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## Asset Allocation Based Investment Strategy to Improve Profitability and Sustainability of the SMEs

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### Abstract

SMEs usually have a volatile revenue and income stream. In order to reduce the operational risk, SMEs allocates high cash position as a buffer during difficult situation. This paper aims to increase earning from this cash position through asset allocation strategy. Asset Allocation Investment Strategy is a strategy that allocates investment among several different investment classes in certain proportions and rebalanced periodically. By keeping the same proportion in these different investment class, SMEs are forced to apply the simplified investment principle which is many time difficult to apply in reality because of market sentiment.

The author forms three portfolios consisting of stock mutual fund, bond mutual fund and money market in certain proportion into conservative, moderate and aggressive portfolio. The proportions are kept in balance through rebalancing process. Three rebalancing process are applied, which is quarterly, semi-annually, and annually. The return performance of all portfolios combined with these three rebalancing processes then will be compared each other and against the IHSG (Indonesian Stock Market Index) performance.

The research result shows that Asset Allocation Strategy with Periodically Rebalancing gives better return compared to IHSG index performance. Aggressive Portfolio with quarterly rebalancing gives superior result compared to all other portfolios. When SMEs use this strategy for profit generated from their business, SMEs can improve their profit and sustainability significantly.

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*Keywords:* SMEs Profitability; SMEs Sustainability; Asset Allocation

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## 1. Background

Entrepreneurs usually face volatility in their SMEs. Volatility in revenues, earnings, and cash flows. This paper are trying to see whether the earnings generated from the SMEs business can be enhanced certain specific investment strategy. Specifically this paper is examining the Asset Allocation Investment Strategy. It is widely known that succesful investing is not determined from how good we are looking for the best asset but it is from how we allocate asset consistently. Asset Allocation Investment Strategy is a strategy that allocates investment among several different investment classes in certain proportions and rebalanced periodically. By keeping the same proportion in these different investment classes, SMEs are forced to apply the “buy-low sell-high” principle which is many time difficult to apply in reality because of market sentiment.

The author forms three portfolios consisting of stock mutual fund, bond mutual fund and money market in certain proportion into conservative, moderate and aggressive portfolio. The proportions are kept in balance through rebalancing process. Three rebalancing process are applied, which is quarterly, semi-annually, and annually. After finding the best way how we are going to allocate asset, then authors will try to apply the suggested strategy into selected SMEs to enhanced business returns.

### Problem Identification

There are four questions to be answered in this research as follows:

- a. Does asset allocation strategy give better risk adjusted return compared to that of IDX?
- b. Does rebalancing process in asset allocation strategy affect risk adjusted return of portfolio?
- c. Which does rebalancing process give the best risk adjusted return performance?
- d. How the asset allocation strategy can be applied to enhance returns of SMEs?

## 2. Theoretical Foundation

### 2.1. Asset Allocation

Asset allocation is an investment strategy that aims to balance risk and reward by apportioning a portfolio's assets according to an individual's goals, risk tolerance and investment horizon (Bodie, Kane and Marcus, 2009). Asset allocation provides the foundation for diversifying a portfolio. Generally, investors diversify their holdings by spreading assets among companies, industries, and countries. However, asset allocation suggests that investors should also diversify their securities across a minimum of three asset classes: stocks, bonds, and liquid instruments like Treasury Bills and money market securities (Mittra, Sahu and Crane, 2007).

### 2.2. Rebalancing Process

One effective way of guarding against risk creep and maintaining a consistent investment strategy is to regularly rebalance the portfolio. This simply means periodically shifting money among the various asset classes to keep the portfolio diversification in line with the desired asset allocation strategy (Mittra, Sahu, and Crane, 2007). Rebalancing is the process of selling portions of your portfolio that have increased significantly, and using those funds to purchase additional units of assets that have declined slightly or increased at a lesser rate.

### 2.3. Risk Tolerance Profile

One of the factors that should also beware by the investor is the risk tolerance profile of the portfolio. There are three basic categorized of portfolio risk profile which are conservative portfolio, moderate portfolio, and aggressive portfolio. These three categorized of portfolios are also could determine the types of investor based on their risk tolerance profile. The author would take the Merrill Lynch risk tolerance profile because Merrill Lynch is already regarded as one of the world's premier providers of wealth management, trusted advisor, and superior execution (Campbell and Viceira, 2002).

### 2.4. Rate of return

In process of calculating risk adjusted return, the author also uses some source to get theoretical

foundations. The rate of return on an investment in a mutual fund is measure as the increase or decrease in net asset value plus income distributions such as dividends or distributions of capital gains expressed as a fraction of net asset value at the beginning of investment period (Bodie, Kane and Marcus, 2009).

$$\text{Return Portfolio} = \frac{\Delta \text{ investment value}}{\text{Investment Value}_0} \times 100\%$$

Where:

Investment value<sub>0</sub> = investment value at the beginning of period

### 2.5. Standard Deviation and Variance

Standard deviation is a measure of the dispersion of a set of data from its mean. In this research, standard deviation is used to measure the investment volatility and risk during the investment. The equation to calculate standard deviation will be listed below, as follows:

$$\sigma = \sqrt{\frac{\sum (r - \bar{r})^2}{n}}; \bar{r} = \frac{\sum_{i=1}^n r_i}{n}$$

Where:

$\sigma$  = standard deviation

$r$  = portfolio return

$\bar{r}$  = average portfolio return

$n$  = number of data calculated

### 2.6. Covariance

Covariance is the measure of the degree how much two random variables of asset move in tandem. If two variables tend to move together is called positive covariance and if it is not move in line is called negative covariance.

### 2.7. Beta ( $\beta$ )

Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole.

$$\beta = \frac{\text{Cov}(r_a, r_p)}{\text{Var } r_p}$$

Where:

$r_a$  = measures the rate of return of the asset

$r_p$  = measures the rate of return of the portfolio

$\text{Cov}(r_a, r_p)$  is the covariance between the rates of return

### 2.8. Sharpe, Treynor, and Jensen Measurement

In order to find risk adjusted return and evaluate the performance of portfolio that, Sharpe's, Treynor's and Jensen's measure are needed to generate the risk adjusted return of the investment. Sharpe's measure is

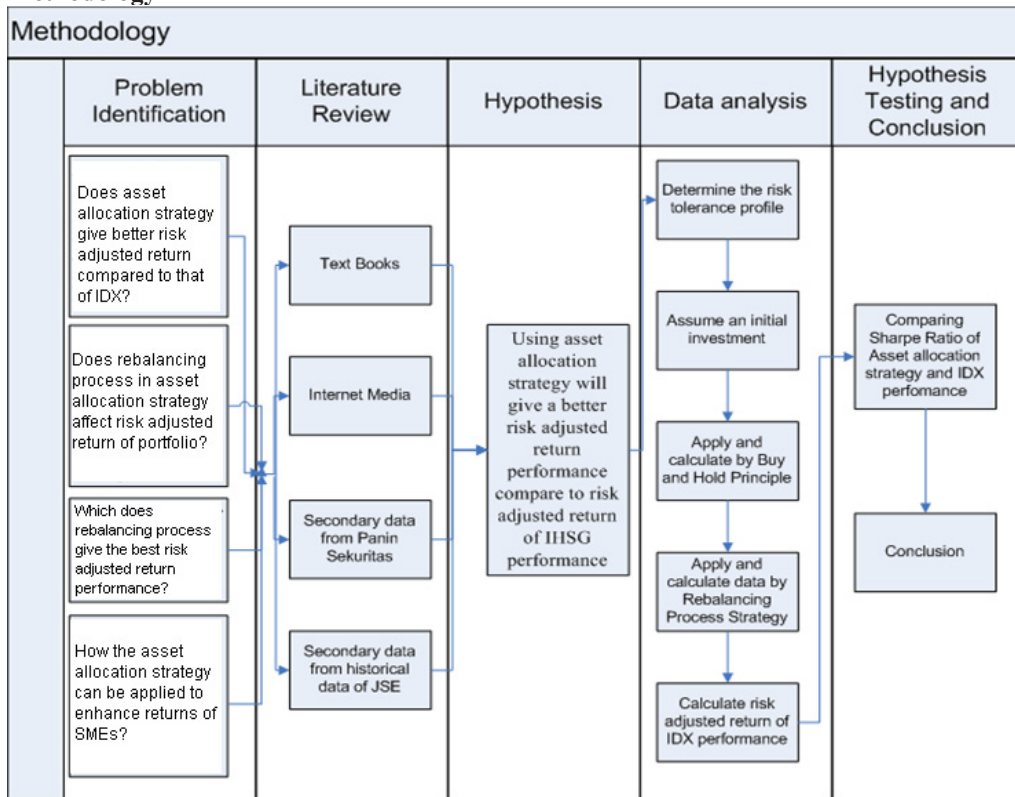
dividing average portfolio excess return over the sample period by the standard deviation of returns over that period. Sharpe ratio measures the reward to (total) volatility trade off. Treynor’s measure gives excess return per unit of risk, but uses systematic risk instead of total risk, Jensen’s measurement which is the average return on the portfolio over and above that predicted by CAPM, given the portfolio’s beta and the average market return. Jensen’s measure is the portfolio’s alpha value (Bodie, Kane and Marcus, 2009).

$$Sharpe: S_i = \frac{\bar{R}_i - \bar{R}_{fr}}{\sigma_i} \quad Treynor: T_i = \frac{\bar{R}_i - \bar{R}_{fr}}{\beta_i} \quad Jensen: \alpha = \bar{r}_p - (r_{fr} - (r_m - r_{fr})\beta)$$

Where:

- $r_p$ = return portfolio
- $r_m$ = return market
- $r_{fr}$  = risk free rate
- $\beta_p$ = beta portfolio
- $\sigma_p$ = standard deviation portfolio

### 3. Methodology



All data in this paper use secondary data from IDX data base and Panin Securities.

#### 3.1. First Step: Determine the proportion of asset allocation strategy that would be applied

The composition of the asset allocation strategy that applied for this research that taken from Merrill Lynch is, as follows:

Table 1. Risk of Tolerance Profile

Types of Investor	Proportions of asset allocation strategy		
	Panin Dana Maksima (Stock Mutual Fund)	Panin Dana Utama Plus 1 and 2 (Bond Mutual Fund)	Cash and Equivalent
Conservative	45%	35%	20%
Moderate	55%	40%	5%
Aggressive	75%	20%	5%

### 3.2. Second Step: Assume the initial capital to be invested

In order to simplify the calculation, the author makes the assumption of 100 million IDR to be invested as the initial value for each type of investor.

### 3.3. Third Step: Apply 'Rebalancing Process' strategy

The investment capital will be allocated in accordance with the risk profile portfolios (conservative, moderate, and aggressive). Rebalancing processes will be applied for quarterly, semiannually and annually. The risk adjusted returns resulted from rebalancing processes will be compared against each other.

### 3.4. Fourth Step: calculate risk and return profile of IDX in 2005-2009

In this step, the average monthly and yearly risk adjusted return for IDX performance will be calculated through Sharpe, Treynor, and Jensen ratio. Then, the risk adjusted return using Sharpe, Treynor, and Jensen Ratio of IDX will be compared to buy-and-hold strategy and then compared to the overall strategy.

## 4. Analysis

### 4.1. Risk Adjusted Return of Asset Allocation Strategy with Periodical Rebalancing

Risk adjusted return of asset allocation strategy will be calculated based on three methods of rebalancing which are quarterly, semiannual, annually rebalancing.

#### 4.1.1. Rebalancing Quarterly

The first rebalancing process will be done for each three months period. The process of rebalancing is purposing to re-adjust the proportion of portfolio back into the original allocation. The table of return per month, standard deviation, and risk adjusted return ratio using quarter rebalancing, can be seen in Table 2.

The result of Sharpe ratio with quarter rebalancing based on yearly basis is differ from the monthly basis one. The most profitable portfolio is the aggressive one which generates average annual return of 28.97 percent during investment period 2005-2009. However after comparing with the risk, the best portfolio is the conservative one which is shown by the largest Sharpe Ratio (0.6814332) and Treynor Ratio (0.4707). The conservative portfolio could generate the highest number of Sharpe Ratio because it generates the lowest risk during the investment compared to others. However in Jensen measurement, the best portfolio is shown by the aggressive one.

Table 2. Summary of Quarter Rebalancing Based on Monthly Basis

Portfolio Types	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
Quarter Rebalancing	1.615%	3.612%	1.769%	4.294%	2.176%	5.047%
Sharpe Ratio	0.2971		0.2858		0.3237	
Covariance	0.0025		0.00297		0.00346	
Beta	0.3976		0.4724		0.5519	
Treynor Ratio	0.02699		0.02597		0.02961	
Jensen Ratio	0.526%		0.577%		0.875%	

In yearly basis, the similar table can be seen bellow:

Table 3. Summary of Quarter Rebalancing Based on Yearly Basis

Type of Investor	Conservative		Moderate		Aggressive	
Rebalancing Strategy	Annual Return	$\sigma$	Annual Return	$\sigma$	Annual Return	$\sigma$
2005	13.72%		14.73%		17.93%	
2006	36.65%		42.32%		50.18%	
2007	16.05%		17.77%		20.22%	
2008	-7.86%		-11.52%		-17.02%	
2009	50.11%		60.15%		73.53%	
Average Annual Return	21.74%	22.36%	24.69%	27.51%	28.97%	34.46%
Sharpe Ratio	0.6814332		0.6613473		0.6520094	
Covariance	0.0871		0.1071		0.1345	
Beta Portfolio	0.3237		0.3983		0.5	
Treynor Ratio	0.4707		0.4567		0.4493	
Jensen Ratio	7.127%		8.21%		9.94%	

#### 4.1.2 Rebalancing Semiannually

This section is similar to the previous subchapter that discuss for return, standard deviation, and Sharpe, Treynor, and Jensen ratio, however in this subchapter the process of rebalancing will be done in each six months period. Below is the result table of return per month, standard deviation, and risk adjusted return measurement using semiannually rebalancing, as in Table 4.

Based from the table 4., the average monthly return and standard deviation is normally that the more aggressive the portfolio, the more profitable and riskier it is. However seen from the Sharpe result, the conservative portfolio shows the best result for its Sharpe compared to the moderate and aggressive portfolio because in moderate and aggressive portfolio the increase of the profit is smaller than the increase of the portfolio volatility. For the Treynor Ratio, the highest number is also shown by conservative portfolio, and by Jensen measurement, the best performance using semiannual rebalancing is shown by investing in an aggressive portfolio.

Table 4. Summary of Semiannual Rebalancing Based on Monthly Basis

Portfolio Types	Conservative		Moderate		Aggressive	
Semiannual Rebalancing Strategy	Average Monthly Return	$\sigma$	Average Monthly Return	$\sigma$	Average Monthly Return	$\sigma$
	1.638%	3.870%	1.823%	4.679%	2.071%	5.703%
Sharpe Ratio	0.2833		0.2738		0.2683	
Covariance	0.0027		0.0033		0.0040	
Beta Portfolio	0.4305		0.5215		0.6385	
Treynor Ratio	0.0255		0.0246		0.0240	
Jensen Ratio	0.5041%		0.5638%		0.6518%	

Table 5. present the Sharpe ratio using semiannual rebalancing, the result shows that by doing semiannual rebalancing, investor should invest their money in conservative portfolio because it will generate the best risk adjusted return using Sharpe Ratio (0.6376702) and Treynor Ratio (0.43739) compared to other portfolio. However in Jensen ratio, the best investment performance during 2005-2009 is the aggressive portfolio.

Table 5. Summary of Semiannual Rebalancing Based on Yearly Basis

Portfolio Types	Conservative		Moderate		Aggressive	
Semiannual Rebalancing Strategy	Average Annual Return	$\sigma$	Average Annual Return	$\sigma$	Average Annual Return	$\sigma$
		22.121%	24.497%	25.219%	30.084%	29.725%
Sharpe Ratio	0.6377		0.6222		0.6151	
Covariance	0.09604		0.11807		0.14824	
Beta Portfolio	0.35715		0.43905		0.55126	
Treynor Ratio	0.43739		0.42634		0.42131	
Jensen Ratio	6.6745%		7.7203%		9.4162%	

#### 4.1.3 Rebalancing Annually

The last section of rebalancing strategy is annual rebalancing. By annual rebalancing the investor will be more passive in managing and adjusting the portfolio because only done once a year. Below is the table that shows the result of the average monthly return, standard deviation, and risk adjusted return measurement, in Table 6.

Seen from the Table 6., it can be concluded that investor should choose a conservative or moderate portfolio model if they want to use annual rebalancing for their portfolio. Moderate portfolio performs the best result for its risk adjusted return based on Sharpe ratio (0.3066), Treynor (0.0274). For Jensen measurement the best portfolio is the aggressive one which generates the highest Jensen number (0.8801%).

Table 6 Summary of Annual Rebalancing Based on Monthly Basis

Portfolio Types	Conservative		Moderate		Aggressive	
Annual Rebalancing Strategy	Average Monthly Return	$\sigma$	Average Monthly Return	$\sigma$	Average Monthly Return	$\sigma$
		1.713%	3.923%	2.015%	4.805%	2.284%
Sharpe Ratio	0.2985		0.3066		0.2976	
Covariance	0.0027		0.0034		0.0041	
Beta Portfolio	0.4365		0.5377		0.6586	
Treynor Ratio	0.02683		0.0274		0.0265	
Jensen Ratio	0.5707%		0.7336%		0.8363%	

In yearly basis, the calculation of the annual return is based on the total investment at the end of each year minus by total investment in the beginning of year divided by total investment in the beginning of the year. The result of the calculation will be shown, in Table 7.

Table 7 Summary of Annual Rebalancing Based on Yearly Basis

Portfolio Types	Conservative		Moderate		Aggressive	
Annual Rebalancing Strategy	Average Annual Return	$\sigma$	Average Annual Return	$\sigma$	Average Annual Return	$\sigma$
		23.925%	26.204%	27.168%	31.928%	31.851%
Sharpe Ratio	0.6650		0.6473		0.6374	
Covariance	0.1018		0.1243		0.1553	
Beta Portfolio	0.3785		0.4623		0.5774	
Treynor Ratio	0.4604		0.4471		0.439	
Jensen Ratio	7.943%		9.087%		10.886%	

Table 7 shows the result of annually rebalancing based on yearly basis. The result is similar with monthly basis calculation which the Sharpe and Treynor ratio of conservative portfolio shows the best performance among the moderate and aggressive portfolio because the volatility of moderate and aggressive portfolio is quite higher. However if it is measured using Jensen Ratio, the risk adjusted return of conservative portfolio is underperform compared with the aggressive.

4.2. *IDX Performance*

The result of Sharpe and Treynor Ratio on IDX performance will be different compared to analysis for rebalancing strategy because the result is not divided into three kinds of portfolios. The result comes from the whole investment fund allocated in IDX stock market. Below is the table that presents average monthly return, standard deviation, and risk adjusted return ratio of IDX performance:

Table 8. Summary of IDX Performance (Monthly Basis)

IDX Performance	Average Monthly Return	$\sigma$
		1.917%
Sharpe Ratio	0.1736	
Treynor Ratio	0.01376	

Based on Table 8 and Table 9., investing in accordance with IDX stock market generate positive and high return for the investment, however if seen from the Sharpe and Treynor ratio, it is not an appropriate investment strategy because the volatility of risk (standard deviation and beta) is high so the result for risk adjusted return of IDX performance is not very good. In market performance, Jensen measurement is not calculated because Jensen Ratio is an alpha that only measure for the return portfolio minus expected return market.

4.3. *All portfolio performance comparison with all methods of rebalancing.*

In this section, the author will discuss and compare the result of risk adjusted return using Sharpe measurement among rebalancing strategy of three months, six months, and twelve months period. Below is the table that presents the result:



Table 9. Summary of IDX Performance (Yearly Basis)

IHSG Performance			
Date	Price	Annual Return	$\sigma$
1-Jan-05	1000.88		
30-Dec-05	1162.64	16.16%	
28-Dec-06	1805.52	55.29%	
29-Nov-07	2688.33	48.90%	
30-Dec-08	1355.41	-49.58%	
30-Dec-09	2534.36	86.98%	
Average Annual Return		31.55%	0.5186
Sharpe Ratio		0.4831	
Treyner Ratio		0.2505	

Table 10 Comparison of Risk Adjusted Return Using Quarter, Semiannual and Annual Rebalancing Process (Monthly Basis)

Rebalancing Process						
Quarter Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	1.615%	3.612%	1.769%	4.294%	2.176%	5.047%
Beta Portfolio	0.3976		0.4724		0.5519	
Sharpe	0.2971		0.2858		0.3237	
Treyner Ratio	0.027		0.026		0.0296	
Jensen Ratio	0.526%		0.577%		0.875%	
Semiannual Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	1.638%	3.870%	1.823%	4.679%	2.071%	5.703%
Beta Portfolio	0.4305		0.5215		0.6385	
Sharpe	0.3035		0.2984		0.303	
Treyner Ratio	0.0255		0.0246		0.024	
Jensen Ratio	0.504%		0.564%		0.652%	
Annual Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	1.713%	3.923%	2.015%	4.805%	2.284%	5.855%
Beta Portfolio	0.3729		0.5377		0.6586	
Sharpe	0.2985		0.3066		0.2976	
Treyner Ratio	0.0268		0.0274		0.0265	
Jensen Ratio	0.571%		0.734%		0.836%	

From table 10 above, it shows that the best portfolio is aggressive allocation with quarterly rebalancing. Based on the annual return comparison the more frequent we do rebalancing the better the result is.

The comparison of average annual return, standard deviation, and Sharpe ratio for three different periods of rebalancing processes can be seen in the Table 11.

Table 11. Comparison of Risk Adjusted Return Using Quarter, Semiannual and Annual Rebalancing Process (Yearly Basis)

Rebalancing Process						
Quarter Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	21.737%	22.360%	24.691%	27.506%	28.967%	34.457%
Beta Portfolio	0.3237		0.3983		0.5	
Sharpe	0.6814		0.6613		0.652	
Treynor Ratio	0.4707		0.4567		0.4493	
Jensen Ratio	7.127%		8.214%		9.940%	
Semiannual Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	22.121%	24.497%	25.219%	30.084%	29.725%	37.760%
Beta Portfolio	0.3571		0.4391		0.5513	
Sharpe	0.6377		0.6222		0.6151	
Treynor Ratio	0.4374		0.4263		0.4213	
Jensen Ratio	6.674%		7.720%		9.416%	
Annual Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	23.925%	26.204%	27.168%	31.928%	31.851%	39.774%
Beta Portfolio	0.3785		0.4623		0.5774	
Sharpe	0.665		0.6473		0.6374	
Treynor Ratio	0.4604		0.4471		0.439	
Jensen Ratio	7.943%		9.087%		10.886%	

Based on the annual return calculation, the best portfolio is the conservative allocation with quarter rebalancing shown by Sharpe and Treynor Ratio. The more frequent we do rebalancing it is also the better.

#### 4.4. Performance comparison between all portfolios and IDX

The performance comparison between all portfolios and IDX is summarized in the Table 12 as follows:

Table 12. Comparison of Risk Adjusted Return Using Rebalancing Process and IDX Performance (Monthly Basis)

Rebalancing Process						
Quarter Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	1.62%	3.61%	1.77%	4.29%	2.18%	5.05%
Beta Portfolio	0.3976		0.4724		0.5519	
Sharpe	0.2971		0.2858		0.3237	
Treynor Ratio	0.027		0.026		0.0296	
Jensen Ratio	0.53%		0.58%		0.88%	
Semiannual Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	1.64%	3.87%	1.82%	4.68%	2.07%	5.70%
Beta Portfolio	0.4305		0.5215		0.6385	
Sharpe	0.3035		0.2984		0.303	
Treynor Ratio	0.0255		0.0246		0.024	
Jensen Ratio	0.50%		0.56%		0.65%	
Annual Rebalancing	Conservative		Moderate		Aggressive	
	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)	Average Monthly Return	$\sigma$ (monthly)
	1.71%	3.92%	2.02%	4.81%	2.28%	5.86%
Beta Portfolio	0.3729		0.5377		0.6586	
Sharpe	0.2985		0.3066		0.2976	
Treynor Ratio	0.0268		0.0274		0.0265	
Jensen Ratio	0.57%		0.73%		0.84%	
IDX Performance	Average Monthly Return	$\sigma$ (monthly)				
	1.92%	7.92%				
Beta Portfolio	1					
Sharpe	0.1736					
Treynor Ratio	0.01376					

Based on monthly basis calculation, all portfolios gives better risk adjusted return compared to IDX performance. Quarterly rebalancing gives the best risk adjusted return result among all portfolios.

Table 13. Comparison of Risk Adjusted Return Using Rebalancing Process and IDX Performance (Yearly Basis)

Rebalancing Process						
Quarter Rebalancing	Conservative		Moderate		Aggressive	
	Average Annual Return	$\sigma$ (yearly)	Average Annual Return	$\sigma$ (yearly)	Average Annual Return	$\sigma$ (yearly)
	21.74%	22.36%	24.69%	27.51%	28.97%	34.46%
Beta Portfolio	0.3237		0.3983		0.5	
Sharpe	0.6814		0.6613		0.652	
Treynor Ratio	0.4707		0.4567		0.4493	
Jensen Ratio	7.127%		8.214%		9.940%	
Semiannual Rebalancing	Conservative		Moderate		Aggressive	
	Average Annual Return	$\sigma$ (yearly)	Average Annual Return	$\sigma$ (yearly)	Average Annual Return	$\sigma$ (yearly)
	22.12%	24.50%	25.22%	30.08%	29.73%	37.76%
Beta Portfolio	0.3571		0.4391		0.5513	
Sharpe	0.6377		0.6222		0.6151	
Treynor Ratio	0.4374		0.4263		0.4213	
Jensen Ratio	6.674%		7.720%		9.416%	
Annual Rebalancing	Conservative		Moderate		Aggressive	
	Average Annual Return	$\sigma$ (yearly)	Average Annual Return	$\sigma$ (yearly)	Average Annual Return	$\sigma$ (yearly)
	23.93%	26.20%	27.17%	31.93%	31.85%	39.77%
Beta Portfolio	0.3785		0.4623		0.5774	
Sharpe	0.6650		0.6473		0.6374	
Treynor Ratio	0.4604		0.4471		0.439	
Jensen Ratio	7.943%		9.087%		10.886%	
IDX Performance	Average Annual Return	$\sigma$ (yearly)				
	0.3155021	0.5185659				
Beta Portfolio	1					
Sharpe	0.483066987					
Treynor Ratio	0.250502059					

Based on yearly basis calculation, all portfolios gives better risk adjusted return compared to IDX performance. Quarterly rebalancing gives the best risk adjusted return result among all portfolios.

#### 4.5. Application for SMEs to Enhance Return and Sustainability:

Asset allocation Strategy in this paper can be applies to some situation in the SMEs to improve profit margin. The business analysis calculations are applied for two (2) SMEs in the agribusiness sector: Handoyo Budi Orchids and Prabu Bestari Grape Farms. The summary of calculation can be seen in the Table 14 and 15 bellow:

**Table 14. Business Analysis Dendrobium Orchid - Handoyo Budi Orchids**

(Source: Lubis, Rusanti, Majalah Pengusaha, January 2009 Edition)

#### I Cost of Production

##### A. Production Facilities

1	Seed	200	bottle	13,000	2,600,000
2	Media	100	bag	17,500	1,750,000
3	Pesticide	1	bag	250,000	250,000
Total					4,600,000

##### B.Tool

1	Seeding Pot	20	kg	4,000	80,000
2	Blooming Size Pot	6000	ea	750	4,500,000
3	Knapsack sprayer	1	ea	250,000	250,000
4	Thermometer	1	ea	100,000	100,000
5	Basket	4	ea	5,000	20,000
6	Scissor	1	ea	30,000	30,000
7	Wire	5	kg	8,000	40,000
8	Plastic Drum	1	ea	50,000	50,000
9	Sprayer	1	ea	30,000	30,000
Total					5,100,000

##### C. Labor

1 (one) man 30 month 400,000 12,000,000

D. Building ± 200 m<sup>2</sup> 1 5,000,000 5,000,000

E. Plant racks 1 5,000,000 5,000,000

F. Miscellaneous 1 1,200,000 1,200,000

23,200,000

TOTAL COST = A + B+ C+ D+ E+ F

32,900,000

#### II Revenue

Selling the plant at 1,5-2,5 year (assumption : 1 bottle = 30 plants)

200 bottle x 30 plants = 6,000 plants @ IDR 15,000 = IDR

90,000,000

#### III Net Profit

= IDR 90,000,000 - IDR 32,900,000 = IDR 57,100,000

Note:

The analysis is valid for land area of 250 m<sup>2</sup>-300 m<sup>2</sup>

This monthly net profit can be resulted after 2.5 years

**Table 15 Business Analysis Prabu Bestari Grape Farm (1 Hectare scale)**  
(Source: Lubis, Rusanti, *Majalah Pengusaha*, January 2009 Edition)

### I. Input Cost Year 1

#### A. Material

1	Seed	625	tree	10,000	6,250,000
2	Urea	350	kg	2,000	700,000
3	ZA	350	kg	2,000	700,000
4	SP-36	175	kg	2,500	437,500
5	Compost Fertilizer	25,000	kg	150	3,750,000
6	Insecticide	6	lt	80,000	480,000
7	Fungicide	10	kg	40,000	400,000
8	KCl	175	kg	2,250	393,750
9	ZPT/PPC	6	lt	50,000	300,000
10	Bamboo	1,500	tree	10,000	15,000,000
11	Wire	750	kg	10,000	7,500,000
12	Nail	75	kg	7,500	562,500
13	Sand	6	pick up	60,000	360,000
14	Fence	1,375	ea	8,000	11,000,000

Total

47,833,750

#### B. Labor

1	Preparation	135	mandays	15,000	2,025,000
2	Palnting	8	mandays	15,000	120,000
3	Fertilizing	180	mandays	15,000	2,700,000
4	Watering	180	mandays	15,000	2,700,000
5	Desease Control	65	mandays	15,000	975,000
6	Fencing	528	mandays	15,000	7,920,000

Total

16,440,000

#### C. Others

Land lease

15,000,000

Total Input Cost Year 1

IDR 47,833,750 + IDR 16,440,000 + IDR 15,000,000 = IDR 79,273,750

### II. Input Cost Year 2

#### A. Material

1	Urea	1,000	kg	2,000	2,000,000
2	ZA	600	kg	2,500	1,500,000
3	SP-36	600	kg	2,250	1,350,000
4	Composting	7,500	kg	150	1,125,000
5	Insecticide	15	lt	80,000	1,200,000
6	Fungicide	30	kg	40,000	1,200,000
7	ZPT/PPC	10	lt	50,000	500,000

Total

8,875,000

**B. Labor**

1	Fertilizing	100	mandays	15,000	1,500,000
2	Pruning	150	mandays	15,000	2,250,000
3	Roof maintenance	150	mandays	15,000	2,250,000
4	Watering	50	mandays	15,000	750,000
5	Thinning	100	mandays	15,000	1,500,000
6	Harvesting	450	mandays	15,000	6,750,000
Total					15,000,000

Total Cost Year II

IDR 8,875,000 + IDR 15,000,000 = IDR 23,875,000

Total Cost Year 1 and 2

IDR 79,273,750 + IDR 23,875,000 103,148,750

**III. Production Year I and II**

3x harvest 5 kg per tree x 625 trees x selling price

3 x 5 kg x 625 x IDR 15,000 140,625,000

**IV. Profit = income - total costs**

37,476,250

**V. Benefit Cost Ratio = income ÷ total cost**

IDR 140,625,000 ÷ IDR 103,148,750 1.36

Notes:

After two (2) years the production is increased 100 % while production cost only increase 5 %

Cost of Production 108,306,188

Revenue 281,250,000

Profit per year 172,943,813

Average profit per month after year 2 **14,411,984**

Based on the business analysis above, the author try to enhance profit margin using moderate asset allocation strategy combined with the quarter rebalancing that gives the monthly return of 1.769 percent. The result of this profit enhancement can be seen in the Table 16 and 17

Table 16. Summary of Profit Enhancement for Handoyo Budi Orchid

Asset Allocation Periode		Monthly Annuity (IDR)	Interest Factor (Annuity) $r = 1.769\%$	Net Profit After Investing (IDR)	Net Profit Without Investing (IDR)	Improved Accumulated Profit Difference
Year	Month					
1	12	57,100,000	13.239	755,946,900	685,200,000	70,746,900
2	24	57,100,000	29.579	1,688,960,900	1,370,400,000	318,560,900
3	36	57,100,000	49.745	2,840,439,500	2,055,600,000	784,839,500
4	48	57,100,000	74.635	4,261,658,500	2,740,800,000	1,520,858,500
5	60	57,100,000	105.354	6,015,713,400	3,426,000,000	2,589,713,400

Table 17 Summary of Profit Enhancement for Prabu Bestari Grape Farm

Asset Allocation Periode		Monthly Annuity (IDR)	Interest Factor (Annuity) $r = 1.769\%$	Net Profit After Invested (IDR)	Net Profit Without Invested (IDR)	Improved Accumulated Profit Difference
Year	Month					
1	12	14,411,984	13.239	190,800,256	172,943,808	17,856,448
2	24	14,411,984	29.579	426,292,075	345,887,616	80,404,459
3	36	14,411,984	49.745	716,924,144	518,831,424	198,092,720
4	48	14,411,984	74.635	1,075,638,426	691,775,232	383,863,194
5	60	14,411,984	105.354	1,518,360,162	864,719,040	653,641,122

From the tables above, the profit margin of each business can be improved significantly. The longer the time horizon for asset allocation application, the greater the improvement of profit margin as a result. After five years period, the profit margin can be improved almost twice.

## 5. Conclusion

Asset allocation strategy can improve return of investment portfolio. From the risk adjusted return portfolio through Sharpe, Treynor, and Jensen measurement, this strategy also shows better result compared to market return. From three rebalancing processes, the quarterly rebalancing seems to give the best result among all risk profile portfolios. It can be concluded that the asset allocation investment strategy with regular rebalancing process can apply effectively the “buy low and sell high” principle.

This investment strategy can be applied to enhance return resulted from SMEs operation. Using moderate asset allocation and quarter rebalancing the profit can be improved significantly as time goes by.

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