA	0.02%	0.08%	Undervaluation
BBL	0.02%	-0.01%	Overvaluation	BTS	0.02%	0.10%	Undervaluation
TCAP	0.02%	-0.01%	Overvaluation	BAY	0.01%	0.03%	Undervaluation
TISCO	0.02%	0.01%	Overvaluation	DELTA	0.01%	0.19%	Undervaluation
				TUF	0.01%	0.02%	Undervaluation
				RATCH	0.01%	0.02%	Undervaluation
				EGCO	0.01%	0.04%	Undervaluation
				DCC	0.01%	0.03%	Undervaluation
				MAKRO	0.01%	0.12%	Undervaluation
				EMRAJ	0.00%	0.08%	Undervaluation
				BGH	0.00%	0.13%	Undervaluation

Table 2 showed that there were 28 undervalued common stocks and 22 overvalued stocks. Based on the CAPM, undervalued stocks implied that actual return was lower than expected return; on the contrary, overvalued stocks existed when actual return was higher than expected return. Therefore, the common stocks in undervalued stock group were selected to move on for the following steps because the market prices of such common stocks are more likely to increase in future. Nevertheless, these are not for overvalued common stocks. As a result, overvalued common stocks were dropped from this research.

Then, the systematic risk in terms of beta coefficient (β) of undervalued stocks was considered. Practically, the criterion of beta coefficient is 1, reflecting that a stock provides risk in the same level of the stock market. When beta coefficient is lower than 1, this means that a stock provides risk in the lower level than the market risk. In contrast, when beta coefficient is higher than 1, it means a stock provides risk in the higher level than the market risk. Thereafter, the undervalued common stocks were reclassified into 2 groups: Group 1 for high return and high risk and Group 2 for high return and low risk. Finally, the research selected top 5 of each group which were presented in table 3 below.

Table 3: Classification of Securities Into 2 Groups:

Group 1: High Return and High Risk			**Group 2: High Return and Low Risk**		
Stock	**Return**	**Beta**	**Stock**	**Return**	**Beta**
TRUE	0.148%	1.85	DELTA	0.192%	0.62
PS	0.092%	1.55	BH	0.169%	0.92
CPN	0.086%	1.37	MAKRO	0.120%	0.34
TPIPL	0.147%	1.33	BTS	0.095%	0.76
AOT	0.218%	1.31	HEMRAJ	0.080%	0.18

From table 3, the results showed that the top 5 common stocks of group 1 comprised TRUE, PS, CPN, TPIPL, and AOT. It should be noted that all stocks provided beta higher than 1. Besides, TRUE provided the highest systematic risk of 1.85. Regarding group 2, the top 5 common stocks of this group were DELTA, BH, MAKRO, BTS, and HEMRAJ, and HEMRAJ had the lowest risk of 0.18.

The portfolio then consisted of the 10 common stocks from both groups, which provided high returns. However, due to risk, the portfolio was composed of both high risk and low risk. After that the optimal weight of each stock was computed to perform an appropriate portfolio, which minimized risk or well diversified. The summation of the optimal weight of each stock must be 1. Researchers used Microsoft Excel to repeatedly calculate to find out the optimal weight of each stock, which had a good diversification. The results were shown in table 4 below.

Table 4: The Optimal Weight of Each Stock

TRUE	PS	CPN	TPIPL	AOT	DELTA	BH	MAKRO	BTS	HEMRAJ
0.0001	0.0001	0.0394	0.0218	0.0348	0.1249	0.1239	0.1965	0.3156	0.1429

Finally, researchers calculated the portfolio in terms of the return, standard deviation, and beta coefficient, which revealed the return of 0.1242%, standard deviation of 0.9966%, and beta coefficient of 0.656. In summary, an appropriate portfolio provided quite high return and low risk, reflecting from beta coefficient which was lower than 1.

5. Conclusion and Discussion

This research aimed to perform an appropriate portfolio, which well diversified or minimized risk and also provided expected return. The research focused on stocks listed in SET50 Index during September 10, 2012 – 2015. The research methodology used was applied from a few

financial theories such as CAPM model and portfolio theory. The major findings were presented as follows.

1. This research revealed that there were 28 undervalued common stocks and 22 overvalued common stock. This implied that the common stocks listed in SET50 Index were undervalued more than overvalued. Thus, investors were able to perform an appropriate portfolio from those undervalued common stocks.

2. Interestingly, AOT provided the highest return of 0.218%, and its risk was quite high at 1.31, which was above 1, or the risk level was higher than the stock market. Meanwhile, Delta also provided high return of 0.192%, but its risk level was quite low at 0.62, which was beneath 1, or the risk level was lower than the stock market.

3. Importantly, an optimal portfolio should consist of common stocks with high returns and a combination of high risk and low risk common stocks.

4. For this research, an appropriate portfolio consisted of 10 common stocks, namely TRUE, PS, CPN, TPIPL, AOT, DELTA, BH, MAKRO, BTS, and HEMRAJ. All of them provided high return. However, the first five common stocks provided high risk, and the rest of them provided low risk.

5. The optimal weight of investment of TRUE, PS, CPN, TPIPL, AOT, DELTA, BH, MAKRO, BTS, and HEMRAJ was 0.0001, 0.0001, 0.0394, 0.0218, 0.0348, 0.1249, 0.1239, 0.1965, 0.3156, and 0.1429, respectively. Certainly, the summation of weighted investment must be 1. The portfolio provided quite high return of 0.1242% and low systematics risk of 0.656.

6. This research was conducted by using a few financial theories and also provided new evidences supporting the theories. This insisted that the CAPM model and portfolio theory are practically employed in SET50 Index.

6. Recommendations and Further Research

The results of this research solved the problem in researchers' minds and suggested investors to recognize the useful information, which are:

1. The good criteria to select common stock are risk and return. In case of return, the comparison between actual return and required return can be a criterion for selecting the undervalued common stocks and overvalued common stocks. In addition, the undervalued common stocks should be selected to invest or perform an appropriate portfolio because its market price is able to increase in the future.

2. Performing a good diversification portfolio in the Stock Exchange of Thailand (SET) should recognize about systematic risk in terms of beta and the optimal weight of investment of each common stock.

These are useful information to suggest investors to select or perform a portfolio themselves given reasonable returns and well diversification. Moreover, the benefits of this research are:

1. Security companies can use this analysis method to prepare useful information or perform the optimal portfolios by themselves to support or suggest their customers.
2. The Stock Exchange of Thailand (SET) should recognize the undervalued common stocks. Besides, the SET should research more to find out what factors affect the undervalued common stocks. This might help assist those listed companies having the undervalued common stocks in SET50 Index and also expand in SET Index.
3. Future researchers should further do research by applying some aspects below:
    - Add more variables and perform new models for comparison study
    - Extend the research period or expand to more stock market for comparison study
    - Employ securities listed on foreign stock markets to gain more useful information for global investment

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