

# Effectiveness of Rebalancing Sector Stock's Portfolio in Indonesia Stock Exchange

Desty Prawatiningsih\*, Budi Purwanto\*\*, Tubagus Nur Ahmad Maulana\*\*

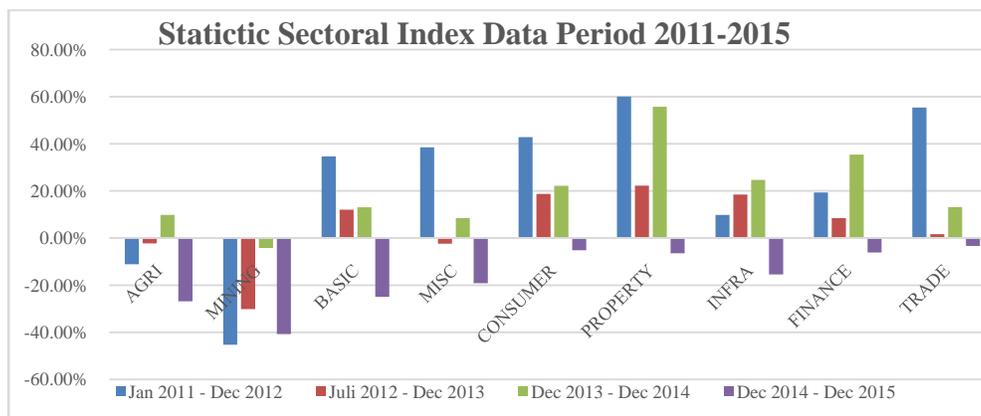
\* Science of Management, Bogor Agricultural University, Indonesia

**Abstract-** This study discusses about the effectiveness of rebalancing on the return and risk of stock portfolio from nine industrial sectors in Indonesia Stock Exchange in the period 2011-2015. When investor invest their funds, invest them in stock forms, by expecting investor could reduce their investement risks. By selecting of Markowitz investment model, resulted optimum portfolio that investor could use for rebalancing portfolio strategy. The asset allocation decision is part of a dynamic investment process, not a one-time act that can be performed and then forgotten. The financial services industry always voice out that portfolio rebalancing as a value-adding strategy. This study used monthly stock data from nine industrial sectors in Indonesia Stock Exchange. The result showed that rebalancing cuts out investment risks, but do not give rise maximum of returns. This also shown by result of wilcoxon signed rank test that there is a significant different risk between rebalancing strategy and non rebalancing strategy. The next obvious point of rebalancing is that the terminal account values of the combinations are higher than non-rebalancing strategy when market crisis (year 2015).

**Index Terms-** Rebalancing, Portfolio, Stock, Risk, Return.

## I. INTRODUCTION

Capitalmarket is an organized financial system, which is set up to trade stocks, bonds, and other types of securities with the services of the brokerage (Sunariyah, 2011: 5). Capital markets allow investors to have a variety of investment options according to their risk preferences (Husnan, 2005: 5). Investments in financial assets such as stock, classified into long-term investments that provide income or return that amount is not fixed. This indicates that investing in stocks is a risky type of investment and not a risk-free investment. Stock as an instrument of financial investment will provide returns to its investors in the form of dividends and capital gain (Tandiontong & Rusdin, 2014: 2). Indonesian government formed a stock market that Indonesian stock exchanges, with the aim to strengthen the structure of the capital market and also further to strengthen the bargaining position of Indonesia in the international business (Fahmi & Hadi, 2009: 47). Indonesia Stock Exchange consists of nine industry sectors, namely agriculture sector, mining sector, the sector of basic industry and chemical sector, miscellaneous industry sector, consumer goods industry sector, property and real estate sector, transport and infrastructure sector, financial Sector and the trade, services and investment sector. The statistics issued by the Indonesia Stock Exchange in the period 2011 to 2015, we can see the movement of the index every industry sector. The position of each index in the industrial sector moves dynamically. This reflects the movement of stocks that are grouped into industry sectors in the market is changing. According to Imelda (2014: 3) if an investor who is able to see important changes in certain sectors quickly, they can make changes to get a better portfolio investment. Tandiontong & Rusdin (2014) that analysis sector industrial investment is important, for reasons facilitate investors in determining investment choices.



Sectoral Index Statistic from Indonesia Stock Exchange, 2015

Investment theory suggest to establish a portfolio, with doing investment in some stocks and industries, which means that investors should diversify the investment (Khajar, 2011:221). Effective investment management which seeks to reduce risk and obtain optimal results. Investment analysis before making investment decisions is one form of effective asset management (Maharani, 2011:191). One step that can be done by the investor is asset allocation strategy through the establishment of sector spread investment portfolio to several industry sectors with different characteristics. The formation of sector portfolio is a part of diversification principle. Diversification is a part of application by managing risk and increasing return. Diversification is done to reduce the investment risk of a substantial loss of all funds of the investment that has been implanted. The formation of sector portfolio can be done using Markowitz portfolio model that emphasizes the relationship of return and investment risk (Natalia *et al.* 2014:1). Diversification Markowitz model is the establishment of a portfolio by considering the negative covariance and correlation coefficients between assets, in order to reduce the level of portfolio risk. This model is a basic model that often used as a reference in developing a model of optimal portfolio formation (Isyuardhana, 2013:89).

In order to obtain the effects of diversification that best manage risks and improve returns, then the process of formulating the asset allocation of the sector's portfolio should be done regularly not only done once at the beginning of the investment period, but should be done on an ongoing basis. The financial services industry always voice out that portfolio rebalancing as a value-adding strategy. Rebalancing is a portfolio adjustment periodically to restore the asset allocation to the initial composition (Putri, 2010). By doing rebalancing of sector portfolio expected formed are always in a valid and optimal conditions. Portfolio rebalancing to identify whether the asset allocation of the sector portfolio in each period are in accordance with management strategies that minimize risk and increase return (Putri, 2010:4). Based on above background, the main problem that wants to put forward in this study are:

1. How does the composition of the portfolio asset allocation Markowitz model, by combining a portfolio of stocks across sectors and how the return and risk of the combined portfolio?
2. How did the portfolio return if investors want to do rebalancing strategy?
3. What is the ratio of return and risk between rebalancing strategy monthly, semi-annually (every 6 months), annually (1 year), and without rebalancing?
4. Is there rebalancing strategy influence on the value of the investment, especially when the market is down, namely when the 2015 crisis?

## II. METHODOLOGY

To meet the goals of this research, data required stock returns from companies that are classified into nine sectors of industry in the Indonesia Stock Exchange, which consists of 525 issuers are listed. The data used are the monthly stock price data from 2011 to 2015. Besides, researchers are trying to dig up information from the literature and books as well as the results of similar studies. Data in this research through historical data available on several internet sites. For a list of issuers each industry sector from the official website of Indonesia Stock Exchange ([www.idx.co.id](http://www.idx.co.id)) while the stock price data taken from the site ([yahoo.finance.com](http://yahoo.finance.com)).

The study design begins with the calculation of stock returns are classified into nine industry sectors. The calculation of the optimal portfolio is done in two phases: first to establish the optimal portfolio of each industry sector. Thus, any issuer that has an optimal asset allocation in the portfolio of each sector, will represent the sector in the establishment of portfolio across all sectors. Processing of research data using the help of computer software, Microsoft excel as well as features excell solver which serves to provide solutions to linear equations to form the optimal portfolio.

Optimal portfolio that is formed with the composition of the asset allocation will be used as a reference in rebalancing strategy simulation. Forming a rebalancing simulation that calculates the value of investment, risk and return portfolio with monthly rebalancing strategy, six months (semiannually) and yearly (annually). Furthermore, comparing the value of return and standard deviation of each of these strategies monthly, semiannually, annually and without rebalancing strategy, we do the non parametric statistics Wilcoxon Signed Rank Test to prove the hypothesis of this study. The final step is to compare the value of the investment when the markets down in 2015, between rebalancing strategy and without rebalancing strategy. The research hypothesis in this study are following below:

- H1: there is a difference return significant monthly rebalancing strategy against non-rebalancing strategy.
- H2: there is a difference return significant semiannually rebalancing strategy against non-rebalancing strategy.
- H3: there is a difference return significant annually rebalancing strategy against non-rebalancing strategy.
- H4: there is a difference risk significant monthly rebalancing strategy against non-rebalancing strategy.
- H5: there is a difference risk significant semiannually rebalancing strategy against non-rebalancing strategy.
- H6: there is a difference risk significant annually rebalancing strategy against non-rebalancing strategy.

## PORTOFOLIO ACROSS ALL SECTOR

The movement of stock prices can be influenced by stock returns in the past (Isyuardhana, 2013:92). Thus in the conditions of dynamic market an optimal portfolio can be done by establishing portfolio across all sector. The purpose of forming a portfolio to get the composition of optimal asset allocation portfolio across all sectors. Table 1 shows the number of companies of portfolio across all sectors. There are 78 companies have a composition of assets allocation in the portfolio across all sectors.

**Table 1. Company list optimal portfolio across all sectors**

Sector	Number of Company
Agriculture	2
Basic Industry and Chemical	9
Consumer Goods Industry	6
Finance	15
Transport and Infrastructure	4
Mining	5
Miscellaneous	7
Property and Real Estate	6
Trade, Service and Investment	24

The composition of asset allocation portfolio across all sectors shows each sector contributes a different asset allocation. Table 2 presents the composition of portfolio asset allocation resulting in the formation of nine industry sectors. Trade, Service and Investment sector give the highest asset allocation 30.55% and Agricultural sector give the smallest contribution in asset allocation 1.83%.

**Table 2. Composition of Asset Allocation Portfolio Across All Sectors**

Sector	Composition Asset Allocation (%)
Agriculture	1,83
Basic Industry and Chemical	12,19
Consumer Goods Industry	7,03
Finance	23,54
Transport and Infrastructure	4,50
Mining	4,32
Miscellaneous	6,60
Property and Real Estate	9,44
Trade, Service and Investment	30,55

Portfolio across all sectors obtained average return, risk and average return against risk ratios as shown in Table 3. The average return of portfolio across all sectors is 26,64% per year. While the risk of portfolio across all sectors is 6,48% per year and average return against risk ratio is 4,11. The best portfolio is a portfolio that gives the most trade-off between risk and return obtained commonly called the reward to variability ratio (Manulang 2012:63). Based on this research we can conclude that portfolio across all sectors is an optimal portfolio.

**Table 3. Average Return, Risk and Average return to Risk Ratio for Portfolio across All Sectors**

	Portofolio (%)	Market (%)
Average return	26,64	5,4
	6,48	4,22
Average Return against Risk Ratio	4,11	1,28

### REBALANCING STRATEGY

This research using rebalancing frequency strategy by one month (monthly), six months (semiannually), and one year (annually). Portfolio rebalancing across all sectors simulation assumes an initial investment Rp. 100.000.000, - with asset allocation based on composition portfolio across all sectors. Table 4 shows the results of the calculation rebalancing strategies. The highest and the lowest average return comes from rebalancing semiannually in 2012 amounted to 33.76% per year, while the lowest in 2015 amounted to 21.86% per year. Non rebalancing strategy was given the highest average return in 2012 amounted 33.62% per year and the lowest average return in 2011 amounted 22.92% per year. It can be concluded that the average return from rebalancing strategy that is not much different from non-rebalancing strategy. The lowest risk comes from rebalancing semiannually in 2013 amounted to 0.71% per year, while the highest investment risk comes from rebalancing annually in 2015 amounted 1.60% per year. The Lowest risk for non-rebalancing strategy in 2011 amounted to 1.07% per year, while the highest risk in 2013 amounted to 2.28% per year. We can conclude that the risk of rebalancing strategy give lower risk compared with non-rebalancing. The ratio of the average return against the risk also presented on Table 4. The highest ratio in 2012 amounted to 41.35 and the lowest ratio in 2015 amounted to 13.83. The highest ratio average return against risk for non-rebalancing strategy in 2012 amounted to 30.30 and the lowest ratio average return against the risk in 2014 amounted to 11.41. Thus, the strategy rebalancing annually in 2012 is the most effective and optimal strategy.

**Table 4. Rebalancing Strategy for Portfolio across all sectors**

Period	Average Return (%)	Risk (%)	Average return against the risk ratio
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non rebalancing			
2011	22,92	1,07	21,45
2012	33,62	1,11	30,30
2013	29,30	2,28	12,85
2014	24,11	2,11	11,41
2015	25,98	2,07	12,54
monthly rebalancing			
2011	26,28	0,97	27,18
2012	30,09	0,96	31,23
2013	26,70	0,97	27,61
2014	27,29	0,97	28,04
2015	22,49	0,99	22,76
semiannually rebalancing			
2011	25,70	0,90	28,40
2012	33,76	0,94	35,95
2013	28,02	0,71	39,66
2014	27,34	0,73	37,33
2015	21,86	1,54	14,18
annually rebalancing			
2011	22,92	1,07	21,45
2012	30,28	0,73	41,35
2013	26,38	0,79	33,24
2014	24,16	1,26	19,17
2015	22,09	1,60	13,83

Overall the results of calculations rebalancing strategy presented in Table 5. The highest average return comes from rebalancing semiannually amounted 27.34% per year with investment risk 0.96% per year, and the ratio of average returns against the risk is 28.33. Semiannually rebalancing strategy is the most optimal investment strategy indicated by the highest value of the ratio average return against the risk. This research is not in line with Barnes (2012) that use rebalancing frequency by asset allocation composition of portfolio 60% stocks and 40% bonds. Results of Barnes (2012) shows the annual rebalancing strategy is the optimal strategy to get highest return and with more frequent of doing rebalancing will be followed by an increased level of investment risk.

**Tabel 5. Summary of Rebalancing Strategy**

Strategy	Average Return (%)	Risk (%)	Average return against the risk ratio
Non rebalancing	27,19	1,73	15,73
Monthly	26,57	0,97	27,34
Semiannually	27,34	0,96	28,33
Annually	25,17	1,09	23,08

### REBALANCING WHEN MARKET DOWN IN 2015

When the markets are down shows the average return from rebalancing strategy are lower than non-rebalancing. The results of simulation are presented in Table 6. The highest average return comes from monthly rebalancing strategy amounted to 22.49% per year. The average return for non-rebalancing give a higher value of 25.98% per year. The lowest risk comes from monthly rebalancing strategy by 0.99% per year and the risk for non-rebalancing is 2.07% per year. Monthly rebalancing strategy is the most effective and optimal strategy, that can be applied when the market conditions are down. The highest average return against risk ratio comes from monthly rebalancing amounted 22.76. This study is in line with Putri (2010) that rebalancing strategy cannot increasing the average return on investment, but rebalancing can reduce the level of risk that may want to limit its exposure to risk and the value of the loss can be limited to a certain level.

**Table 6. Rebalancing Strategy Result When Market Down in 2015**

Strategy	Average Return (%)	Risk (%)	Average return against the risk ratio
Non rebalancing	25,98	2,07	12,54
Monthly	22,49	0,99	22,76
Semiannually	21,86	1,54	14,18
Annually	22,09	1,60	13,83

### WILCOXON SIGNED RANK TEST FOR HYPOTHESIS

Wilcoxon signed rank test was conducted to determine whether there are significant differences in return and risk among rebalancing strategy and non-rebalancing. The hypothesis tested in this study are:

- H1: there is difference significant in return among monthly rebalancing towards non-rebalancing.
- H2: there is difference significant in return among semiannually rebalancing towards non-rebalancing.
- H3: there is difference significant in return among annually rebalancing towards non-rebalancing.
- H4: there is difference significant in risk among monthly rebalancing towards non-rebalancing.
- H5: there is difference significant in risk among semiannually rebalancing towards non-rebalancing.
- H6: there is difference significant in risk among annually rebalancing towards non-rebalancing.

Table 7 presents the calculation results SPSS for return and risk. SPSS calculation for return with asymp.sig value higher than significance level (0.05), then the hypothesis Ho is accepted and concluded there was no significant difference in return between rebalancing strategy and non-rebalancing. SPSS calculation for the risk with asymp.sig value lower than significance level (0.05). Ho hypothesis is rejected and it was concluded that there are significant differences for the risk between rebalancing strategy and non-rebalancing.

**Table 7. Result Wilcoxon Signed Rank Test**

Strategy	Asymp.sig	Conclusion
Hypothesis test to return		
Monthly	0,859	non-significant
Semiannually	0,673	non-significant
Annually	0,353	non-significant
Hypothesis test to risk		
Monthly	0,000	significant
Semiannually	0,000	significant
Annually	0,000	significant

### III. CONCLUSION

Portfolio across all sectors provides average return and risk higher better than market. The composition of asset allocation of each stock which formed in the portfolio spread in nine industrial sectors in Indonesia Stock Exchange has the same investment opportunities and worthy of inclusion into the portfolio. The results of rebalancing strategy simulation shows that rebalancing strategy give the lowers investment risk compared with no rebalancing. Rebalancing strategy does not show significant increase in the average return compared with non-rebalancing. Semiannually rebalancing strategy is the most effective and optimal investment strategy indicated by the highest value of average return against the risk ratio. When the market down in 2015 the monthly rebalancing is the most effective and optimal strategy. This strategy cannot increasing the average return when the market conditions are down. Monthly rebalancing strategy can only limit the exposure value of the investment risk and limit your losses at a certain level.

Wilcoxon signed rank test for return is not significantly different between rebalancing strategy and non-rebalancing. Wilcoxon test against the risks showed a significant difference between rebalancing strategy and non-rebalancing. Suggestions for further research that optimal Markowitz portfolio model are in static portfolio position, where the static portfolio formed only once at the beginning of the investment. Dynamic market movement can lead and changed to optimal composition asset allocation of portfolio

across all sectors. Further research to establish the optimal dynamic portfolio. Applying a rebalancing strategy to restore the composition of the asset allocation portfolio to optimal dynamic.

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#### AUTHORS

**First Author** – [desty.prawati@gmail.com](mailto:desty.prawati@gmail.com), faculty of economics and management, Bogor agricultural University  
**Second Author** – [desty.prawati@gmail.com](mailto:desty.prawati@gmail.com), faculty of economics and management, Bogor agricultural University  
**Third Author** – [desty.prawati@gmail.com](mailto:desty.prawati@gmail.com), faculty of economics and management, Bogor agricultural University

**Correspondence Author** – [desty.prawati@gmail.com](mailto:desty.prawati@gmail.com), phone : 0812-86816617.