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Rational Decision-Making in Portfolio Management For Thai Investors

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Abstract

This study presents a strategy to allocate assets in accordance with the age range of the investors. The applied strategy includes Integrated Asset Allocation under Modern Portfolio Theory, and also rationality concept from Microeconomics for choosing between traditional assets (represented by investment in stock market for SET50 TRI and 1-year fixed deposit), and alternative assets (represented by government bond, gold bullion, and PROPCON TRI for real estate). The focus was to allocate the limited resources – the investor's asset – to generate the most efficient outcome. The result of the study provides the alternatives for Thai investors, who accept risk differently in each age range, when making investment and planning their asset portfolio management.

Keywords: Portfolio Management, Rational Investor, Risk Preferences, Investment Decision, Thai Investors

1. Introduction

“All investment involves risk” is a saying that all investors are familiar with. The asset allocation, one of the portfolio management processes based on the expected return data and the risk tolerance level, is thus introduced to help the investors reduce their risk. According to Modern Portfolio Theory (MPT), under the market efficiency concept, an investor is defined as rational. A literature review of factors affecting personal investment reveal that the level of risk acceptance is one of the key factors, besides age and period of time. The current study is based on the previous study entitled Asset Allocation Model for Private Investment (Karuna and Dalina, 2018). This study builds on the previous paper by classifying by period of investment, investors’ age and their level of risk acceptance as well. This is to be consistent with the fact about Thai demographical change. With advanced technology it is expected that the Thai population with age more than 60 years old will increase from 4.02 million in 1990 to 17.74 million in 2030 (Fiscal Policy Office, 2014). It is thus crucial for each individual to give more priority to the financial planning in order to create one’s financial stability in the future. Besides, it was also found that Thai people preferred to deposit their money in the bank since Thailand was among one of those Asian countries mainly relying on the commercial bank or so called bank-based economy. And one more significant reason is that most Thai people might still lack financial literacy as well as literacy about investment in risk assets. However, depositing money in the bank will not only devalue the real value of the deposit as a result of inflation, it will also create an opportunity cost from investing in alternative assets which could generate more return. However, high return investment usually comes with high risk. When wishing to invest in high return assets one thus needs to consider the issue of risk or to diversify investments in various assets. This is not only to reduce the risk but also to increase the efficiency of the investment as well. Thanks to the lowest risk comparing to other methods, however, the return from saving is not enough to compensate with the negative effect from the inflation rate – rising higher than that of the interest rate year on year – not to mention the opportunity cost for obtaining a better benefit if investing in other alternative investment with higher returns than bank interest. According to the rate of returns for the past 10 years, the asset that generated

the highest return was Thai securities (18%), followed with petroleum (16%), gold bullion (16%), and Property Fund (11%). And certainly the one that provided the least return was saving (1%); this was even less than the inflation rate (3%). Fortunately, the present financial market provides options for investment in various types ranging from equity, debt securities, or mutual funds; these could be sub-categorized into several formats depend on the style of each individual for investment. After all, what all investors expect were the worthy return that must be higher than the risk they have to undergo. Hence, with various options, the rate of return in each asset is thus the most significant factor that each investor will take into consideration before making their investment.

Additionally, for the asset allocation or the investment in different kinds of security, the investors should make a decision based on well-studied information or the past performance of each asset so they could choose to invest in the asset that will bring them the highest return under the risk level they accept. This paper investigated the asset allocation of personal investment in 5 popular assets among Thai people: (1) common stock, (2) property & construction stocks, (3) gold bullion, (4) bond, and (5) 1-year fixed deposit. The study also included the analysis of the real return (cancelled out the inflation effect), and the risk of each asset in accordance with its investment term in order to find the most efficient proportion in each group categorized by risk level. The results of this study would reveal the return and the risk in the past according to the investment in different type of assets. Moreover, the investors could use the result as a frame for managing their own asset allocation and apply the knowledge learned from the study to adjust their portfolio in order to gain the highest return under the risk level they accepted.

2. Literature Review

2.1 Related Paper in Portfolio Management

The priority of most investors making their investment in common stock would be on the return on investment. Hence, with the application of behavioral finance concept, many studies focused on factors affecting the return on investment. At the initial stage, the study employed the finance economics thorory with the hypothesis that the investors are rational, hold the

same believe, and obtain symmetric information. They will thus make an investment based on the fundamental analysis (Hansen & Sargent, 1993). The idea that the security price reflects its real value according to the market efficiency concept helps us understanding the fundamental of the security price behavior. Later on, there is a new theory called behavioral finance with the concept contradicting to that of the market efficiency; it indicates that the market efficiency concept fails to explain many situations in the real world (Shiller, 1981) since the investors are irrational and usually make an investment based on their sentiment (Hirshleifer, D., 2001). This later concept, however, is another one that required further in-depth study. However, this study still relies on the theoretical concept about rationality of human being and the allocation of limited resources to meet the most efficient and highest benefit. In order to consider the amount of utility each investor will obtain from making an investment in each type of asset, it needs to be accepted that all investors are classified into 3 types (Haugen, 1997). The first group is called the risk seeker; they are those enjoying high risk even though facing with low return. Thus, this group will face with high uncertainty as well as high risk from unpredictable situation. The second group, the risk averter, consists of those prefer to avoid the risk. They are those expecting high return from high risk. The last group is called the risk-neutral. They are those making investment based on the rate of return only and do not pay attention to those alternative investment.

When investigating into the past research on factors affecting the investment in risk asset in Thailand such as the one by Wapee Nontaleeruk (2011), it was found that those demographic determinants included gender, age, education level, revenue, marital status, attitude, and also financial literacy were all contributed to investment behavior in stock or risk asset. However, age was the main factor indicating that the older one become, the lesser risk they accept. Nontaleeruk's result was consistent with Bucciol (2008). They concluded that the level of risk acceptance would reversely vary with age, but would directly vary with the wealth for household in the United States. These studies are all in line with Asset Allocation over the Life-Cycle Investing Theory by Bodie (2007) and imply that the difference in level of risk acceptance of each person leads to the variation in personal investment in risky asset.

The previous research on managing investment portfolio mostly focused on investing in 3 types of assets: bond, equity, and cash equivalent asset. Porntip Worapaspreuk (2009) found that the investment proportion that created the lowest risk per unit across all investing period was 30% for 12-month fixed deposit, 50% for government bond, and 20% for SET50. This finding was similar to that of Montree Sukhontamarn (2007): the investment model generating the lowest risk per unit was 70% for 12-month fixed deposit and 30% for government bond without any investment in SET50 or gold bullion. These two studies supported the investment in risk asset as well as gold bullion. Chatchai Siritewankul (2012) encouraged those retired to invest 50% in gold bullion, 20% in common stock, and the rest 30% in government bond and cash. This suggested model was the investment proportion that generated the highest withdrawal rate averagely, and the lowest error rate. In short, it was highly recommended to make an investment in common stock in higher percentage than in government bond to decrease the error rate. The finding also conformed to the study in Turkey by Gencer, H. G. (2014). As suggested by Gencer, H. G. (2014), increasing the percentage of gold bullion and common stock in the investment portfolio, especially in a fluctuating market or a crisis period, will help reducing the risk of one's portfolio.

In addition to this, the previous study also revealed that the real estate was another type of asset preferred by Thai people. As shown in study by Patamaporn Nithichai (2013), which assessed the sufficiency of saving for the retired, it was found that on average the investment portfolio's structure of the sufficient saving group was mostly 23% on real estate for rent, 23% on deposit, and 17% on provident fund. In spite of high cost and lack of liquidity, the present investors could indirectly invest in real estate via other forms of financial instrument such as property and construction stocks, property fund etc. And when reviewing the past studies, they suggested that most property and construction stocks might create systematic risk less than the market. The study by Kuerkool Jamsilp (2005) confirmed that the property and construction stocks averagely provided higher return and lower risk when comparing to the market. Since the unsystematic risk was more than the systematic one, the risk of property and construction stocks thus mainly came from the company's internal factors that could be reduced by improving the management. In addition,

other factors affecting the price of property and construction stocks were also further analyzed. Chutha Sae-ngou (2009) suggested that the Bangkok Commercial Property Fund (BKKCP) and Millionaire Property Fund (MIPF) were influenced by economic factors including Gross Domestic Product (GDP), the exchange rate (Baht to US Dollar), and the inflation rate. Moreover, according to the study by Chalit Wongprasertsook (2008), Construction Material Price Index (CMI) and Real Effective Exchange Rate (REER) were another two factors contributed to the high risk when investing in property and construction stocks. In summary, to reduce the unsystematic risk, the investors have to consider making an investment mainly in well management companies.

2.2 Related Theories

2.2.1 Integrated Asset Allocation Strategy

According to this integrated asset allocation strategy proposed by William F. Sharpe, the creation of security group starts with the survey of risk acceptance level of the investors, analyze the expected rate of return, the risk, the coefficient of correlation between rates of return of each security. Then, the derived information will be classified into group that suits to each type of investor. Each group will consist of security that satisfies the need of the investor under the expected market circumstance. Finally, after the investment has been done, the actual rate of return would be brought to compare with that of the original target. This study has applied this concept for security management in order to allocate the capital investment in 5 types of security for Thai investors. The amount of investment in each type of security depends on investment policy, expected rate of return, and risk acceptance level of each investor.

2.2.2 Markowitz's Modern Portfolio Theory (MPT)

Harry Markowitz was the one who proposed the new concept about diversifying the investment in security group. This concept explains the individual's decision in making investment in security under the limited financial resources, and allocating the investment to generate the highest return under the lowest level of risk. The fundamental hypotheses of this concept are as follows (Markowitz, H. M., 1999)

- 1) Choice for making investment depends on the expected rate of return and the risk acceptance level of each investor.
- 2) The investors are all seek for the highest utility.
- 3) Each investor will calculate the risk of investment based on the variation of the expected rate of return by considering the value of variance or standard deviation of each investment.
- 4) Under the same certain level of risk, the investor will choose to invest in security with the highest rate of return. And in the same manner, under the same certain rate of return, the investor will choose to invest in security with the lowest risk.

According to the above hypotheses, the investor is rational and makes decision in security trading based on rational expectation.

3. Methodology

According to the integrated asset allocation strategy, there are 2 principles for assets allocation.

- 1) The first principle is to allocate the assets in accordance with the life cycle. The concept of this principle focuses solely on the age range of the investor who could make investment in security from high risk to low risk. The assets allocation by age range could be done as follows.

The distribution of investment in different types of asset according to the investment policy of each group with different risk level could be applied by utilizing the investment principle in accordance with the age of the investors.

Proportion of Investment in Stock (%) = 100 – Age of Investor

According to the above formula, the high-risk group should make an investment at the age of 20 – 39 years old, the medium-risk group should make an investment at the age of 40 – 59 years old, and the low-risk group should make an investment at the age of 60 years old onwards.

2) The second principle for assets allocation is based on the level of risk acceptance of the investor. The process is as follows.

- 1st Stage Evaluate the level of risk acceptance of the investor; there are 3 levels namely conservative portfolio, moderate portfolio, and aggressive portfolio.
- 2nd Stage Specify the optimal portfolio that is in line with level of risk acceptance of the investor
- 3rd Stage Adjust the investment portfolio to be in line with the investment period and the investment limitation of each target of the investor.
- 4th Stage Find the most optimal investment portfolio to help the investor to achieve the investment target under the accepted risk level.

Then the data on return and risk of each individual asset were brought to calculate the return and risk of each scheme's portfolio in different investment period. Each portfolio schemes was then classified into group in according to its risk level: high, medium and low. Next, the comparative study on Sharpe's Ratio was analyzed before choosing the most efficient portfolio of each group, given the same investment period.

Data Analysis

The secondary data utilized for calculating the real rate of return and risk in this study were derived from five assets classes: common stocks (*SET50 TRI*), property & construction stocks (*PROPCON TRI*), government bonds (*GBI TRI*), gold bullion, and 1-year fixed deposit. The consumer price index (*CPI*) was used to represent an inflation rate. The monthly data collected were those during January 2006 – December 2015: totally 10 years.

(A) Study Result on Individual Asset Analysis

As previously mentioned, the calculation of real rate of return was derived from the collection of monthly data of each asset while using CPI as a representative of inflation. The result was shown in Figure 2, it was found that on average (Arithmetic Mean) the asset with the highest rate of return and

also highest risk in every investment period was *PROPCON TRI*, followed with *SET50 TRI*, gold bullion, government bond (GBI TRI), and 1-year fixed deposit respectively. In fact, 1-year fixed deposit's average rate of return was negative or "loss" since the inflation rate was higher. In addition, it was also found that the longer the investment period, the higher the return and risk. Also, the longer period produced the higher the efficiency of the investment measured by Sharper's Ratio: the highest one was when the investment period equaled 7 years (see Figure 1 and Figure 2). Furthermore, it was revealed that the investment period from 5 years onward clearly decreased the value of minimum return (Min) when comparing to that of investing in individual asset for 1 and 3 years. In short, this implied that an investment in individual asset for 5 and 7 years continuously during the study period can help reducing the opportunity to get loss.

Figure 1 Show the Highest and the Lowest of Rate of Return, the Average Rate of Return, and the Risk per Year of Individual Asset in Each Investment Period.

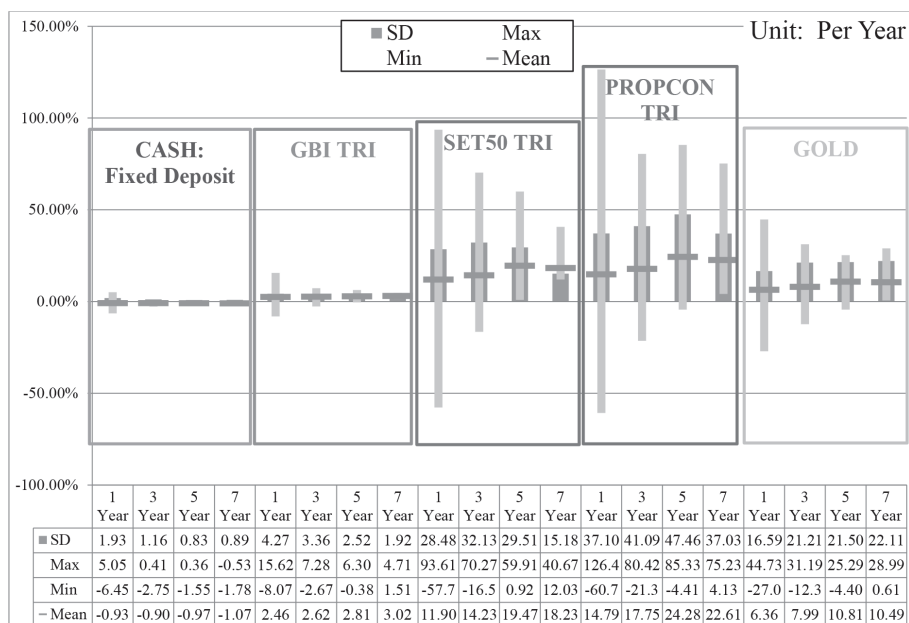
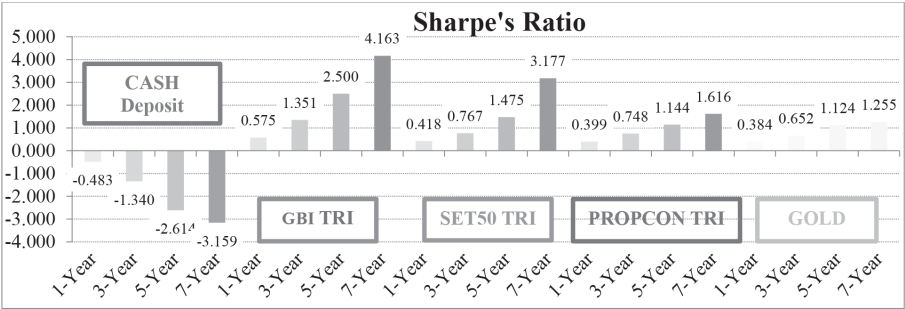
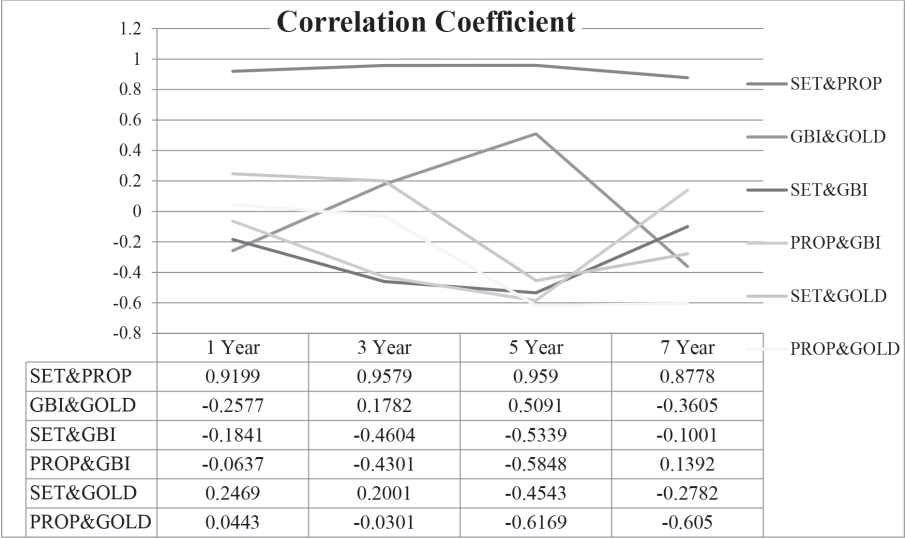


Figure 2 Show the Efficiency of Each Individual Asset from Sharper’s Ration in Each Investment Period



Next, the analysis on correlation coefficient from the real rate of return of individual asset (see Figure 4) found that both equity instruments (*SET 50* and *PROPCON*) showed the highest correlation at every investment period. However, the government bond (GBI) and gold bullion (GOLD) revealed the highest correlation at the investment period of 5 years (0.5091) whereas their lowest correlation was when increasing the investment period to 7 years (-0.3605).

Figure 3 Show the Correlation Coefficient from the Rate of Return at Different Investment Periods



When considering the values of correlation coefficient of Debt Instrument and Equity Instrument (Figure 3), it was found that mostly they were negative in every investment period except PROPCON and GBI that showed small positive correlation (0.1392) at the investment period of 7 years, but revealed the highest negative correlation at the investment period of 5 years. This implied that GBI was efficient in risk distribution from the investment in Equity Instrument at every investment period, and was the most efficient at the investment period of 5 years.

For gold bullion and Equity Instrument, it was found that the correlation coefficient value of SET50 and GOLD was positive at the investment period of 1 and 3 years, and showed the highest negative value at the investment period of 5 years and 7 years respectively. AS for property and construction stock and gold bullion (PROPCON & GOLD), it was revealed that their correlation coefficient value was less than that of SET50 and GOLD in every investment period; their correlation coefficient value was positive at the investment period of 1 year and became highest negative at the investment period of 5 years, 7 years, and 3 years respectively. In summary, gold bullion was more efficient in risk distribution for investment in property and construction stock, and its efficiency would increase when the investment period get longer: the most efficient was at the investment period of 5 years.

(B) Study Result on Portfolio Analysis

The investment portfolios were classified by their risk level. The percentage of high risk assets (*SET50 TRI* and *PROPCON TRI*) were the main classification criteria. The portfolio then classified into 3 groups: high risk, medium risk, and low risk. The criteria used to classify the securities were shown in the following table.

As shown in Figure 4, the Sharpe's Ratio was applied to analyze the security proportion classified by acceptability level of risk, while the color code was employed to represent each class of asset: grey for 1-year fixed deposit or cash equivalent, blue for government bond (*GBI TRI*), orange for *SET 50*, green for *PROPCON*, and yellow for gold bullion. From this Figure, the proportion of government bond (GBI) could be found within the range of the moderately aggressive portfolio (MAP) to the conservative portfolio (CP).

Since the government bond generate low rate of return as well as low risk, it thus an efficient asset in risk distribution in each portfolio. As for the alternative asset–*PROPCON TRI*, its investment proportion appeared only at the investment period of 1 and 3 years. Given the longer investment period, *PROPCON TRI* would be more fluctuate than SET 50, as a result the investment in *SET50* was more efficient than *PRPCON TRI*. Even though in the short run *PROPCON TRI* helped increasing the rate of return well, in the long run it became excessively high risk asset. Another alternative asset that could be found in almost every investment period was gold bullion. Since its value of correlation coefficient with equity instrument was low, gold bullion, in spite of higher risk, was efficient in risk distribution close to the government bond (GBI)’s level.

The analysis of portfolio at different level of risk as shown in Figure 5, it was found that the longer investment period produced the higher rate of return, and the highest one would be at the investment period of 5 years. Also, the longer investment period resulted in the higher risk in average, and the highest one would be at the investment period of 3 years. Then the risk would decrease until hit the lowest level at the investment period of 7 years. It was also found that, expanding the period of investment would increase the minimum rate of return until it became positive or no more loss at the conservative portfolio group with the investment period of 5 years. However, at the investment period of 7 years, the lowest rate of return was positive in every group. Next, when considering the range line of the average rate of return, it was found that the range line become narrower as the investment period lasted longer; it implied that the longer investment period helped reducing the fluctuation of the rate of return. And finally, the expansion of the investment period would increase the efficiency as measured by Sharpe’s Ratio (See Table 1 for more information).

Figure 4 Show the Most Efficient Investment Proportion of Portfolio in Different Investment Period

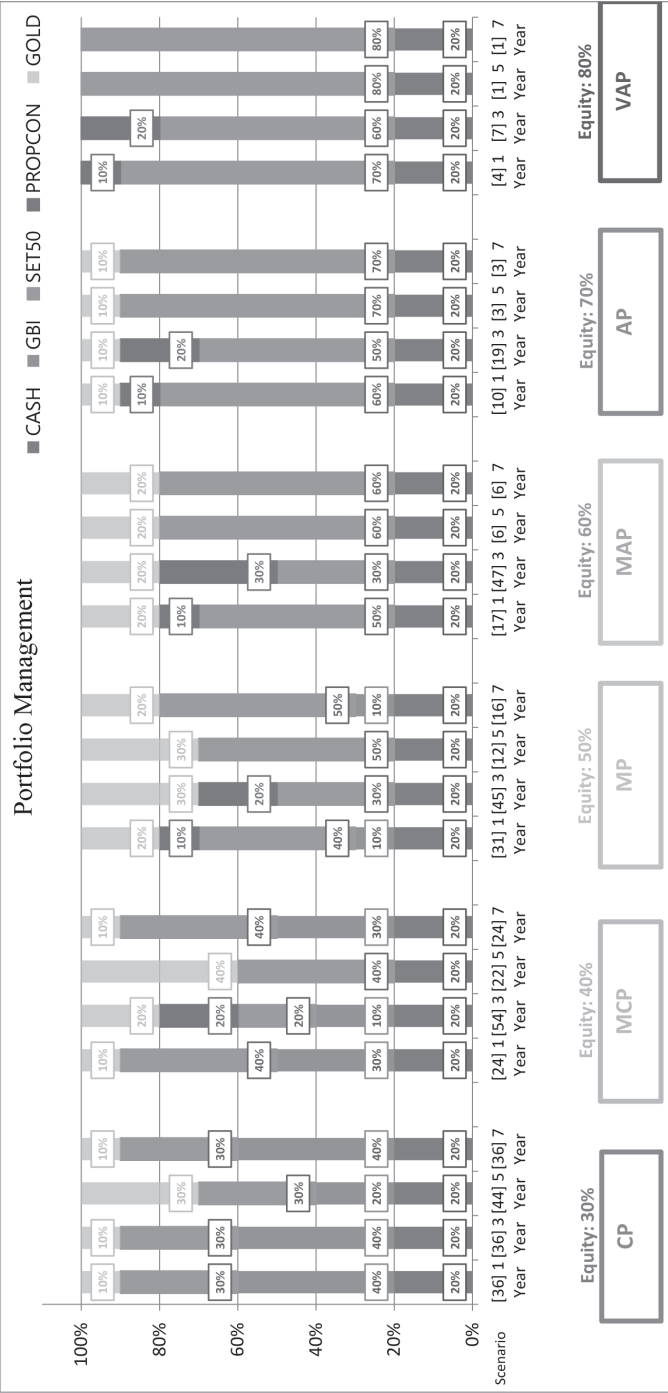


Figure 5 Show the highest and lowest of the rate of return, the average rate of return, the risk per year of portfolio in different investment period.

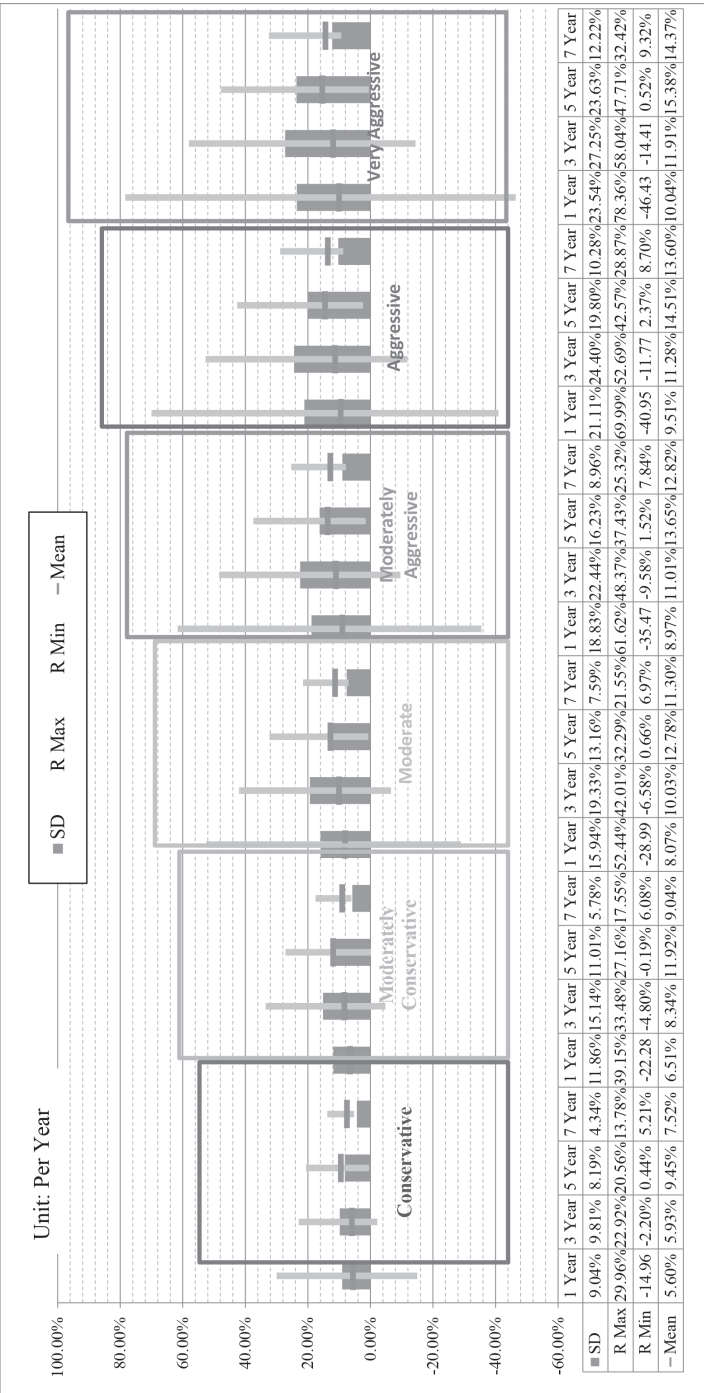


Table 1 Show Information of Security Groups that Provide No.1 and No.2 Highest Efficiency according to the Sharpe Scale within the Investment Period of 7 Years, Ordering by the Level of Loss Acceptance of the Investor.

1-Year Period Investment												
Age range	Returns		Minimum Loss		Total Returns		Sharpe	Investment Proportion (%)				
	Mean	Total	Mean	Total	Mean	Total		C	Gb	S	P	Go
Low Risk Portfolio												
70-80	5.60%	-	-14.96%	-	9.04%	-	0.620	20	40	30	-	10
70-80	5.98%	-	-15.80%	-	9.81%	-	0.609	20	30	30	-	20
Moderate Risk Portfolio												
60-70	6.51%	-	-21.28%	-	11.86%	-	0.549	20	30	40	-	10
60-70	7.16%	-	-22.50%	-	13.09%	-	0.547	20	20	30	10	20
50-60	8.07%	-	-28.99%	-	15.94%	-	0.506	20	10	40	10	20
Aggressive Risk Portfolio												
50-60	8.72%	-	-30.21%	-	17.28%	-	0.505	20	-	30	20	10
40-50	8.97%	-	-35.47%	-	18.83%	-	0.477	20	-	50	10	20
40-50	8.70%	-	-35.26%	-	18.33%	-	0.475	20	-	60	-	20
Very Aggressive Risk Portfolio												
30-40	9.51%	-	-40.95%	-	21.11%	-	0.450	20	-	60	10	10
30-40	9.78%	-	-41.17%	-	21.78%	-	0.449	20	-	50	20	10
20-30	10.04%	-	-46.43%	-	23.54%	-	0.426	20	-	70	10	-
20-30	10.32%	-	-46.65%	-	24.24%	-	0.426	20	-	60	20	-
3-Year Period Investment												
Low Risk Portfolio												
70-80	5.93%	17.80%	-2.20%	-6.60%	9.81%	18.31%	1.047	20	40	30	-	10
70-80	5.40%	16.19%	-3.12%	-9.36%	8.99%	15.58%	1.040	20	50	30	-	-
Moderately Conservative Risk Portfolio												
60-70	8.34%	25.01%	-4.80%	-14.39%	15.14%	26.23%	0.954	20	20	20	20	20
60-70	7.98%	24.95%	-4.34%	-13.03%	14.55%	25.20%	0.950	20	20	30	10	20
50-60	10.03%	30.10%	-6.58%	-19.73%	19.33%	33.47%	0.899	20	-	30	20	30
Moderate Risk Portfolio												
50-60	9.50%	28.49%	-6.96%	-20.89%	18.42%	31.91%	0.893	20	10	30	20	20
40-50	11.01%	33.03%	-9.58%	-28.75%	22.44%	38.86%	0.850	20	-	30	30	20
40-50	10.31%	30.92%	-8.67%	-26.02%	21.09%	36.54%	0.846	20	-	50	10	20
Aggressive Risk Portfolio												
30-40	11.28%	33.85%	-11.77%	-35.31%	24.40%	42.89%	0.801	20	-	50	20	10
30-40	11.64%	34.91%	-12.22%	-36.67%	25.18%	43.62%	0.800	20	-	40	30	10

Table 1 Show Information of Security Groups that Provide No.1 and No.2 Highest Efficiency according to the Sharpe Scale within the Investment Period of 7 Years, Ordering by the Level of Loss Acceptance of the Investor. (cont.)

Very Aggressive Risk Portfolio												
20-30	11.91%	35.72%	-14.41%	-43.23%	27.25%	47.19%	0.757	20	-	60	20	-
20-30	11.56%	34.67%	-13.96%	-41.87%	26.44%	45.80%	0.757	20	-	70	10	-
5-Year Period Investment												
Conservative Portfolio												
70-80	9.45%	47.26%	0.44%	2.20%	8.19%	18.31%	2.581	20	20	30	-	30
60-70	12.40%	61.99%	1.06%	5.31%	11.67%	26.10%	2.375	20	-	30	10	40
50-60	12.78%	63.91%	0.66%	3.31%	13.16%	29.43%	2.171	20	-	50	-	30
50-60	13.26%	66.32%	1.91%	9.57%	14.30%	31.98%	2.074	20	-	40	10	30
40-50	13.65%	68.24%	1.52%	7.58%	16.23%	36.30%	1.880	20	-	60	-	20
40-50	14.13%	70.65%	2.77%	13.84%	17.64%	39.44%	1.792	20	-	50	10	20
30-40	14.51%	72.57%	2.37%	11.84%	19.80%	44.27%	1.639	20	-	70	-	10
30-40	14.99%	73.38%	1.97%	9.83%	21.35%	47.73%	1.571	20	-	60	10	10
20-30	15.38%	76.90%	0.52%	2.58%	23.63%	52.84%	1.455	20	-	80	-	-
Low Risk Portfolio												
70-80	10.25%	51.26%	-0.30%	-1.51%	9.12%	20.38%	2.515	20	40	30	-	10
60-70	11.92%	59.58%	-0.19%	-0.95%	11.01%	24.62%	2.420	20	-	40	-	40
20-30	15.86%	79.30%	-0.02%	-0.08%	25.27%	56.51%	1.404	20	-	70	10	-
7-Year Period Investment												
Low Risk Portfolio												
70-80	7.52%	52.61%	5.21%	36.49%	4.34%	11.49%	4.579	20	40	30	-	10
70-80	8.26%	57.83%	5.16%	36.13%	6.70%	17.73%	4.235	20	30	30	-	20
60-70	9.04%	63.25%	6.08%	42.59%	5.78%	15.28%	4.139	20	30	40	-	10
60-70	10.22%	71.54%	6.87%	48.09%	7.20%	19.06%	3.754	20	20	30	10	20
50-60	11.30%	79.13%	6.97%	48.80%	7.59%	20.08%	3.940	20	-	50	-	30
50-60	10.56%	73.90%	6.96%	48.69%	7.26%	19.21%	3.848	20	20	50	-	10
40-50	12.82%	89.77%	7.84%	54.90%	8.96%	23.71%	3.786	20	-	60	-	20
40-50	12.08%	84.55%	7.83%	54.79%	8.76%	23.19%	3.646	20	10	60	-	10
30-40	13.60%	95.20%	8.70%	60.89%	10.28%	27.21%	3.499	20	-	70	-	10
30-40	12.85%	89.97%	8.41%	58.88%	10.68%	28.27%	3.183	20	10	70	-	-
20-30	14.37%	100.62%	9.32%	65.27%	12.22%	32.33%	3.113	20	-	80	-	-
20-30	14.81%	103.68%	8.53%	59.74%	14.07%	37.24%	2.785	20	-	70	10	-

4. Conclusion

This study focuses on the portfolio management consisting of both traditional assets (represented by investment in stock market for *SET50 TRI* and 1-year fixed deposit) and alternative assets (represented by government bond, gold bullion, and *PROPCON TRI* for real estate.) By applying the integrated asset allocation strategy, besides the rate of return and the level of risk acceptance, the analysis of this study also brought the age of the investor into consideration as well. The result of the study found that the fixed deposit generated the lowest return comparing to the other 4 types of assets, and even the inflation rate. The fixed deposit's real rate of return thus became negative in all investment period. This implies that the return from the fixed deposit is not high enough to compensate with the negative effect of the inflation. For each individual, allocating some of the cash for investment is thus recommended in order to avoid its devaluation in the future. Each type of portfolio management comes with different return and risk, and at the same time each individual aims for different expected return and level of risk acceptance, this study has thus summarized the information of security group that provides No.1 and No.2 highest efficiency according to the Sharpe scale and ordered by the investment period and level of highest loss acceptance. The investor then could bring this information into consideration before making investment. From the study on rate of return, risk, and fluctuation of all 5 types of assets, it was found that the assets providing No.1 and No.2 highest rate of return, risk, and fluctuation were *PROPCON TRI* and *SET50 TRI*, followed with gold bullion and *GBI TRI*. Finding also indicated that the investment was more efficient when its period was allowed to be longer.

The investment in low-risk portfolio consisting of the government bond is considered as assets with the highest efficiency in diversifying the risk. The alternative investment in *PROPCON* would be efficient in case of short period. This was obvious when consider the portfolio management policy with the highest efficiency for the investment period of 1 year and 3 years. Since *PROPCON* helped the portfolio's rate to return increase in the short period, but for the long period *PROPCON* generated excessively high risk and clearly more risk than that of *SET50*. And it was found that the alternative investment in gold bullion provided the efficiency in diversifying the risk of

the portfolio as same as the government bond, but with more return. The inclusion of gold into portfolio that invests in bond and common stock helps raise the investment efficiency. Gold is thus considered as assets with risk-reducing character for the portfolio. On one hand, the investment in high risk security group could provide either high return or high loss. The target for this kind of investment is thus to increase the return. On the other hand, the investment in those low-risk securities generates low return and less chance of facing loss. It is thus considered as the one that focuses on maintaining the principal. This principle could be applied for making investment in accordance with the economic situation; investing in high-risk security during the boom period (Bull Market) in order to increase the return, and doing the opposite when the market is sluggish (Bear Market) to keep the principal. For each pair of assets, the correlation coefficient analysis of the rate of return has been applied to help managing the portfolio. In order to diversify the risk in the investment, the assets with opposite relationship could be chosen. From the study, it was found that the assets with the opposite relationship are gold GBI and SET; both assets have opposite relationship in every period of investment. Mostly, it was also found that the alternative assets such as gold possessed inconsistent relationship; gold and bond had negative relationship during the investment period of 1 year, later on the relationship increased until year 3 and year 5 that their relationship became positive, and finally in year 7 it declined. As for equity instruments and gold bullion, their relationship was in the same direction during the investment period of 1 year and 3 years. However, in year 5 and year 7, their relationship was in the opposite direction. The study on rate of return, risk and Sharpe efficiency of security group found that those high-risk security groups could produce the high return, and the highest return could be found in the investment period of 5 years. As for the optimal investment period, it was found that the risk from investment would decline when allowing the investment period to be longer (3 years for the highest one, and 7 years for the lowest one.) The longer period of investment is thus a significant factor that helps decreasing the risk of investment. However, the longer period of investment would lead to the decrease in the average return since the longer period balance out the risk and at the same time the return. The investor's portfolio management by considering which type of assets to make investment and in what proportion does not only help reducing the risk, but also creating

the factor determining the return of investment in the long term. Thus, it is essential for all investors to know the portfolio management strategy that is in line with their expected target. Besides the limitations of this study, deserved to be considered by those interested in this research topic, as mentioned above, another important point is the limitation of the efficient market hypothesis. In the real world, there are several contradictions to this hypothesis including the asymmetric information – each investor unequally access to the information, the different interpretation depending on the experience and the attitude toward investment of each investor. Thus, the market price does not always reflect the actual value of the security. Hence, the study of investment psychology according to the behavior and the decision making behavior of each investor is very significant, and could be brought to explain the phenomenon from the psychological perspective. It is thus deserved to be further study in the future.

References

- Bodie, Z., Kane, A. & Marcus, A. j. (2007). *Investments*. Translated by Ravee Longkanee. Bangkok: McGraw-Hill.
- Buccioli, A., & Miniaci, R. (2008). Household portfolios and implicit risk aversion. *Review of Economics and Statistics*, 93(4). <http://www.dse.univr.it/documenti/Seminario/documenti/documenti400209.pdf>
- Chatchai Siritewankul (2012). *Asset Allocation for the Retirement* (Masters Thesis). National Institute of Development Administration, Bangkok, Thailand.
- Chalit Wongprasertsuk (2008). *Macroeconomic Factor Influencing the Stock Price Index of the Property Development Group in the Stock Exchange of Thailand* (Masters Thesis). The University of the Thai Chamber of Commerce, Bangkok, Thailand.
- Chutha Sae-Ngou (2009). *Economic Factors Influencing the Stock Price of the Property Fund in The Stock Exchange of Thailand* (Masters Thesis). The University of the Thai Chamber of Commerce, Bangkok, Thailand.
- Fiscal Policy Office. (2014). *Annual Report in 2014*. Retrieved from <http://www.fpo.go.th/main/getattachment/About-Us/AnnualReport/5329/CNT0014389-1.pdf.aspx>

- Gencer, G., & Musoglu, Z. (2014). Volatility transmission and spillovers among gold, bonds and stocks: an empirical evidence from Turkey. *International Journal of Economics and Financial Issues*, 4(4), 705-713.
- Hansen, L. P., & Sargent, T. J. (1993). Seasonality and approximation errors in rational expectations models. *Journal of Econometrics*, 55(1-2), 21-55.
- Hirshleifer, D. (2001). Investor psychology and asset pricing. *The Journal of Finance*, 56 (4), 1533-1597.
- Karuna and Dalina (2018). Asset Allocation Model for Private Investment. *Nida Business Journal*, 22, 24-43.
- Kuerkool Chamsilp (2005). *Factors Influencing the Rate of Return of Real Estate Development Securities in The Stock Exchange of Thailand* (Masters Thesis). Chiang Mai University, Chiang Mai, Thailand.
- Markowitz, H. M. (1999). The early history of portfolio theory: 1600-1960. *Financial Analysts Journal*, 55(4), 5-16.
- Montree Sukhontamarn (2007). *Personal Portfolio Management* (Masters Thesis). Chiang Mai University, Chiang Mai, Thailand.
- Patamaporn Nithichai (2013). *The Analysis of Portfolio Investment of Salary Earners in order to Increase the Opportunity for a Happy Retirement*. Stock Exchange of Thailand Research Note, 4, 1-9. Retrieved from https://www.set.or.th/setresearch/files/spotlight/Research_Note_04_2556.pdf
- Pornthip Worapaspreut (2009). *The Analysis of Risks and Returns of Simulated Portfolio Investment with Different Time Ranges* (Masters Thesis). Bangkok University, Bangkok, Thailand.
- Shiller, R. (1981). Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends? *American Economic Review*, 71, 421-436.
- Wapee Nontaleeruk (2011). *Determinants of Household's Asset Allocation* (Master Thesis). Thammasat University, Bangkok, Thailand.