

CURRENCY RETURNS AND INVESTMENT PORTFOLIO IMPACT IN OPTIMIZING ASSETS RISK

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Abstract- This method determines the proportion of each asset to be invested based on the risk-adjusted return. To know the performance of optimal portfolios that have been formed, the writer used the Sharpe ratio and then compared with performance market of the Jakarta Composite Index (JCI). The sample data used by the author is Indonesia financial instruments which are 10 stocks that listed on the LQ-45 index and the Indonesian retail bonds (ORI), and foreign currencies against rupiah that recorded as hard currency, during the observation period October 2012 to May 2014, which was determined by purposive sampling method. The results of this study, foreign currency has given advantage to the investment on financial asset instrument. It can drive the performance portfolio that consist only stock and bond from 0.0736 to 0.1103. With adding foreign currency, rate of return portfolio became 0.0554% at risk level 0.3443%. EUR (euro) and CNY (yuan) are the most affect to the portfolio performance with 23.36% and 13.36% proportion in portfolio. Based on the calculation Sharpe ratio, performance of the optimal portfolio with foreign currency, have an average better performance than the performance on JCI.

Keywords: Investment, Portfolio, Foreign Currency, Risk and Return, Markowitz Efficient Theory.

Introduction

Currently, saving is not the only option for Indonesian people to manage their money. As time goes by, technology has evolved rapidly, the dissemination of information has made an individual to be smart in managing their personal money, and so they can achieve their needs and goals. This statement is supported by economic growth of Indonesia in recent years; it gives credence to Indonesian people to start investing to manage their money. Badan Koordinasi Penanaman Modal (BKPM) targeting 15% of investment growth for 2014 by calculating and considering various economic factors that happens in the country.

In general, investment is known in two form; real investment and financial investment. According to William F. Sharpe, in the primitive economy, almost all investments are close to real investment, while in modern economy are more done in financial investment. Thus, both investment forms are complimentary, not competitive. So, we can say that one of the economic measurements of one country is progressing, which is from the existence and quality of their stock exchange index.

Basically there are many investment instruments that can be used by individuals for their personal finances. However, here the authors limit the investment instruments that easier trading that can be done by an individual and has a high degree of liquidity for minimizing risks that occur. In the stock market, bonds and foreign exchange, each of the financial instruments has a rate of return and the risks that also different. In investing, a smart investor should be able to analyze the calculation of rates of return and risk can be certified. As said by Markowitz (1959), selection of a

portfolio that discusses the problem how to allocate capital investment in order to bring the highest profit but with the smallest risk. According to Markowitz, the maximum portfolio is to combine some of the assets of its correlation coefficient is less than positive, besides that, if there are two securities returns is the same but different risks, then selected the low risk. Agus, (2005), Markowitz efficient set of portfolios located on the boundary line (efficient frontier) set of portfolios that have the maximum return for a given level of return. The core of the Markowitz efficient frontier is how to allocate funds to each of the assets in the portfolio to find the maximum value of the portfolio.

Literature review

Investment

Essentially, investments is the placement of the funds at this time with expectation it will generate a profit in the future. On the other hand Relly and Brown give definition that investment is current commitment of money for period of time to derive future payment that will compensate the investor for 1) the time of the funds are committed, (2) the expected rate of inflation, (3) the uncertainty of the future payment. Investing is the proactive use of money to make more money. It is different from saving. Saving is a passive activity, even though it uses the same principle of compounding. Saving is more focused on safety of principal and less concerned with return.

The basis of decision that investor want to invest are the level of expected return, the level of acceptable risk and the correlation between both of return and risk. It's very reasonable if some investor expected a maximum rate of return from investment that they have done. But, there is some point that investor must be consider, that is how much risk accepted by the investor from their investment. Halim (2003), the level of risk and expected return have a linear relation. So the higher return from investment also give a higher level of risk.

Investment Instrument

Stock

Almost every company has a form of certificate or documents that evidence ownership of a company or it can be called as shares or stock. There are two ways how to get return from investment of stocks. First by selling stock at higher price from the par value or price value at buying that stocks. The difference between the sell price and purchase price is called a capital gain. The other one is from receiving dividend. It is a periodic distribution share or cash of the after-tax profit of a company, distributed to its shareholders according to the number and class of shares held by them.

In Indonesia, shares traded on most major exchanges in Indonesia, it is Indonesia Stock Exchange. In 2014 Indonesia Stock Exchange recorded 502 companies whose shares can be bought by investors as an investment instrument. Indonesia stock exchange using Jakarta Composite Index (JCI) or stock index (IHSG) as an indicator of price movements of shares listed in the Indonesia Stock Exchange. One of the index that existed in the Indonesian stock exchange is the LQ-45. LQ-45 is a number of 45 large capitalization stocks with a liquid and active trading. Every six months 45 stocks is evaluated and replaced if necessary.

Bonds

According to L.J.Gitzman et al (35:2012) Bonds are long-term debt (minimum three years) instruments used by business and government to raise large sums of money, generally from a diverse group of lenders. bonds are marketable securities, and are freely traded, where the bonds contains a promise from the party which bond issuer pay compensation in the form of interest (coupons) at a particular period and to pay the loan principal (par value of the bond) to the bondholder on a fixed date (maturity date) as well as a fixed rate of interest for the life of the bond.

Their market price depends mainly on the rating awarded by bond rating agencies on the basis of issuer's reputation and financial strength.

Foreign Exchange

Foreign exchanges is a transactions of a country's currency to another country's currency which involves major money markets in the world for 24 hours. It is the world's largest financial market in which every day, on average, some one and one-half trillion dollar worth of currencies are bought and sold.

Market conditions and the price moves in the forex market is very dynamic, it can change at any time quickly, in response to events both economic events, politics, war, disaster, etc. Especially for countries with advanced economies and strong, there is little sensitive information, then the price of its currency could move up and down. According to Maurice D Levi (2004:),

This is seen by traders as an opportunity and a chance to make the trade. So simple forex trading goal is to achieve a profit or gain with short period of time. From Heli C. Berlianta (2008), the currency that often used as a means of payment in the international economic and financial transactions referred to as hard currency. It is the currency whose value is relatively stable and sometimes has appreciation or increase in value compared with other currencies. Hard currency converter is generally derived from the advanced industrial countries such as the United States Dollar (USD), Yen - Japan (JPY), Euro (EUR), British Pound (GBP), China Yuan (CNY) and others.

Optimal Portofolio

Referred to Bodie, Kane, Marcus (2009) defined portfolio as collection of investment assets there are more than one held by the investor by grouping of financial assets such as stocks, bonds, and cash equivalents. This theory is based on fact that individual investor will invest their money into different types of securities with purpose of minimize the risk.

According lraham F. and Yovi L., (2011: 3) the purpose of constructing portfolio is:

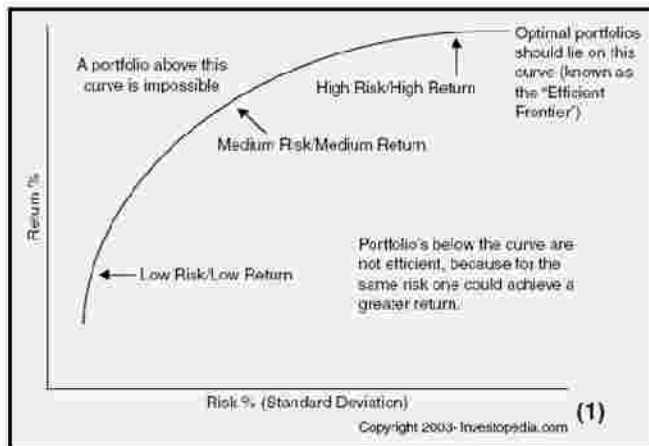
1. Trying to achieve maximum benefit or expected return.
2. Trying to achieve both level of profit in minimal risk.

Markowitz Optimal Porofolio Theory

The optimal portfolio was used in 1952 by Harry Markowitz, and it shows us that it is possible for different portfolios to have varying levels of risk and return. Each investor must decide how much risk they can handle and then allocate (or diversify) their portfolio according to this decision.

In 1952, Markowitz developed an efficient form of diversification. The size used in the correlation coefficient is Markowitz's portfolio. A positive correlation coefficient indicates that both the asset moves in the same direction of the correlation coefficient is negative, indicating that the two assets move in opposite. According to Markowitz, portfolio maximum is to combine some of the assets that the correlation coefficients of his less than positive, besides, if there are two securities that his return-same but different risks, then selected a low risk. (Agus, 2005). A collection of efficient portfolio Markowitz is located on the boundary line (efficient frontier) a series of portfolios that have the maximum return for a given rate of return. The perpose of the Markowitz efficient frontier is how to allocate funds to each asset in the portfolio to find tthe point of optimal portfolio.

The Efficient Frontier



(Source: Financial-Dictionary)

In order to compare investment options, Markowitz developed a system to describe each investment or each asset class with math, using unsystematic risk statistics. Then he further applied that to the portfolios that contain the investment options. He looked at the expected rate-of-return and the expected volatility for each investment. He named his risk-reward equation The Efficient Frontier. The purpose of The Efficient Frontier is to maximize returns while minimizing volatility. Portfolios along The Efficient Frontier should have higher returns than is typical, on average, for the level of risk the portfolio assumes. Notice that The Efficient Frontier line starts with lower expected risks and returns, and it moves upward to higher expected risks and returns.

Measuring Portfolio performance

Sharpe ratio

An optimal portfolio is the portfolio that has best performance. To measure the performance of the portfolio by using Sharpe ratio. Sharpe ratio is a ratio that measures the angle between excess return (expected rate of return minus the risk-free rate) by total risk (measured by standard deviation of the portfolio).

Methodology



This objective's research is to develop an optimal portfolio by combining set efficient portfolio that further generate efficient frontier from three different kinds of assets which are stocks, bonds, and foreign currencies. After that, the author also seeking the correlation of each asset that want to invested. In this research; author will use several literature references to recognize the data analysis to be sharpened and objective. Data collection is the step where the researcher finds and collects the data. In this step, the author collect data is secondary data that mostly taken from related websites. All data collection will be taken by the same amount from period 10th October 2012 until 31th May 2014 and following the business day. Is there any available data in weekends and bank holidays will not included. Author using purposive sampling method to sorting the data sample that have been decided from the beginning of this research. Data analysis is step of processing the data that have been collected to achieve the final conclusion and recommendation of the research. This

research will be analyzed with Microsoft Excel and Solver by using Markowitz Modern Portfolio Theory. Conclusion of this research is analyzing the optimal portfolio performance consist of stocks, bonds, and foreign currencies based on Markowitz Portfolio Theory.

Data Analysis

In this research author will selected three different assets which are stocks, bonds and foreign currencies. For stock, author picking 10 stocks that listed on LQ-45 index. The first stage is collecting all companies that listed in LQ-45 from October 2012 until Mei 2014. After that is calculating their total trading value within the period of time and choose the top 10. To calculate the trading value is trading volume multiply by the price value of the stocks. The next phase is collecting their historical data for each of them. The data will be daily historical prices of each stock and take the adjusted close price because it has to be adjusted due to corporate actions, dividends, stock splits and reverse stock split.

Type of bonds that selected into the portfolio will be a retail bond that issued by Indonesian government which is Obligasi Ritel Indonesia (ORI). The retail bond that exist from October 2012 – Mei 2014 only ORI 008 and ORI 009. The different between them lies on the issue date, maturity date and coupon. The next step is collecting their daily prices and distribution date of the bond's interest. For this retail bonds, the coupon will be distributed monthly from the payment of bond until date maturity.

To selecting foreign currencies that will input into portfolio is group of hard currencies. A hard currency is expected to remain relatively stable through a short period of time, and to be highly liquid in the forex market. After determining the group of hard currencies, there selected by the currency that have positive track record against Indonesian Rupiah during October 2012 until May 2014. There only JPY that will be deleted from constructing portfolio because it has negative return. After through filtering several assets to constructing optimal portfolio, all historical data will input into Microsoft Office Excel 2010.

For summarize, these are several assets from stock, bond and currencies to constructing portfolio:

ASII	BMRI	TLKM	GBP
BBCA	KLBF	WIKA	CNY
BBNI	PGAS	USD	ORI008
BBRI	SMGR	EUR	ORI009

Risk and Return of Individual Asset

To calculate risk and return for each asset, author using arithmetic mean method. Average method assumes that the expected rate of return can be considered equal to the average of its historical value. All the data will be evaluated daily (only on business day). By using functions of AVERAGE that present average return and STDEVP that present risk, to the daily return of each asset.

		Average Mean Return	Standard Deviation
	IHSG	0.04157%	1.20564%
1	ASII	0.02085%	2.25766%
2	BBCA	0.10196%	2.02323%
3	BBNI	0.09505%	2.33210%
4	BBRI	0.11655%	2.40681%
5	BMRI	0.09700%	2.42674%
6	KLBF	0.14613%	2.33755%
7	PGAS	0.09967%	2.26725%
8	SMGR	0.03282%	2.32835%
9	TLKM	0.14806%	2.24234%
10	WIKA	0.19410%	3.29804%
11	USD	0.05187%	0.64325%
12	EUR	0.06525%	0.72133%
13	GBP	0.06355%	0.75109%
14	CNY	0.05821%	0.64492%
15	ORI008	0.02415%	0.21533%
16	ORI009	0.02075%	0.25393%

After see the result from analyzing data risk and return of each single asset from stock, bond and foreign currencies, WIKA, Wijaya Karya Tbk., generated the highest return from stock which having average daily return of 0.19410%. EUR, Euro, represent the highest return from foreign currencies by 0.06525%. and from bond, the highest return generated by ORI008 in 0.02415% daily return. After that, the lowest point of return from stock showed by ASII in 0.02085% daily return, from foreign currencies showed by USD, United States Dollar, in 0.05187%, and ORI009 in 0.02075% return per day. To identify the volatility of return's single asset will be showed by the standard deviation which means the risk indicator. The lowest risk in this portfolio, first from bond was indicated by ORI008 at risk level 0.02075%, from currencies hold by USD with 0.64325% and BBCA, Bank Central Asia Tbk., at 2.02323% level of risk from stock. For highest position of standard deviation which is the higher risk of asset held by WIKA with 3.29804% level of risk from stock, GBP, British Pound Sterling, with 0.75109% level of risk from currencies and from bond is showed by ORI009 with 0.25393% risk level.

The JCI risk and return will be a subject of comparison to the market. The daily return of JCI is 0.04157% with 1.20564% of standard deviation. This index indicates of benchmarking risk and return for all of assets in portfolio.

The Set Efficient Portfolio

To obtain the efficient portfolio, this research using MS. Excel: Solver add-ins. Markowitz's Model portfolio define the minimum risk for a certain expected return. By using solver, it can calculate the the smallest risk portfolio and the proportion of each of its assets, with consideration of maximizing or minimizing an objective function. To find the Minimum Variance Portfolio, the risk function is set to a minimum while searching for the optimal portfolio, Sharpe ratio function set on maximum points. Because in this study are not allowed to do short selling, then must added constraint for each asset with $W_i > 0$ and $i = 1$. After that, the solver will adjust the proportion of each asset until

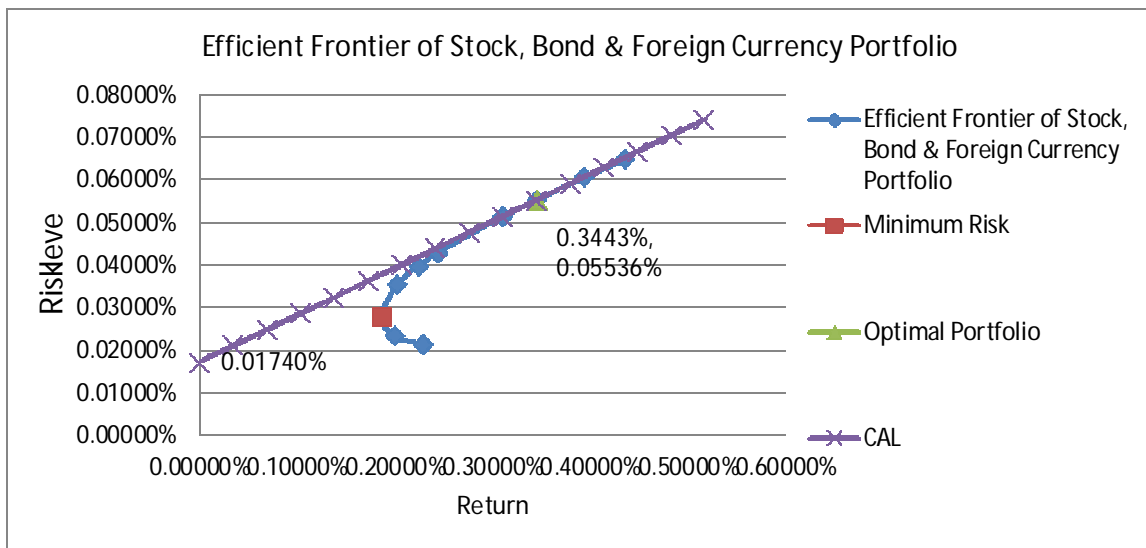
accordance within the desired objective function (the Minimum Variance Portfolio and Optimal portfolio). This picture below is the display data entry to be processed by the solver

The set efficient portfolio consisted of Minimum Variance Portfolio, Optimal Portfolio, and several set of portfolios. The Sharpe ratio indicates that the higher value will represent the better performance. The calculation is adjusted by subtracting risk-free rate from the return portfolio, then it is divided by the portfolio standard deviation. Risk-free rate using ORI009 with discount rate of 6.25% and will be divided into 12 months and divided again into 30 days.

The Author constructed 10 possible set of portfolio for each category which is stock and currency only, then mixed portfolio with two asset that have proximate risk level there will be set of portfolio that contained stock-currency and currency-bond and the last is the mixed portfolio from all of them. The purpose is to compare the return and risk of each optimal portfolio with the best proportion of asset that generated the possible of maximum return and minimum risk. To determine the optimal portfolio, author will use Solver tools from Microsoft Excel to constructing the possible weight of each asset.

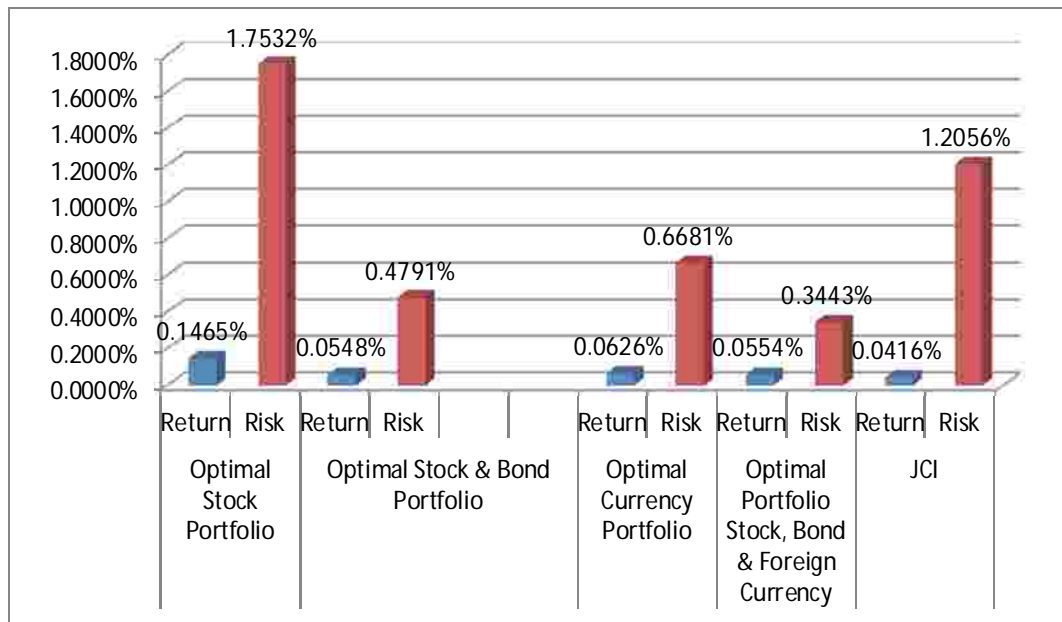
Optimal Portfolio in the Efficient Frontier Diagram

There is an optimal portfolio for each category of set efficient portfolio. Optimal Portfolio means that generate the best performance by risk-adjusted performance that measured by Sharpe ratio.



By seeing this chart, has Capital Allocation Line or called CAL. This line formed from combination of two asset portfolio which determined by the proportion of the risky asset to the risk-free asset. The line starts at the zero risk with minimum return of the risk-free asset when the entire portfolio is invested in the risk-free asset to the maximum return and risk when the entire portfolio is invested in the risky asset. In this risk-free asset, it is using the rate coupon of ORI009 which is 6.25% a year and divided into a day rate of return

Comparison Risk and Return



From the figure above, the highest daily return has generated from the optimal stock portfolio and also has the highest risk. Compare to the return from market that indicate by JCI, optimal stock portfolio gives a significant difference, it almost four times bigger that been generated from market, but the risk is not difference too much. The JCI rate of return came from the average return from all stock's company that listed in JCI, so if investor put the capital in all of the stock's company that listed in JCI, the return would be 0.0416% with 1.2056% level of risk.

Stock and Foreign Currency has big different in risk level. From the figure shows risk for stock portfolio is 1.7532% and risk for foreign currency is 0.6681% which is one-third from risk of stock portfolio. This means that stock has higher volatility compare to the price movements of foreign currency. Along with the lower risk of foreign currency, rate of return would be lower too. If stock portfolio has 0.1465% rate of return, foreign currency portfolio has 0.0626% rate of return.

Author also construct portfolio by mixing stock and bond. The result from portfolio that consisted of stock and bond has daily return 0.0548% at risk level of 0.4791%. By seeing this result, return from the stock portfolio has decrease very significant however, the risk also drop significantly into 0.4791% which is lower than the risk from foreign currency portfolio.

The next step, Author input the selected foreign currency into the latest portfolio. By seeing the figure above, it can generate optimal portfolio with the lowest risk from all category at 0.3443% level of risk. The rate of return from portfolio that consisted of foreign currency and others, it gives 0.0554%. If comparing to the stock portfolio, foreign currency reduce the rate of return by 0.1465% to 0.0554%. Although, if seen from the risk level, portfolio with foreign currency can highly leverage the risk level from 1.7532% to 0.3443%. This means foreign currency has a big impact to leverage the risk, it almost one-six reducing the risk level. Next the portfolio that input with foreign currency will compare to the portfolio that consisted only stock and bond. The rate of return shows higher than the return from optimal portfolio that consisted only of stock and bond from 0.0548% to 0.0554%. This increasing is quietly small, but the optimal portfolio that added with foreign currency gives lower risk level from 0.4791% to 0.3443%. It cause by Markowitz Portfolio Theory makes an

optimal portfolio by diversify asset with a proportion in each single asset. In this case, foreign currency has affect the diversification of asset in constructing the optimal portfolio that gives higher return and lower risk level.

The last thing is Author comparing optimal portfolio that consisted of stock, bond and foreign currency to the market risk and return. The portfolio with foreign currency gives the higher return if compare to JCI return from 0.0416% to 0.0554%. Than if compare to the risk market, the portfolio consist foreign currency with stock and bond can generate the lower risk that almost one-four reducing the risk level.

Measuring Portfolio Performance

Sharpe Ratio

Author using Sharpe ratio to measure the optimal portfolio performance that being used in previous chapter. To calculate Sharpe ratio, the required data are the rate of daily return and standard deviation from each portfolio and risk-free rate that using discount rate from ORI009 as an indicator. The discount rate will be divided into daily discount rate and it would be 0.0174%.

Optimal Stock Portfolio		Optimal Stock & Bond Portfolio				Optimal Currency Portfolio		Optimal Portfolio Stock, Bond & Foreign Currency		JCI	
Return	Risk	Return	Risk			Return	Risk	Return	Risk	Return	Risk
0.1465%	1.7532%	0.0548%	0.4791%			0.0626%	0.6681%	0.0554%	0.3443%	0.0416%	1.2056%
Sharpe ratio		Sharpe ratio				Sharpe ratio		Sharpe ratio		Sharpe ratio	
0.0736		0.0781				0.0676		0.1103		0.0200	

The table above showed that the Sharpe ratio for every optimal portfolio is higher compared to the market. It can be seen that the greatest Sharpe ratio generated by Optimal Portfolio Mix and its value has 6 times greater than the market. This Optimal Portfolio gives the best performance which means it less risk than the market but gives the higher return.

Conclusion

Higher returns get higher risk, is a common statement in investment. Generally characteristics of investors do not like risk and wanted a high expected return. The concept of investment diversification shown by Henry Markowitz can help investors to minimize the risk and give consistent effect on expected return. This diversification is the solution by placing assets in a few places that have a low risk so that there is efficient portfolio which will form the efficient frontier. Portfolios that are on the frontier is efficient portfolio share of each asset gives the possibility to produce the lowest risk or returns to the desired level of risk. To determine the portfolio with the risk-adjusted return the highest performance, the author uses Sharpe ratio as an indicator tool that shows the highest value taken as the optimal portfolio

Author has completed the analysis and successfully constructing investment portfolio on Indonesia financial instrument during period October 2012 until May 2014. The main object on this research which is foreign currency has significant effect to the investment outcome basis on risk-adjusted return. There are four composition of portfolio to analyzing which combination of asset that could generate the best performance. The first two portfolios constructed without foreign currency and the next two portfolios input the foreign currency. All the result can be seen in the table below:

Optimal Stock Portfolio		Optimal Stock & Bond Portfolio			Optimal Currency Portfolio		Optimal Portfolio Stock, Bond &		JCI	
Asset	Weight	Asset	Weight		Asset	Weight	Asset	Weight		
BBCA	6.22%	BBCA	2.00%		EUR	62.0%	BBCA	0.315%		
KLBF	32.07%	KLBF	8.08%		CNY	38.0%	BBRI	0.087%		
PGAS	14.11%	PGAS	3.34%		Total	100%	KLBF	4.796%		
TLKM	28.63%	TLKM	6.86%				PGAS	2.193%		
WIKA	18.97%	WIKA	4.85%				TLKM	4.193%		
Total	100%	ORI008	74.86%				WIKA	2.372%		
		Total	100%				EUR	23.360%		
							CNY	13.363%		
							ORI008	49.320%		
							Total	100%		
Return	Risk	Return	Risk		Return	Risk	Return	Risk	Return	Risk
0.1465%	1.7532%	0.0548%	0.4791%		0.0626%	0.6681%	0.0554%	0.3443%	0.0416%	1.2056%
Sharpe ratio		Sharpe ratio			Sharpe ratio		Sharpe ratio		Sharpe ratio	
0.0736		0.0781			0.0676		0.1103		0.0200	

By this result, conclusion can be taken about the effect of foreign currency in portfolio performance by Markowitz Portfolio Theory. The optimal portfolio that consisted of stock, bond and foreign currency can generate the best performance ratio of 0.1103 with 0.0554% rate of return at risk level 0.3443%. By input foreign currency in the portfolio, it can drive the performance from 0.0736 to 0.1103 that gives greater impact rather the portfolio combination of stock that could only raise the performance from 0.0736 to 0.0781. It is happened because foreign currency has negative correlation with stock and bond that can be seen on appendix D. Markowitz Portfolio Theory tend to choose the combination of asset with negative correlation. The conclusion is pure based from the empirical results.

Proportion assets from the best portfolio performance are BBCA (0.315%), BBRI (0.087%), KLBF (4.796%), PGAS (2.193%), TLKM (4.193%), WIKA (2.372%), EUR (23.36%), CNY (13.363%), and ORI008 (49.32%). As this results, Foreign Currency has a big contribution by generating the portfolio performance. EUR and CNY are the currencies that chosen from Markowitz Portfolio model to drive the portfolio performance.

This means that by mixing asset it successfully give the lowest risk for a given return. By Comparing to the market, the Optimal Portfolio of stock, bond and foreign currency gives the higher return than market (JCI) that is 0.0554% to 0.0416% but surprisingly the risk even lower to the market risk that is 0.3443% to 1.2056 and it is a big difference. The Sharpe ratio also indicate that Optimal Portfolio has 6 time higher that the market. The Markowitz Theory truly gives the best choice proportion of assets to generate optimal portfolio with better performance. Therefore, as an individual investor with preference on risk-adjusted return should input foreign currency to combine with stock and bond in their portfolio..

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