A Study Of Measuring Return In A Well Diversified Portfolio

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Abstract

In this study we increased awareness regarding the benefits of investment in a well diversified portfolio and the investment options ever. We took two types of investor, one who invest his capital in one company, the other invest his capital in more than one company. For drawing the inference we used regression model, best subset selection, and proportion test. After applying these tests we found that the return on investment in a well diversified portfolio for a short period of time as well as for a long period of time is greater than the return on investment in an undiversified portfolio.

Key words: investment, portfolio, regression, best subset selection, proportion test, investor

Introduction

It was identified that investing in stock market was risky. Both practitioners and theoreticians recommended holding a well-diversified portfolio to reduce risk (Bissoondoyal-Bheenick and Brooks, 2010). While mutual funds offered a quick and relatively inexpensive way to diversify. It was also important that diversification in portfolio must be done properly which means the company that were taken in the portfolio had no relation between each other. If there were relation between the companies in such portfolio only then it was possible; that if the return from one company goes down; other might goes up.

Another important thing in portfolio investment was the share of investment that should be higher in such portfolio which provided maximum returns and the share of investment was lower in the portfolio which offered low returns. It was obvious that a group of companies gave high returns should got more investment share. Among the more incommmodious problems of a business organization were decisions; related to optimal allocation of resources among competing investment opportunities.

The classical theory of portfolio choice rests on strong assumptions as no transaction costs, investor’s awareness of menu of asset available and knowledge of their risk and return, no uninsurable risks, such as human capital. If all investors face same distribution of returns and had same information set, in equilibrium they selected the same menu of risky assets (Arjan, et.al. 2004).

A varying trend in the financial sector was observed during the past decade, which was now focused its attention towards lending to the common salaried individuals. The objective of this policy was to encourage the common people to invest in small business ventures and other portfolio which will help increasing the economic activity in the country. This policy had opened many new options for investment and portfolio diversification. Among the better known such approaches were those attributable to (Markowitz 1952; Drucker 1963; Basu 1977; Wright 1978; Allan 1979, Wind 1975, and Sheth and Frazier 1983). At a more strategic level, researchers concerned with Research and Development had proposed a variety of tools for use...
in the selection of individual projects. Examples of these approaches included scoring procedures (Dean and Nishry 1965), and various process models of innovation (Utterback and Abernathy 1975). In addition, different portfolio models appear to produce different managerial implications (Wind, Mahajan, and Swire 1983). A number of such tools and their particular strengths and weaknesses were also discussed by Anderson (1981).

Earlier studies explored the problem of optimal portfolio size mostly focused on how many stocks are sufficient to make an efficient portfolio. For example, Statman (1987) revealed that a portfolio including 30-40 stocks can effectively achieve efficient diversification. Related researches can be found in Chung (2000) and Shawky and Smith (2005).

Goetzmann & Kumar (2008) found considerably intense portfolios in the individual brokerage accounts. The current empirical literature on diversification had two main limitations (Polkovnichenko, 2005). First, the samples used often were not representative of the population. Second, diversification was measured only for a part of the household portfolio. In recent years, there has been a growing interest in incorporating financial planning tools in product portfolio approaches and project selection techniques (Rezayat and Yavas 2006). This research was aimed to observing the level of profit available to the people in portfolio investment and the portfolio options available to the people. There were many opportunities to make sound investment that had a positive financial social impact. Learning from the financial intermediaries was just one of the ways that people became aware of investment opportunities.

**Methodology**

As far as our research was concerned in the theoretical framework we had taken the return as a dependent variable and independent variable was investment.

![Independent Dependent](Investment Return)

In this research we have done quantitative research study of two different types of investors who were investing their capital, out of these two one person invest his capital in one company, the other invest his capital in more than one company. Basically from this data we have measured the effect of investing in just one company with respect to investing the capital in more than one company that means in a diversified portfolio firm.

Population of our research is the listed companies of Pakistan. These companies are as follows; Chemical Industry, Fertilizer Industry, Vehicle Industry, Cement Industry, Insurance Industry, Oil & Gas Industry, Glass Industry, Banks. In this research we calculated the actual return from each investment done in companies.

Share prices of different companies were taken for drawing inference about the return on investment. There were 36 observations related to diversified and undiversified portfolio (3-Year dataset on monthly basis), and data for longer time period was also collected (3-Year dataset on 3-month basis), these observations were taken with 15 different industries related to diversified and 15 companies of a single industry related to an undiversified portfolio.

**Results and Discussion**

In our research return (Y) as response variable and investment (X) is predictor. Regression analysis is performed to estimate fitted values of portfolio return (Y).
The results of regression equation of undiversified portfolio are as:
\[
Y = 0.0272 X + U \quad (3\text{-Year dataset on monthly basis})
\]
and
\[
Y = 0.0774 X + U \quad (3\text{-Year dataset on 3-month basis})
\]

This model indicates that investment in undiversified portfolio is inversely related with return. The regression model is appropriate as it satisfied all the basic assumptions like; normality of residuals, homoscedastic and autocorrelation.

We also find regression equations of diversified portfolio are as:
\[
Y = 0.00160 X + U \quad (3\text{-Year dataset on monthly basis})
\]
and
\[
Y = 0.0051 X + U \quad (3\text{-Year dataset on 3-month basis})
\]

This model indicates that investment in diversified portfolio is directly related with return. Value of adjusted \( R^2 \) indicates that 92% of change in return is due to investment and remaining 8% is due to other factors either whose individual impact on return is not significant or highly correlated with the investment included in the equation.

To improve the model, an attempt has been made; we apply the Akaike’s information criterion (AIC) and Schwarz’ Bayesian criterion (SBC) on the same predictor which used in the regression procedure. The table 1 reports these values of AIC and SBC.

<table>
<thead>
<tr>
<th>Model</th>
<th>AIC</th>
<th>SBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undiversified Portfolio</td>
<td>7.46</td>
<td>7.51</td>
</tr>
<tr>
<td>Diversified Portfolio</td>
<td>7.43</td>
<td>7.47</td>
</tr>
</tbody>
</table>

As model having small values of AIC or SBC is considered best model, so the diversified portfolio model having minimum value of AIC (7.43) is:
\[
Y = 0.00160 X
\]

Here note that the SBC have minimum value (7.47). One can choose the same model for prediction of the best model and may concludes that investment in well diversified portfolio will increases the return. Both the criterions discussed above select the same prediction model of return with predictors as investment in well diversified portfolio.

From the above prediction models, it is clear that investment in undiversified portfolio, the return on the average decrease. Hence we can conclude the investment in undiversified portfolio contributes negatively to return. On the other hand, return increases as the investment in well diversified portfolio increases. The effect of investment in well diversified portfolio is positive on return. So our study recommends that any investment in well diversified portfolio is suitable for better return.

Proportion test is performed on data set with the following hypothesis:

\[
H_1: R_{dp} > R_{udp}
\]

or

\[
H_1: p > 1
\]

Where \( p = R_{dp} / R_{udp} \)

Hypothesis for investment in long time period as follows:


\[ H_2: R_{dp} > R_{udp} \]

or

\[ H_2: p > 1 \]

Where \( p = \frac{R_{dp}}{R_{udp}} \)

Our research hypothesis can be tested in this case by t-statistics as:

\[ t = \frac{(p - p_0)}{\sqrt{\left(p_0 q_0/n\right)}} \]

### Table 2: Proportion Test

<table>
<thead>
<tr>
<th>Test</th>
<th>For period</th>
<th>Short</th>
<th>For Long</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-statistic</td>
<td>0.11627</td>
<td>0.9081</td>
<td></td>
</tr>
<tr>
<td>P-Value</td>
<td>0.50577</td>
<td>0.623</td>
<td></td>
</tr>
</tbody>
</table>

From the results it is clear that we do not reject \( H_1 \) and \( H_2 \) at the 5% level of significance and concludes that the investment in well diversified portfolio increases the return (for both time periods).

From the above hypothesis testing, it is clear that investment in undiversified portfolio for a long period (3-Months) and short period (1-Month), the return on the average decreases. On the other hand, return increases as the investment in well diversified portfolio increases for both (1 and 3 Months) time periods. So our study recommends that any investment for both time periods in well diversified portfolio can increases ones return.

**Conclusion**

On the basis of above results we conclude that investing in a well diversified portfolio results in increased over all profitability and the risk involved is significantly reduced to a bare minimum level. Diversifying is basically a risk management technique that attempts to provide some insurance against the unexpected. The rule of thumb for diversification is to combine investments that have low or negative correlation. In order to have maximum return a person must invest his total capital in the form of a well diversified portfolio investment that is investing in two or more firm belonging to different industries.

If a person is investing in just one company he/she has to face more risk because if that particular industry goes down then it will affect his/her total investment and as the result the lost he/she may be facing can be maximum.

**References**


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