
Parastoo Mandegari*
University of Tehran, International Campus- Kish Island, Kish, Iran.

ABSTRACT
Linear and nonlinear models have always been taken into account by investors, researchers, finance students, organizations and investment companies operating in stock markets in order to predict stock returns. The aim of the current study is to introduce a model to improve the prediction of stock returns at the banks listed in Tehran Stock Exchange. For this purpose, 7 financial ratios were used in a period from early 2009 to late 2014. Moreover, a data-mining technique, named Support Vector Regression (SVR) and used for prediction, was employed in this study. The research results indicate that SVR can predict stock returns at the banks listed in Tehran Stock Exchange.

Keywords: Prediction, Stock Returns, Support Vector Regression, Financial Ratios.

INTRODUCTION

With the increasing expansion and complexity of financial markets, it has become much more important to pay due attention and predict the future problems which have long been discussed in such markets1. In other words, the managers of investment companies, operating in financial markets, try to use the latest scientific tools now in order to analyze such markets. In fact, they intend to select their asset portfolios to maximize the returns, a fact which indicates that it is not possible to operate in today’s modern markets without benefiting from scientific tools and techniques. Otherwise, there will be failure and negative returns2,3.

Given the fact that Tehran Stock Exchange is known as an organization responsible for supplying savings and directing them towards productive and beneficial investment in favor of society and economy, it is very important to study the relevant areas4,5. If the return on investment can be predicted, and a model can be presented for it, uncertainties will be largely eliminated. Investments will also increase in the stock exchange. On the other hand, investigating the active industries of stock market separately and evaluating the reasons for their recession and prosperity can lead to applied strategies for the modification and efficiency of such industries and the market as a result.

* Corresponding Author: pari.m1364@yahoo.com

The Prediction of Stock Returns at the Banks Listed in Tehran Stock ...

METHODOLOGY

The aim of this study was objective, real, and ordered description of stock output characteristics and its relationship with financial ratios. Therefore, this study was descriptive and correlation-based in terms of nature because in this type of studies, the researcher seeks to evaluate the relationship between the variables. Financial statements and reports of banks published by Tehran Stock Exchange as well as Rahavard Novin software were used to gather the required data.

RESULTS

In this study, R and Package: e1071 were used to implement SVR. First, the research data and variables were introduced in a file. Then two functions and four kernels were employed to design 8 models for execution on R:

Model.1=svm(nv8~nv1+nv2+nv3+nv4+nv5+nv6+nv7,type="eps-regression", kernel="linear"
yh1=predict(model.1)
r2[1]=(cor(nv8,yh1))^2

Model.2=svm(nv8~nv1+nv2+nv3+nv4+nv5+nv6+nv7,type="nu-regression", kernel="linear"
yh2=predict(Model.2)
r2[2]=(cor(nv8,yh2))^2

Model.3=svm(nv8~nv1+nv2+nv3+nv4+nv5+nv6+nv7,type="eps-regression", kernel="sigmoid"
yh3=predict(model.3)
r2[3]=(cor(nv8,yh3))^2

Model.4=svm(nv8~nv1+nv2+nv3+nv4+nv5+nv6+nv7,type="nu-regression", kernel="sigmoid"
yh4=predict(Model.4)
r2[4]=(cor(nv8,yh4))^2

Model.5=svm(nv8~nv1+nv2+nv3+nv4+nv5+nv6+nv7,type="eps-regression", kernel="polynomial"
yh5=predict(Model.5)
r2[5]=(cor(nv8,yh5))^2

Model.6=svm(nv8~nv1+nv2+nv3+nv4+nv5+nv6+nv7,type="nu-regression", kernel="polynomial"
yh6=predict(Model.6)
r2[6]=(cor(nv8,yh6))^2

Model.7=svm(nv8~nv1+nv2+nv3+nv4+nv5+nv6+nv7,type="eps-regression", kernel="radial"
yh7=predict(Model.7)
r2[7]=(cor(nv8,yh7))^2
Model.8=svm (nv8-nv1+nv2+nv3+nv4+nv5+nv6+nv7, type="nu-regression", Kernel="radial"") 
)yh8=predict(Model .8 
\[ \text{r2 [8] = (cor(nv8,yh8))^2} \]

After execution on R, the optimal model was introduced. With respect to R^2, Model 7 was selected (R^2 [7]=0.345563).

Call
svm(formula = nt8 ~ nt1 + nt2 + nt3 + nt4 + nt5 + nt6 + nt7, type = "eps-regression" 
kernel = "radial"

Parameters
SVM-Type: eps-regression
SVM-Kernel: radial 
cost: 1 
gamma: 0.1428571 
epsilon: 0.1 
Number of Support Vectors: 16 
R^2=0.79

The following table indicates the criteria for the evaluation of regression error with SVR:

<table>
<thead>
<tr>
<th>MAE</th>
<th>RMSE</th>
<th>MSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10</td>
<td>0.14</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Therefore, SVR is able to predict stock returns at the banks listed in Tehran Stock Exchange. According to the results, mean squared error, root mean squared error, normalized mean squared error, mean absolute error, mean absolute percentage error and the correlation of coefficient were 0.01, 0.14, 0.21, 0.10, 0.20 and 0.79, respectively. Support vector machine could predict 79% of stock returns at the banks listed in Tehran Stock Exchange in 2014, using financial ratios.

CONCLUSION

The relationship between accounting ratios and stock returns is quite weak. It cannot be reliable. These results are consistent with the findings of Richard and Charles. According to them, if the items of financial statements and their financial ratios are only considered, there will be limited and slight profitability in the prediction of price and stock returns with financial variables.

REFERENCES

