Value of perfect information in stock picking

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Abstract. Portfolio picking is an important aspect in investment management. Before deciding what stock to pick, an investor will consider many aspects of the stock, the fundamental and the trend of the market. Knowing what to expect is an important science and art in investment. Expected value of perfect information – EVPI is the difference between two payoff that predicted to be the best of some certain condition. For portfolio management, we could employ Capital Asset Pricing Model to provide clearer view of each securities and using treynor ratio to optimize the investment result. Description in this paper about performance analysis of stocks in LQ-45 index in Indonesian Stock Index in 1-st quartil period of 2015, based on return and risk to reach the group of stocks which optimum using the model of Capital Asset Pricing Model (CAPM). Our finding suggests that using CAPM and Treynor Ratio analysis could optimize the portfolio outcome, while changing business and economic environment create limitation on the portfolio.

1. Introduction
Maximizing return at some point of risk is the ultimate goal of any portfolio manager. Investment in stock market gaining traction in Indonesia as Indonesia stock exchange reopened again in 1977. Since then, Indonesian company have new way to raise the capital directly from financial market.

There are so many benefits of being present in capital market. By selling the stock to public, company reach the fund from stock market. The purpose of using the fund are vary, from funding for expansion, fix the structure of capital, refinance the previous debt or even an exit strategy for current shareholders.

On the process, Investments always have risks. Investors certainly will minimize the potential loss on the investment. Hence, knowing risk level and what to expect from investment is an integral part on investment process.

Before picking the stock for portfolio, we need to measure the potential risk and return. In common investment practice, the more expected return we desire, the more risk we need to tackle with.

Well diversified portfolio is a common practice, as conventional wisdom tells us that “never put all your eggs in one basket”. Prior to portfolio construction, gaining information on the expectation of future situation is an important thing to do. Nowadays, we could easily find many analyses on the prospective stock, and it should help portfolio manager to mixed the composition based on their own risk appetite.

The main duty of portfolio manager is finding the best mix for the investor. Portfolio manager hold some securities for a period of time, hoping for above benchmark investment return. The manager will rotate the portfolio based on his expectation on possible future outcome of an investment. Back to the concept of duality both in Mathematics and Economics, portfolio investor could aiming for maximum expected return subject to a level of desirable risk, or minimize the risk subject to a certain level of expected return.
Formally, in finance, Harry Max Markowitz in the early 1950 develop a portfolio theory to maximize potential return on investment. He shows a method to measure the risk and combine it to gain maximum advantages for the portfolio. In general, measuring the stock value is not only understanding the potential return, but also understanding the risk that bear behind the securities.

In practice, higher investment returns usually come with higher risk, vice versa. One of the most common models in financial market is Capital Asset Pricing Model (CAPM), which was introduced at 1950s. CAPM is an equilibrium model which measure the relevant risk on an asset and return to expect. An important function on CAPM is providing benchmark rate of return on some securities.

2. Theoretical Framework

Capital Asset Pricing Model (CAPM) were used to understand the appropriate return desired on an asset. In practice, this theory could be used to find the optimum portfolio from a set of stock investment. Using the data from Indonesia Composite Index (IHSG), we will use formulation as explained below to calculate the rate of return:

2.1. Individual Stock Return

\[ R_i = \frac{P_t - P_{t-1}}{P_{t-1}} \]  

Where:
- \( R_i \) = return of the i-th stock
- \( P_t \) = stock price at period t
- \( P_{t-1} \) = stock price at period t-1

2.2. Risk-free Return (\( R_f \))

Bank Indonesia interest rate as risk-free return, have fluctuated interest rate based on time determine. SBI interest rate taken based on fixed time period. SBI interest rate taken from time period of taken the stock. In this analysis, we use interest rate 7.50% which is final observation of SBI.

2.3. Market Rate of Return

Market Return or index of market prices represented by Compound Stock Price Index (IHSG). So that, market return can be determine by the following:

\[ R_m = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}} \]  

Where:
- \( R_m \) = market return
- \( IHSG_t \) = stock price index of compound stock price at period t
- \( IHSG_{t-1} \) = stock price index of compound stock price at period t-1

With level of expected return, we reach the following formula:

\[ E(R_m) = \frac{\Sigma R_m}{n} \]  

2.4. Systematic Risk \( \beta \)

To measure the systematic risk \( \beta \) (risk of relative asset to market), value of \( \sigma_{im} \) divided by variance of market return \( \sigma_m^2 \):

\[ \beta = \frac{\sigma_{im}}{\sigma_m^2} \]  

CAPM model gives accurate prediction about relation of return and risk. CAPM model uses beta which relate return and risk.
2.5. *Return rate CAPM*

\[ k_i = R_F + \beta_i [E(R_M) - R_F] \]  \hspace{1cm} (5)

Where:
- \( k_i \) = return rate which require by investor on i-securities.
- \( E(R_M) \) = market portfolio returns which is expected
- \( \beta_i \) = coefficient of beta securities
- \( R_F \) = return of risk-free rate

3. *Method*

In this research, we use secondary historical data which regularly posted in stock exchange. For analysis, we use 3 years of data from 2012 to 2014. The data consist of monthly closing price of LQ-45 index, Indonesia Composite Index (IHSG) and data of Indonesian Bank Interest Rate (SBI) as a proxy of risk free assets in Indonesia capital market.

Main analysis in this research are about the risk and return of investments. Expected return is the desired capital appreciation investors expect from an investment, while the risk is chance of different investment outcome.

This paper is discussing about the performance of stock which is included in LQ-45 index in Indonesia stock market in 1st quarter of 2015. Step on this research are:

a. Determining the systematic risk
b. Determining expected return of each stock
c. Determining selected stock security market line
d. Determining selected and not selected stock
e. Choosing optimum portfolio

4. *Result and Discussion*

4.1. *Constructing Portfolio*

Based on data, we find this result:

4.1.1. *The \( \beta \) value of each stock*

| No. | Stock | Beta | No. | Stock | Beta | No. | Stock | Beta |
|-----|-------|------|-----|-------|------|-----|-------|------|
| 1   | AALI  | 0.75 | 16  | CTRA  | 1.68 | 31  | PGAS  | 0.90 |
| 2   | ADHI  | 1.60 | 17  | EXCL  | 0.77 | 32  | PTBA  | 1.03 |
| 3   | ADRO  | 1.04 | 18  | GGRM  | 0.96 | 33  | PTPP  | 1.62 |
| 4   | AKRA  | 1.10 | 19  | HRUM  | 0.71 | 34  | PWON  | 1.49 |
| 5   | ASII  | 1.40 | 20  | ICBP  | 1.01 | 35  | SMGR  | 1.45 |
| 6   | ASRI  | 1.68 | 21  | INDF  | 0.92 | 36  | SMRA  | 1.56 |
| 7   | BBCA  | 1.13 | 22  | INTP  | 1.35 | 37  | SSIA  | 1.76 |
| 8   | BBNI  | 1.36 | 23  | ITMG  | 0.78 | 38  | TBIG  | 0.48 |
| 9   | BBRI  | 1.51 | 24  | JSMR  | 0.82 | 39  | TLKM  | 1.13 |
| 10  | BDMN  | 0.84 | 25  | KLBF  | 1.07 | 40  | UNTR  | 1.23 |
| 11  | BKSL  | 1.34 | 26  | LPKR  | 1.31 | 41  | UNVR  | 1.18 |
| 12  | BMRI  | 1.49 | 27  | LSIP  | 0.70 | 42  | VIVA  | 0.82 |
| 13  | BMTR  | 1.21 | 28  | MAIN  | 1.21 | 43  | WIKI  | 1.50 |
| 14  | BSDE  | 1.62 | 29  | MLPL  | 1.19 |     |       |      |
| 15  | CPIN  | 1.66 | 30  | MNCN  | 1.33 |     |       |      |
4.1.2. Expected return of stock

Table 2. Expected return of stock

| No. | Stock | Exp Return | No. | Stock | Exp Return | No. | Stock | Exp Return |
|-----|-------|------------|-----|-------|------------|-----|-------|------------|
| 1   | AALI  | 9.32%      | 16  | CTRA  | 11.58%     | 31  | PGAS  | 9.69%      |
| 2   | ADHI  | 11.37%     | 17  | EXCL  | 9.37%      | 32  | PTBA  | 10.00%     |
| 3   | ADRO  | 10.01%     | 18  | GGRM  | 9.82%      | 33  | PTPP  | 11.43%     |
| 4   | AKRA  | 10.18%     | 19  | HRUM  | 9.23%      | 34  | PWON  | 11.10%     |
| 5   | ASII  | 10.90%     | 20  | ICBP  | 9.95%      | 35  | SMGR  | 11.01%     |
| 6   | ASRI  | 11.57%     | 21  | INDF  | 9.73%      | 36  | SMRA  | 11.29%     |
| 7   | BBCA  | 10.24%     | 22  | INTP  | 10.78%     | 37  | SSIA  | 11.77%     |
| 8   | BBNI  | 10.81%     | 23  | ITMG  | 9.39%      | 38  | TBIG  | 8.68%      |
| 9   | BBRI  | 11.16%     | 24  | JSMR  | 9.48%      | 39  | TLKM  | 10.23%     |
| 10  | BDMN  | 9.55%      | 25  | KLBF  | 10.10%     | 40  | UNTR  | 10.49%     |
| 11  | BKSL  | 10.76%     | 26  | LPKR  | 10.68%     | 41  | UNVR  | 10.36%     |
| 12  | BMRI  | 11.12%     | 27  | LSIP  | 9.19%      | 42  | VIVA  | 9.49%      |
| 13  | BMTR  | 10.43%     | 28  | MAIN  | 10.44%     | 43  | WIKA  | 11.14%     |
| 14  | BSDE  | 11.43%     | 29  | MLPL  | 10.39%     |     |       |            |
| 15  | CPIN  | 11.54%     | 30  | MNCN  | 10.73%     |     |       |            |

4.1.3. Selected stock based on security market line

Figure 1. Selected stock based on security market line
Selected stock are upper security market line. So that, the result for each stock can be seen as follows.

| No. | Stock | Beta | Return mean (%) | Expected return in SML | Jensen α | Status  |
|-----|-------|------|-----------------|------------------------|----------|---------|
| 1   | AALI  | 0.75 | 6.58%           | 9.32%                  | -2.74%   | Not Selected |
| 2   | ADHI  | 1.60 | 83.26%          | 11.37%                 | 71.89%   | Selected   |
| 3   | ADRO  | 1.04 | -16.59%         | 10.01%                 | -26.60%  | Not Selected |
| 4   | AKRA  | 1.10 | 37.60%          | 10.18%                 | 27.42%   | Selected   |
| 5   | ASII  | 1.40 | 6.90%           | 10.90%                 | -4.01%   | Not Selected |
| 6   | ASRI  | 1.68 | 25.54%          | 11.57%                 | 13.97%   | Selected   |
| 7   | BBCA  | 1.13 | 17.08%          | 10.24%                 | 6.84%    | Selected   |
| 8   | BBNI  | 1.36 | 11.21%          | 10.81%                 | 0.40%    | Selected   |
| 9   | BBRI  | 1.51 | 20.22%          | 11.16%                 | 9.07%    | Selected   |
| 10  | BDMN  | 0.84 | -5.27%          | 9.55%                  | -14.81%  | Not Selected |
| 11  | BKSL  | 1.34 | 8.93%           | 10.76%                 | -1.83%   | Not Selected |
| 12  | BMRI  | 1.49 | 15.27%          | 11.12%                 | 4.15%    | Selected   |
| 13  | BMTR  | 1.21 | 45.46%          | 10.43%                 | 35.03%   | Selected   |
| 14  | BSDE  | 1.62 | 23.62%          | 11.43%                 | 12.20%   | Selected   |
| 15  | CPIN  | 1.66 | 26.95%          | 11.54%                 | 15.42%   | Selected   |
| 16  | CTRA  | 1.68 | 40.73%          | 11.58%                 | 29.15%   | Selected   |
| 17  | EXCL  | 0.77 | 1.05%           | 9.37%                  | -8.32%   | Not Selected |
| 18  | GGRM  | 0.96 | 7.01%           | 9.82%                  | -2.82%   | Not Selected |
| 19  | HRUM  | 0.71 | -35.37%         | 9.23%                  | -44.60%  | Not Selected |
| 20  | ICBP  | 1.01 | 31.73%          | 9.95%                  | 21.78%   | Selected   |
| 21  | INDf  | 0.92 | 11.18%          | 9.73%                  | 1.44%    | Selected   |
| 22  | INTP  | 1.35 | 16.15%          | 10.78%                 | 5.36%    | Selected   |
| 23  | ITMG  | 0.78 | -17.05%         | 9.39%                  | -26.44%  | Not Selected |
| 24  | JSMR  | 0.82 | 21.05%          | 9.48%                  | 11.57%   | Selected   |
| 25  | KLBF  | 1.07 | 36.11%          | 10.10%                 | 26.01%   | Selected   |
| 26  | LPKR  | 1.31 | 21.16%          | 10.68%                 | 10.48%   | Selected   |
| 27  | LSIP  | 0.70 | 1.18%           | 9.19%                  | -8.00%   | Not Selected |
| 28  | MAIN  | 1.21 | 58.42%          | 10.44%                 | 47.98%   | Selected   |
| 29  | MLPL  | 1.19 | 90.80%          | 10.39%                 | 80.40%   | Selected   |
| 30  | MNCN  | 1.33 | 47.85%          | 10.73%                 | 37.13%   | Selected   |
| 31  | PGAS  | 0.90 | 18.71%          | 9.69%                  | 9.02%    | Selected   |
| 32  | PTBA  | 1.03 | -15.81%         | 10.00%                 | -25.81%  | Not Selected |
| 33  | PTTP  | 1.62 | 65.86%          | 11.43%                 | 54.43%   | Selected   |
| 34  | PWON  | 1.49 | 27.07%          | 11.10%                 | 15.97%   | Selected   |
| 35  | SMGR  | 1.45 | 22.24%          | 11.01%                 | 11.23%   | Selected   |
| 36  | SMRA  | 1.56 | 32.24%          | 11.29%                 | 20.95%   | Selected   |
| 37  | SSIA  | 1.76 | 68.07%          | 11.77%                 | 56.30%   | Selected   |
| 38  | TBIG  | 0.48 | 54.49%          | 8.68%                  | 45.82%   | Selected   |
Result: there are 2 stocks in optimal portfolio and 28 in efficient portfolio.

4.2. Portfolio Analysis

4.2.1. The Result of Selected Stock in 1st Quartal 2015

![Figure 2. The Result of Selected Stock in 1st Quartal 2015](image)

4.2.2. Portfolio backtesting in 2014

![Figure 3. Portfolio back testing in 2014](image)
4.3. Choosing Optimum Portfolio

In this case, we try to choose optimum portfolio with Beta as 1 (equal to market risk), but combined two stock which generate highest return. Based on this analysis, we find the following stock in portfolio composition, consist of MLPL and TBIG. Combination of these stocks generate 130.27% of return with similar beta with market at 1.00.

Table 4. Combination of these stocks generate 130.27% of return with similar beta with market at 1.00.

|                | MLPL     | TBIG     |
|----------------|----------|----------|
| Proportion in Portfolio | 84.27%   | 15.73%   |
| Return Mean     | 145.54%  | 48.47%   |
| Beta            | 1.10     | 0.47     |

|                | Beta Portfolio | Expected Return Portfolio |
|----------------|----------------|---------------------------|
| Beta           | 0.99           | 99.59%                    |

4.4. Result of Analysis CAPM

Generally, using CAPM can give satisfied return in Indonesian capital market better than the return of Indonesia Composite Index (IHSG). Our efficient portfolio is providing better return 49.60% in 2014 with 1.41 beta and 0.30 treynor ratio in 2014. Meanwhile, our optimum portfolio indicate high return at 99.59%, 0.99 beta and 0.93 treynor ratio in 2014. In 2015 both efficient and optimum portfolio still record better return than IHSG, but with some change in treynor ratio and beta, indicating change in economic environment.

Table 5. Portfolio return in 2014

|                | 2014     | 2014     | 2014     | 2014     |
|----------------|----------|----------|----------|----------|
|                | JCI Index| Optimum Portfolio | Efficient Portfolio | Unfavourable Portfolio |
| Beta           | 1.00     | 0.99     | 1.41     | 1.05     |
| Return         | 22.29%   | 99.59%   | 49.60%   | 3.32%    |
| Treynor ratio  | 0.15     | 0.93     | 0.30     | -0.04    |

Table 6. Portfolio return in 2015

|                | 1Q15     | 1Q15     | 1Q15     | 1Q15     |
|----------------|----------|----------|----------|----------|
|                | JCI Index| Optimum Portfolio | Efficient Portfolio | Unfavourable Portfolio |
| Beta           | 1.00     | 1.79     | 1.34     | 1.26     |
| Return (Annualized) | 0.22     | 0.30     | 0.23     | 0.11     |
| Treynor ratio  | 0.15     | 0.12     | 0.12     | 0.03     |

Stock market return in 2015
The result indicate that there are some factor outside CAPM model that could create disturbance and potential change in the result, which are:

a. **Economic factor:**
   Economical change in first quartal 2015 provide more advantages for defensive sector as economy start to slow down with 4.8% GDP growth in 2015. Other than that, steep change in currency provide change in stock market expectation.

b. **Internal company factor:**
   Change condition of company is also inevitable as earnings growth change during the change of economic condition.

5. **Conclusion**
   a. Generally, in a stabil market condition, CAPM can give suggestion to choose the stock.
   b. CAPM cannot explain market condition perfectly for the future because of specific stock factor which cannot cover in analysis.
   c. We need recalibrate the model once economic condition change.

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