Performance Evaluation and Optimal Portfolio Selection Among Industries And Investment Funds

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Abstract: Nowadays, selecting the optimal portfolio among financial assets in which investors will invest is one of the most important topics for investors. The purpose of this study is to determine a composition of investments in mutual investment funds and various industries, so that the best combination of risk and return is recognized on the basis of known financial ratios. Since the history of investment funds is not a very deep-rooted one, there are some limited time-series data in this regard. Accordingly, those investment funds that were endowed with calculated NAV from the beginning of 2012 were considered thereof. Regarding investment funds in Iran, 6 investment funds in qualified stocks and 6 active industries in the stock exchange were selected. Then, their performance was examined from the beginning of 2012 until the end of 2013. Since the investment funds have been classified as top, bottom and middle funds, these researchers attempted to choose from each class to achieve different returns. The values of alpha and beta were extracted from simple linear regression to determine and assess the significance level. The results of this study determined the optimal portfolio among funds and the industries. Also, the rate of return against the level of risk was examined for all the investment funds and industries. In this article we have tried to form a pattern of Econometrics, using data combined cross-sectional time-series 2-year, 12 funds of funds and the use of panel data, the relationship between expected return and risk premium examined.

Keywords: Portfolio optimization, indicator, industries, mutual investment funds. Panel data

1. Introduction

Investors in the stock market are often faced with the question of how much and in which industries they should deal or to determine the stock of each industry in their investment portfolio. According to Eghtesad Online, the investment portfolios of companies and individuals investing in the stock market provide a diverse range of choices among industries. The diversity of portfolios can be looked upon in terms of short-term and long-term perspectives in the course of different decisions and analyses. For example, the absence of automotive industry in the investment portfolio of individuals or companies may relate to decision making time horizon, the internal conditions of the automotive industry in terms of reducing production or reduced purchasing power in terms of inflation and recession and other factors thereof. On the other hand, the presence of automotive industry in the investment portfolio can make investors optimistic for lifting the sanctions and increase the lending power of financial institutions. The same also applies to other industries. However, the question is how to determine those criteria through which the industries, their stocks in the investment portfolios and investment funds can also be determined. In the first place, the answer to this question depends on the investor's time horizon in the long-term and short-term domains. Secondly, it can be related to analysis of the profitability situation of the industry in the desired time horizon. Put it simply, if a person or company insightfully decides to choose stock industries, even if the risk is not there, it requires a team of industry experts in different fields. The reason goes back to the fact that the human mind is incapable of simultaneous analysis of a wide range of issues in the risky circumstances.

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Besides, decision making science with the help of advanced computer has not so much progressed to help human kids. Investment portfolios are dominated by some major industries including Petrochemistry, refinery, basic metals, metal ores, non-metallic minerals, banks and insurance companies. However, other industries have a smaller stock of investment. Consequently and contrary to initially difficult and complex circumstances, it seems easier to choose a limited range of industries. Regarding the Tehran Stock Exchange, there are several models to choose the optimal portfolio. Furthermore, these models have diverse and different applications. One of these models is CAPM model that helps investors to control risk and increase return on equity. In this model, the two pillars of risk and evaluate the return performance of investments. Accordingly, the maximum return with respect to a certain level of risk can be considered as an appropriate indicator for investment (Rai and Saidi, 2006) Managers are always judged on the basis of their decisions. On the other hand, managers of organizations are in dire need for accurate and reliable models to meet the requirements of today's dynamic market as well as make effective decisions (Makridakis, 1982). Regarding the different financial scenarios, choosing to invest in mutual investment funds is one of the best financial strategies (Change et al, 2010). Mutual investment funds tend to attract investor via providing numerous benefits including diversification, professional management, liquidity and the ratio of efficiency to scale (Jafari, 2007; Riazat, 1996; Nazarpour et al, 2009). In this research, 6 stock industries, 6 investment funds and total index have been studied. Although it was possible to make use of industry market value, the performance of industries was evaluated using their indices. Since we had a large initial release and dividend, the market value could not provide reliable data for the analyst. Thus, the index of industries was selected. In this analysis, the researchers have tried to assess the risks and returns of different industries in two periods of time in order to determine premier industries and funds.

2. Literature

So far, many researchers have been conducted in order to answer to the issue of optimal portfolio selection. The following researchers are among the pioneers of these investigations:

Harry M. Markowitz (1952) postulated his proposed model for portfolio selection to answer the question of optimal investment portfolio selection. His model, called Markowitz mean-variance model, is among the most common approach to select the optimal portfolio. One of the most prominent features of his study is that he is able to take into account the return of different types of investments as well as risk criterion. It should be mentioned that he could introduce the risk criterion, which was considered as a qualitative factor until then, as a quantifiable factor (Vakili Fared, 2009). Markowitz showed that the deviation of returns was a good measure to gauge the risk of portfolio under a set of assumptions (Islami Bidgoli, 2005). Regarding his definition of risk, that was based on the deviation of expected return from the observed return; the standard deviation was calculated as a measure of risk assessment (Rai). Ema et al. Studied returns of New York and NASDAQ stock exchanges between 1963 and 1990 and found that, regarding such a relatively long period of time, the difference in returns of different periods could not be justified via their beta values. Also, there was not a linear relationship between beta and returns of a stock in a short period of time. The research results questioned the basis of the CAPM model and indicated that the model may be wrong. Although the above-mentioned research and some other researchers have questioned the reliability of this model, this model is still widely used in the investment and financial communities. Although it can be argued that calculation of beta value of a stock may lead to a complete diagnosis and prediction of movement, and reaction of a stock against the movement of a market, investors can confidently claim that the portfolio with a beta greater than one will be ahead of the market either in a positive or negative return trends. However, portfolios with beta values smaller than one will move slower than the market. This is important for investors and, in particular, funds managers because they are weary of keeping money in cash. Furthermore, if they believe that the market will be a bear one for a time, they can invest in stocks with low beta values. In other words, if they are aware of beta values of

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different bands, they will be able to adjust their portfolios is accordance with desired risk and return policies. As a result and when the bull market condition is prevalent, they will be able to invest in those stocks with beta values greater than one. Conversely, when the market is of bear type, they will invest in those stocks with beta values less than one (Industrial Management Institute of East Azerbaijan). Safari (2002) attempted to gauge the performance of active investment companies listed on the Tehran Stock Exchange based on Sharp and Trainer indicators. He concluded that as the number of stocks increased in a portfolio, non-systematic risk was also decreased. Also, if the portfolios were quite diverse, performance rating based on Sharp and Trainer's indicators would be closer together. Chen et al. (2007) proposed a new criterion for measuring the performance of investment funds called efficiency ratio. This ratio made use of minimum global deviation of the portfolio as a basis for comparison. Hubner (2007) offers some empirical evidence on the evaluation of the performance criteria. The results of his research confirm the supremacy of generalized ratio of Trainer as an optimal indicator compared to Sharp indicators (1964) in terms of fund performance evaluation.Abdeh Tabrizi and Sharifian (2008) evaluated the effect of unfavorable risk on the adjusted performance on the basis of risk of investment companies listed in Tehran Stock Exchange. In this study, the relationship between companies ranking was based on Sharp indicator and optimum potential ratio. They concluded that there was a relationship between these two ratios. Furthermore, this relationship would stem from the existence of negative skewness in the distribution of returns.Sajjadi and Fathi (2013) attempted to optimize the portfolio using a four-step process to calculate the value at risk (VAR). They implemented it in an investment optimization model to achieve a measure for risk assessment.

3. Data and methodology

3-1.Data

The model presented in this report assessed the risks and returns of capital asset pricing model, namely CAPM model. This model suggested that the market trend (risk premium) could help us to determine the relationship between risk and expected return on investment.

CAPM model uses the following equation to calculate the stock market trend:

$$\mathbf{E(r_i) = R_f + (R_m - R_f)\,\beta}$$

In which,

Ri stands for the expected rate of return

Rf stands for the risk-free rate of return

β stands for the sensitivity coefficient

Rm stands for the market rate of return on the basis of total market index

Rm – Rf stand for risk premium

So, CAPM model states that the expected rate of return is a function of two components:

$E(R_i)$ stands for risk-free rate of return + risk premium

It gauges the impact of a particular stock on the total risk of a set of diverse stock with a beta of a stock. As the value of beta of any stock increases, it will be more affected by the market and its fluctuations will increase.

RF was also calculated using information from the site of the Central Bank of Iran in order to determine on account interest rates of two-year term deposit investment. The rate for the years 2012 to 2013 was 20%.

Regarding the return calculation, it is clear that as the duration of time interval is smaller, the level of return would be more accurate.

3.2. Methodology

The way in recent years, studies have been used in many econometric model estimation is based on panel data. Examined Mygyrd.marh listed below is defined as:

F= (RRSS- URSS) /N-1/ (NT- N- K) URSS

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To choose the best model for the fixed effects model and random effects panel method, the data may Hausman statistic (H) is used. The estimation of fixed effects (FE), assuming that the intercept is equal to the industry. Also, the probability statistics for the selection of these works as the best model Hausman Hey, Hey Hausman statistic alone is sufficient justification for the selection model is superior. Hausman test the null hypothesis is as follows:

H_0 :R_F=R_F

H_1:R_F≠R_F

In case of rejection of the hypothesis H0, . using fixed effects and random effects is inconsistent and should be adapted to the use of fixed effects. To estimate the model using panel data for the identification of models, fixed effects and random effects models, the Hausman test is used. The value of the Hausman statistics for the industry, which were 20.35 p-values equal to 2. This statistic was obtained according to the method used to estimate the fixed effects model was more appropriate.The researchers analyzed CAPM model for industry, fund and stock separately. Having determined the dependent and independent variables, the researchers attempted to determine those industries and funds or stock indices that have had better and more optimal performance in terms of beta coefficient

Firstly, the researchers examined industries and evaluated the impact of risk premium on the expected returns. Having conducted F-Limer test and panel data type, the following conclusions were drawn:

Tab1: Effect of expected returns on risk premium

variable	coefficient	t-statistic
C	*0.032592*	5.168454
Premium risk	*0.376351*	7.629575
R-squared	*0.799729*	
F-statistic	*58.21041*	
Prob (F-statistic)	*0.000000*	

Source: **conducted F-Limer test and panel data type**

Then, investment funds were examined and the effect of risk premium on the expected returns was examined. Having conducted F-Limer test and pool data type, the following conclusions were drawn:

Tab2: **Effect of expected returns on risk premium**

variable	coefficient	t-statistic
C	*0.013308*	*1.981023*
Premium risk	*0.217441*	*9.275582*
R-squared	*0.672859*	
F-statistic	*58.21041*	
Prob (F-statistic)	*0.000000*	

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Source: **conducted an F - Limer test and pool data type**

Finally, the researchers examined the stock index as well as the effect of risk premium on expected return. Having conducted F-Limer test and panel data type, the following conclusions were drawn in next page:

Tab3: **Effect of expected returns on risk premium**

variable	coefficient	t-statistic
C	*0.027837*	*3.393028*
Premium risk	*0.369762*	*8.908923*
R-squared	*0.471951*	
F-statistic	*15.83240*	
Prob (F-statistic)	*0.000000*	

Source: **conducted an F - Limer test and pool data type**

4. Results and discussion

The data embedded in the tables as well as the results of which showed that the index beta is lower than the other two betas. So, purchase of a stock index leads to higher expected return and lower systematic risk compared to other two items. For example, the automobile industry could buy a stock index instead of forming its own portfolio. Besides, if we obtained negative coefficients, it would mean that, during 2012 to 2013, none of the industries or funds have been able to demonstrate higher rate of return compared to the index (against risk). This meant that the letters have underperformed. This fact led to positive values at all output of the sum of all coefficients. Furthermore, the results showed that although Sharp index could help researchers to rank industries and fund, this index and regression test should be calculated in order to provide accurate ranking of industries and funds.

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