Evaluation Methods of Performance in Security Selection Process: Case Study Research

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ABSTRACT: *In Azerbaijan, there are limited researches in investment portfolio management, especially security selection process. The main purpose of this research is to review generally used evaluation methods of performance in security selection decisions. This paper also includes case study research which analyses four imaginary energy companies in Azerbaijan. Sharpe, Treynor and Sortino ratios have been explained and applied in decision making process in order to optimize investment portfolio. Descriptive statistics and visual graphs have been used in our analysis. The study also found that, working with ratios eliminates uncertainty and leads to better decision making.Evaluation methods in our case study research canbe useful for traders and potential investors.*

Keywords: security selection process, Sharpe ratio, Treynor ratio, Sortino ratio

I. INTRODUCTION

Security selection is the first process in portfolio construction by which investor chooses financial assets. In security selection process, every investor wants to quantify risk and return of securities. For diversification purposes, investors prefer to include many financial securities in portfolio. Today, there are more than 45000 companies listed in international financial markets around the world. It is necessary to analyze the individual companies before portfolio construction. There are many methods to quantify risk-return and to measure normality. We have discussed three ratios which are used to measure performance of stocks and to compare them. The most regularly mentioned measurement in financial analysis is the Sharpe ratio which tends to measure the manager's ability of generating returns with risk. In particular Sharpe or reward-to-variability ratio formulated in 1966 by William F. Sharpe and initially tested in the measure of performance for mutual funds. Concurrently, Sharpe ratio determines efficient link between risk-free return and standard deviation or excess expected return of investment and its return volatility. Illuminating in more detail this ratio measures the return of a portfolio in excess of the risk-free rate, compared to the total risk of the portfolio, measured by its standard deviation. This ratio, originally named the reward-to-variability ratio, is defined by: $[E(r)-R(f)]/\sigma(r)$

Where: $E(r)$ - represents the expected return of the portfolio; $R(f)$ - represents the return on the risk-free asset; $\sigma(r)$ - represents the standard deviation of the portfolio returns.

In practice this ratio is also appropriate for evaluating performance of portfolio that embodies total investment of entities. In financial market investors are sensible in risk and volatility that they expose and need to figure out expected return in exchange for level of risk they are taking. Particularly Sharpe ratio is beneficial for most investors in comparison of funds with similar strategies. When analyzing investment, higher Sharpe ratio is more preferable for investors. Although this ratio is widespread and has some value of measure of strategy, but while reviewing its principles and restatement regarding with this ratio results in several vital restrictions. People think that Sharpe ratio is not a reliable measure because of the reason illustrates it relies on standard deviation, which is based on the normal distribution curve. In the case of rare occurrence variables, Sharpe ratio is become inflated and cannot address real volatility of investment. Another drawback of Sharpe ratio is a same treatment toward volatility. As Sharpe ratio does not differentiate them, it sometimes leads to significant loss of performance for investors. Moreover, it has been highlighted by the fact that Sharpe ratio is prone to manipulations by managers. With the aid of selling upside return potential largely, managers tend to exaggerate Sharpe ratio in the short term period. Nevertheless, there is no other best choice for better measurement of performance except the traditional Sharpe; it can be responsible for deceptive conclusions especially when it relies on the assumptions that the returns are normally distributed. In order to prevent such incorrect indicator of performance the modified and adjusted versions of Sharpe ratio, i.e. ASR and MSR were applied. These are the sophisticated substitutes for portfolio performance measurement tools.

The Sortino ratio is used for calculating a risk adjusted return of an investment assets or portfolio. Sortino ratio is some different variation of Sharpe ratio. The main difference is the Sortino ratio ignores positive return and takes only the negative volatility or the downside deviations of returns. These returns are lower than desired target return or it is called required rate of returns which are considered risky. Best advantage of Sortino ratio over Sharp ratio is that it is not penalizes the both downside and upside volatility at the same level. The Ratio is named after finance professor Frank Sortino. It is calculated as; $[E(R)-R(f)]/DD$

Where: E (R) - represents the expected return of the portfolio, R (f) – represents the risk-free rate, DD – is downside deviation.

The target downside deviation is defined as the root mean-square of the deviations of the recognized return's underperformance from the target return where all returns above the target return are treated as underperformance of 0. The high value of ratio means better performance and return of portfolio and low possibility of significant losses. Sortino ratio also have different kind of approach to the investment instead of concentration on risk it focuses on investors' returns and defines excess return to the risk which is not fulfils investors minimum accepted return. Therefore, it is more appropriate for the investors to calculate their efficiency portfolio performance and to get their desired return.

Similar to Sharpe Ratio, Treynor or Reward to Volatility Ratio is index to establish the amount of return coming from the risky portfolio minus those that can be gained on a risk-free portfolio per every unit of market risk. One and only, and at the same time very important difference between Treynor and Sharpe Ratios is Jack Treynor, the developer of Treynor Ratio modified the formula of his colleague, Nobel winner William F. Sharpe, by changing the denominator of the formula through suggesting the use of portfolio beta to assess only the portfolios reactions to the market changes instead of standard deviation which is the measure of total volatility. By doing so, Treynor had created a chance for the investors to assess the risk of their portfolio much reliably. The main objective of the Treynor Ratio is to avoid all the instabilities of the market and value the real performances of the portfolios. As per using this index we can easily put all the portfolios in the same level and assess their enactments by taking into account their respective risk rates. If one portfolio gives us more return than the others it still does not mean that this portfolio performed better than the others as when taking into account the beta of it the Treynor Index can be lower than the other "lower" return giving portfolios. Thus, as it is already understandable, the higher Treynor Ratio means the better decision of investment and vice versa.
Overall formula for calculating the Treynor Ratio is: [E (R) – R (f)]/β

Where: E (R) - represents the expected return of the portfolio, R (f) – represents the risk-free rate, β– is beta coefficient.

As already mentioned Treynor Ratio uses beta as market risk or systematic risk and shows how selected investments affects diversified portfolios. One more thing about this ratio is if it is higher than it is better. Who would not want more returns against every risk they are taking? But what happens when Treynor Ratio is too high? The abnormally higher Treynor Ratio is most probably appeared as a result of lower beta. So is this acceptable to get very high Treynor Ratio and live with it peacefully? Obviously, not. Therefore in order to avoid it, instead of calculating the index for highly diversified portfolios wholly, managers should take each investment separately within the portfolio and calculate the index for each asset class, and only after then start using the correlation of the different Treynor Ratios. Another very important limitation of the ratio is it can only take past data into account to foresee the future. However in stock market past is almost never repeated.

II. CASE STUDY RESEARCH

In this section we have analyzed four imaginary companies in Azerbaijan which are in the same industry. In this section we have analyzed four imaginary companies in Azerbaijan which are in the same industry: Rovnag Oil, Xoshbaxt Gas, Natig Energetics, and Etibar Energy. Table 1 includes the monthly returns between the period of June-2015 and July-2016. In addition, change in monthly market rates are given in the last column. We have used Monte-Carlo Simulation in spreadsheet to get these random numbers.

Table 1: Monthly change in returns of the companies' stock and market rate

Date/Companies	Rovnag Oil	Xoshbaxt Gas	Natig Energetics	Etibar Energy	Market rate
June-2015	-1.00%	-7.00%	-1.00%	6.00%	9.00%
July-2015	-8.00%	-5.00%	0.00%	-2.00%	10.00%
August-2015	-6.00%	10.00%	13.00%	-3.00%	11.00%
September-2015	7.00%	-8.00%	11.00%	-6.00%	-3.00%
October-2015	-5.00%	-8.00%	-5.00%	13.00%	8.00%
November-2015	9.00%	-2.00%	-3.00%	11.00%	5.00%
December-2015	14.00%	-1.00%	-5.00%	14.00%	1.00%
January-2016	11.00%	6.00%	2.00%	-6.00%	8.00%
February-2016	-2.00%	-3.00%	3.00%	5.00%	8.00%
March-2016	-2.00%	-3.00%	-4.00%	5.00%	10.00%
April-2016	1.00%	-4.00%	3.00%	-3.00%	-4.00%
May-2016	2.00%	10.00%	-3.00%	6.00%	-2.00%
June-2016	12.00%	-8.00%	2.00%	0.00%	-2.00%
July-2016	-8.00%	1.00%	-6.00%	8.00%	9.00%
August-2016	-2.00%	-8.00%	11.00%	2.00%	12.00%
September-2016	11.00%	8.00%	2.00%	7.00%	2.00%

According to data collected, we can calculate the important descriptive statistical measures: standard

deviation, mean, downside deviation and beta coefficient. According to results shown in table 2, Etibar Energy has the biggest average return for 16 months among these 4 companies. Standard deviation measures investment's volatility. Rovnag Oil is the most risky company because of returns of stocks deviate more from the expected value. Downside deviation is used in the Sortino ratio which includes only negative returns in calculation of riskiness. Beta coefficient is the indicator of sensitivity of stock returns to the change in the market rate. It is calculated as "covariance of market rate with stock return/Variance of market rate". All beta coefficients are below 1 and it suggests that all companies are less risky than market itself in general.
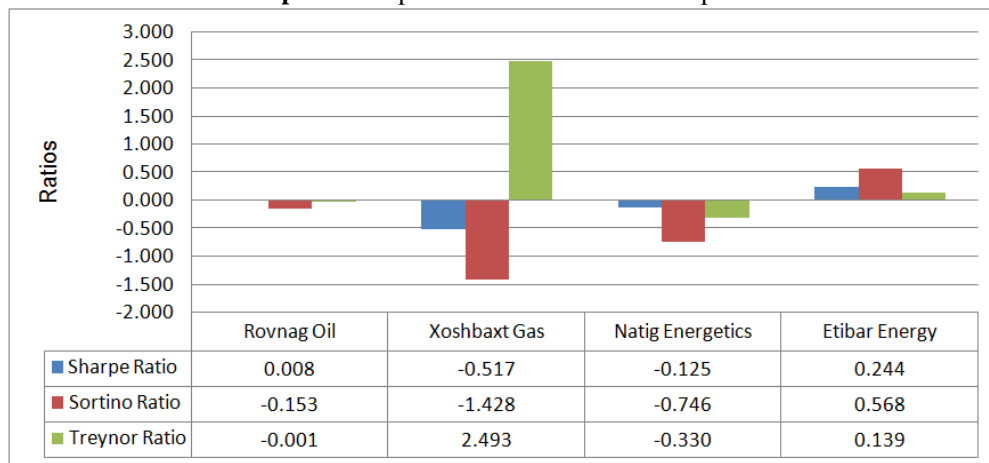
Table 2: Descriptive statistics

Descriptive statistics/Companies	Rovnag Oil	Xoshbaxt Gas	Natig Energetics	Etibar Energy
Average	2.06%	-1.38%	1.25%	3.56%
Standard Deviation	7.53%	6.53%	5.98%	6.41%
Downside Deviation	2.87%	2.71%	1.68%	1.87%
Beta Coefficient	-0.823	-0.014	0.023	0.112

Comparison of the performance ratios for the companies

The multiple bar chart presents information about the ratios for these imaginary companies. Investors should analyze all ratios for maximizing overall portfolio return, not make decision based on only one criterion. This method should only be used when investor faces many choices and all related to specific industry.

Graph 1: Comparison of ratios for the companies

	Rovnag Oil	Xoshbaxt Gas	Natig Energetics	Etibar Energy
Sharpe Ratio	0.008	-0.517	-0.125	0.244
Sortino Ratio	-0.153	-1.428	-0.746	0.568
Treynor Ratio	-0.001	2.493	-0.330	0.139

Comparison of Sharpe ratios for the companies

Sharpe ratio is calculated as difference between expected return and risk-free rate then is divided by standard deviation of historical stock returns. In our case, risk-free rate is assumed to be 2%. The given bar chart represents the Sharpe ratio for all four companies. Ranking of companies according to Sharpe ratios are like this: Etibar Energy, Rovnag Oil, Natig Energetics, and Xoshbaxt Gas. Risk-averse investor should not choose the last two companies if he or she wants to invest in this industry. In these companies risk-free rate is above return of stock. Investors want to maximize Sharpe ratio. Etibar Energy is the best choice because you gain 2.4 cents per one risky dollar you invested.

Comparison of Sortino ratios for the companies

Sortino ratio is calculated by subtracting targeted rate from expected return on stock, then dividing by downside deviation. The calculation of Sortino ratio is similar to that of Sharpe ratio, but ignores positive returns. The given bar chart compares the Sortino ratios for these corporations. In our case, the targeted rate of return is 2.5% which is above risk-free rate. According to calculations, Etibar Energy has the highest Sortino ratio. Risk-averse investor should include only Etibar Energy's stocks in his portfolio.

Comparison of Treynor ratio for the companies

Treynor ratio is also similar to Sharpe ratio, but it doesn't take standard deviation into account. In the denominator, beta coefficient which measures sensitivity of stock return to market returns is used. Higher the Treynor ratio, higher the risk-adjusted return. According to Graph 3, Xoshbaxt Gas and Etibar Energy companies have positive Treynor ratios. Intelligent investor would prefer to Xoshbaxt Gas Company which has maximum value of Treynor ratio amongst them.

III. CONCLUSION AND SUGGESTIONS

Today the security selection process and portfolio construction has become integral job of chief financial officers. In security selection process, manager should analyze every detail of financial assets. One of the methods is ratio analysis. Decisions based on these ratios can lead to less uncertainty and higher returns. Our practical case study has explained these ratios deeply and comparatively. We, authors have also some suggestions about the topic.

1. Investors should gather all the historical information of company's stock prices. For better results, sample size should be greater than we used in the case.
2. Investors should use their own countries' risk-free rate, not LIBOR or FED rate. In addition, market rates also are international rates formed in capital markets.
3. Investors should use descriptive statistics in order to quantify risk and return. Ignoring outliers is good idea in data collection process. They underestimate (overestimates) your forecasts.
4. Investors should analyze all ratios and then make decision. According to the recent researches, Sharpe ratio is the best measure of risk and return.
5. Investors should not forget the saying "When it is a question of money, everybody is of the same religion". Every investor wants to maximize profit. Risks are also important and we think Sortino and Treynor ratios as best measures of risks which include downside deviation and beta coefficient.

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