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Research Article

PREDICTION OF STOCK RETURNS USING FINANCIAL RATIOS BASED ON HISTORICAL COST, COMPARED WITH ADJUSTED PRICES (ACCOUNTING FOR INFLATION) WITH NEURAL NETWORK APPROACH

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ABSTRACT
The purpose of this research is to predict stock returns and the purpose of the least squares regression and neural network approach is used. The potential financial ratios based on the historical cost and financial ratios based on Adjusted Cost predict stock returns are investigated. Independent variables and the dependent variable in this study and financial ratios and stock returns is for these purpose financial ratios for listed companies in Tehran Stock Exchange for the period 2007 to 2012 were collected. The results showed that the predicted stock returns based on financial ratios financial ratios adjusted based on the general price index and the use of neural networks better performance in comparison with the historical financial ratios and least squares regression approach in predicting stock returns has the variables are adjusted based on the general price index, variables, net profit margin, return on assets, current ratio, asset turnover ratio and fixed assets turnover ratio, respectively, are of the greatest importance and impact.

Keywords: *Stock Returns, Financial Ratios, Accounting for Inflation, an Artificial Neural Network*

INTRODUCTION
Due to the increasing importance of capital markets in small capitalization equip the individual to productive activities, identify variables influencing the behavior of investors and the market price of the stock return is gained (Babaeian and Arab, 2000). It is clear that investing in the stock market is an important part of the economy no doubt, the greatest amount of capital through stock markets around the world will exchange and the national economy is heavily influenced by the performance of the stock market to professional investors and to the public as an investment tool available. Stock markets and other macro-economic parameters and many other variables affected, several of the factors affecting capital markets and their unknown causes uncertainty on investment (Khaloozadeh, 2003).
Obviously this is undesirable feature of uncertainty in decision making and also for investors in the stock market this property is inevitable (Hendrickson, 1992) the overall objective of the research hypothesis and research, is to reduce uncertainty, investors are looking for ways to better predict stock returns to get the maximum performance from your investment.

History of Research
Many studies have been conducted to predict the stock price is according to the method used in the present paper, the most important of which are mentioned below:

Research Carried Out within the Country
Hossain (2000) "Prediction of stock price index using artificial neural networks" to identify the behavior of the stock market represents the effect of these variables on several factors. Forecast of the changes it can capitalize on the growing market for financial decision is the way his research results indicate a preference model and artificial neural networks to regression models.
Saidi and Norosh (2003), "Comparison of traditional linear neural network technique to predict the stock price Tehran" tried comparing the CAPM model and Fama and French as a linear model with artificial neural networks as nonlinear models to be the statistical comparisons found that ANN prediction accuracy better than both other models in predicting stock prices blond Tehran had a thriving market. Seyyed *et al.,*

(2010) studied the relationship between financial ratios and stock prices in the metallic and non-metallic minerals industry began. The results indicate that the linear and non-linear relationship between financial ratios and stock prices and models of type B (without intercept) greater ability to explain the stock price. Koadrtik nonlinear models are better than the other models can not explain the stock price. The proportion of activity in the circulation and Profitability ROA, return on capital and the percentage of non-profit special sales can better explain the stock price. Mohammad and Noureddine (2005) the main theme of his research study and analyze the relationship between stock returns and financial ratios of the firms listed in Tehran Stock Exchange. The results of the survey of all companies and industries are examined separately, showed that among all financial ratios and stock returns meaningful relationship. Thus all the hypotheses presented in the study were confirmed.

Ali Rahimi, a study to examine the relationship between stock returns and price-to-earnings ratio of listed companies in Tehran Stock Exchange. Research focused on two factors: efficiency coefficient price to earnings. In this study, the hypothesis that shares of stock by a factor of 73 greater efficiencys - low price-to-earnings ratio of price to income over the period of 76 has been studied. The obtained results demonstrated hypothesis.

Reza Rai and Kazem Chavoshi a study can predict the ten stocks in Tehran Stock Exchange using the artificial neural network model and multifactor models examined. The results showed that the predictability of stock returns in the stock market is influenced by macroeconomic variables. Multi-index model able to predict stock returns using macroeconomic variables, the artificial neural networks in this success and can significantly reduce forecast error. The use of artificial neural networks has good flexibility. The relationship between stock returns and macroeconomic variables are not always constant, and for various reasons, this relationship can be changed.

Mohammad Namazi and Behrooz Zare the risk of the entropy applied research and their impact on changes in share prices of companies in Tehran Stock Exchange were examined. Study period was from 1995 to 2000. The results showed that the entropy balance sheet and profit and loss statements and information items related to significant changes in stock prices. Also, the entropy of the balance sheet and profit and loss statements, and there is a significant relationship between systematic risk.

Muhammad Namazi and Khajavi a study useful in predicting the risk of systematic accounting variables listed companies the results of simple regression analysis showed which varies between 12 and systematic study of risk is a meaningful relationship. It also became clear that the 17 variables in the model predictive variables explain more than 85% of the total capacity of systematic risk changes.

Seyed *et al.*, (2009) in their research design and provide a model to predict stock prices by using fuzzy neural networks and genetic algorithms to reduce errors in forecasting stock prices use it to use the technique of artificial neural networks have been studied in isolation. The results show that the combination of genetic algorithms and fuzzy neural networks have a much better predictor of single neural network to approximate the speed and ability to predict the stock price has been stronger.

Reza (2002) the relationship between the stock price and financial ratios of the firms listed in Tehran Stock Exchange investigated. His research period from 1995 to 2000 and the number of companies we have had 50 participants. The results showed a significant relationship between price changes and changes in financial ratios exist. Technology independence hypothesis was confirmed and it was shown that different ratios in different industries have different behavior with respect to changes in the financial ratios show.

Zra (2009), using the method of artificial neural networks, dynamic, inflation rate for the period 2008 to 2012 were forecast. Doctor Ramazanali (1993) in an article entitled Accounting for inflation accounting and Accounting Development in the third seminar of the results of his research on inflation accounting paraphrased as adjusted financial information on the general price level does not lead to different investment decisions or predictions.

Ahmed *et al.*, (2003) studied the effects of inflation on the erosion of capital as the company concluded inflation during the distribution of profits and paying taxes based on income statement based on historical cost companies will lead to capital erosion.

Mohsen and Mohsen (2004) in an article entitled Barriers of inflationary accounting in unfamiliar factors such as lack of corporate accounting authorities inflation accounting concepts and institutions, inadequate indicator of the level of prices, increases in tax liabilities resulting from the revaluation of assets, an increase in interest expenses on account of inflation and lack of public support, including barriers to Iran's inflation accounting.

Gholam (2006) in an article entitled, inflation factors, and strategies for dealing with Iran, come to the conclusion that inflation in Iran is caused by structural factors and loss of purchasing power due to inflation and rising government deficits and funded through borrowing from the central bank increases the money supply in the community adds to inflationary pressures and consumer spending and investment spending of oil revenues flowing into the country and the disproportionate growth in increased liquidity demand, inflationary pressures will intensify the prices of imported goods and the intensification of inflation have been effective.

Akbar (2002) investigate the relationship between stock prices in the petrochemical industry profitability review and concluded that the level of 1% error between the intended Profitability there is a significant relationship between the stock price.

Ahmad (2002) the relationship between financial ratios and stock prices in the industry, vehicles (15 companies) Tiles and cement industry (19 companies) in the period (2002)-1996 is examined. The results indicate a significant relationship between the dependent and independent variables were included in the company.

Although this takes different conditions in different industries for example, this relationship has been less severe in the vehicle industry. Mohammad and Mohsen (2007) a study on the relationship between stock returns and profitability ratios adjusted based on the general price index of companies in the oil industry petrochemicals are paid. The findings showed a significant correlation between profitability ratios adjusted on the basis of the general level of prices and stock returns in the oil and petrochemical companies for 81 to 84 years there.

Research Abroad

Henry (1973) studied the effects of inflation on financial statements and accounting information to be examined. Sweeney argued that the rules are in conflict measure before we take a suitable measure of value, currency should hold good measure (Mohsen, 1993). Research results show that John and others in 1991 in the Japanese market the ratio of book value to market price to earnings and the company has the ability to explain the company's excess returns.

Han et al. 1994 on the contrary, it indicates that the variable accounting as profits and stock prices in the Japanese market for 1980, there is no significant relationship (Monadjemi *et al.,* 2009)

Kuo *et al.,* (2001) article entitled "An intelligent decision support system for stock trading by using social and genetic algorithm based on fuzzy neural network and artificial neural networks "to maintain a system of consultation, sale or purchase of stock market shares have been attempted.

Features of the system, allowing quantifying the qualitative factors involved in predicting stock prices. The researcher, in (1998), an article with the same title, regardless of genetic algorithms has done. In the paper, a questionnaire with fuzzy Delphi method to the use of expert opinion is used to predict the stock price.

Refenes *et al.,* (1994), the stock price behavior modeling by neural networks, its performance have been compared with the regression models. The results show that neural networks have better performance than the statistical techniques and models are better.

Tan *et al.,* (1995), the system has been designed significant changes in the short-term stock price forecasts. The events took place before processing and neural network modeling the situation very well benefit estimates.

Zhuowenwang (2004) concluded that technical analysis basic and can reveal hidden rules behind stock prices. Of the EPS and P / E of the most important and most powerful analysis techniques are essential.

MacMillán (2001) take note the nonlinear relationship between stock returns and changes can be made based on the logarithmic transformed into simple linear equations. Accordingly, the nonlinear relationship

between the output variables such as interest, dividends, and return on equity, return on assets and the ratio of dividends to stock price was determined through a simple logarithmic model.
Souto-Maior (2006) to predict the direction of stock prices in Brazil using fuzzy logic payment in the end, the result was predictable, adequate evaluation.
Kanas and Yannopouluos (2001); in this study the linear and nonlinear models for the prediction of monthly stock returns New York Stock Exchange were compared.
Spiro (1990) America shares in the stock market is affected by changes in interest rates, stock price forecasting model for the long-term and short-term talent.
Bae and Kim (1998) in the accounting system of the utility of the product of accounting profit and the book value of net assets (equity) in predicting stock returns has been studied the research shows that this model has the great ability in predicting stock prices and returns.
Sim (2000), in this paper to predict the stock price of four institutions (companies) superior bank of a factor model with respect to financial and other economic variables action.
Richard and Charles, in a study of the New York Stock Exchange Company for the years 1974 to 1994 were studied. According to Gordon, the stock's intrinsic value is calculated as the present value divisible for all future profits were defined based on current information.
Yim (2002), a study comparing neural network prediction and forecasting methods, classical methods (GARCH, ARMA) has done Evaluation Criteria (R and MSE). The results show the superiority of neural networks compared to samples GARCH, ARMA.
Kim and Stambough (1986), Cambell (1987), Fama and French (1976) and Hodrick (1992) showed that financial variables such as dividend to price ratio, price-earnings ratio and short-term interest rates can not predict stock returns.
Dater *et al.,* (1998) the effect of liquidity on stock returns examined. Research since the 1963 -1991 period is done. Variable rate of return on equity) of the dependent variable (the change rate Inventory turnover) independent (that Inventory turnover is negatively correlated with stock returns.
Fama and French showed that dividends can predict stock returns. During *et al.,* study examined the relationship between cash and stock returns. The results showed a significant positive correlation between the ratio of cash and stock returns.
Xing study the relationship between investment and return on equity capital of the company in both cross-sectional and time-series data examined. The results showed that investment is negatively associated with future stock returns and future stock returns are positively associated with an investment in the future.
Lewellen a study of financial ratios to predict stock returns will be examined. The study period was the year 2000 -1995. The results showed that a significant dividend yields can predict stock returns, the price-earnings ratio of book value to market value have little ability to predict stock returns.
Olsen and Mossman a study to predict stock returns using financial ratios studied. The study of neural network model and ordinary least squares technique is used to predict stock returns. 1976 to 1993 study period. The results show that the neural network technique to predict than other technologies, more acceptable results are presented and forecast error is significantly reduced.
Busu (1997) in an article entitled "The relationship between price-to-earnings ratio and the performance of investments in equities," writes price-earnings ratio data entirely in stock prices and investment performance does not reflect the same speed. And average looks equation in multiples shares of profit compared with other types of pricing and opportunities from "abnormal returns" that are available to investors, disproportionately priced.

Hypothesis

1) Adjusted price more accurately predict stock returns based on the forecast is based on historical cost.
2) The expected return on shares of companies listed on the stock exchange based on neural networks more accurately predict stock returns using classical methods (linear regression).
3) The design of a neural network model to predict stock returns Tehran Stock Exchange listed companies as possible.

MATERIALS AND METHODS

Research Methodology

Since the present study is descriptive correlational research, the relationship between two or more variables, in other words, the relationship between stock returns and financial ratios will be discussed. For this purpose, according to the research questions, the research was the following:

The research firms listed in Tehran Stock Exchange are among the companies considerations were taken into account. After the election on the basis of considerations into account, financial data required to run the model presented in the project was collected by referring to relevant sources. At this stage, according to the needs of hypotheses, models, independent and dependent variables are related to each hypothesis was measured according to the definitions of operating. At this stage, variables, return on equity and financial ratios were calculated on the basis of research models and continue to fit models were categorized and sorted. Then, using financial ratios based on historical cost and price adjustment (accounting for inflation), model parameters by least squares regression analysis and artificial neural network estimated and finally, based on the estimated parameters will attempt to confirm or reject the hypothesis.

The Findings

Predict stock returns based on financial ratios based on the historical cost of the least squares regression

In this study, the ratios for predicting stock returns last year to predict stock returns this year has been used and the method of least squares regression (OLS) estimate the return on equity.

To predict stock returns with financial ratios based on historical cost regression model (1) was used:

Model (1) $R_{it}=16.3+1.5CR_{it-1}+10AT_{it-1}-05.\ FAT_{it-1}+31.5NPM_{it-1}-8\ ROA_{it-1}+\varepsilon_{it}$

To select the type of model we shall see better Pooled model or fixed effects model, which the Chow test (F test or binding) occurs. In this test, the null hypothesis and its opposite is presented as follows:

H0: the Pooled = all intercepts are equal.

H1: At least one of the intercept = fixed effects model was different.

Chow test results for the model (1) are shown in Table 1

Table 1: The Chow test for the model (1)

Test sectional fixed effects	Statistics	Degree of freedom	Significance level
F statistics	13.454779	(4,471)	0.0000
Chi-square statistic	52.042.68	4	0.0000

As you can see, the null hypothesis is rejected on the same latitudes.

Therefore, at this stage, the fixed effects model is selected as the preferred model. However, the fixed effects model should be tested against the random effects model. Hausman test was used for this work.

In this test, the null hypothesis and its contrast is as follows:

H0: = random affects model, there is no correlation between the explanatory variables and the individual effects.

H1: = fixed effects model, the individual effects and the explanatory variables are correlated.

The Hausman test for the model (1) is shown in Table 2. As you can see, the null hypothesis that there is no relationship between the individual effects and the explanatory variables may be rejected. So we need to estimate model (1) the method used fixed effects.

The model (1) is shown in Table 3.

Table 2: Results of Hausman test for the model (1)

	Random effects test cross		
Test	**Chi-square statistic**	**Degree of freedom**	**Significance level**
Random time	12.49501	5	0.0296

Table 3: Results of model (1)

Dependent variables: return on equity

Period: 2007-2012 Number of years-now: 588

Variables	Coefficients	Significance level
Constant coefficient	16.28586	0.0093
Current ratio	1.545686	00251
Asset turnover ratio	10.003130	0.0224
Fixed asset turnover ratio	-0.463349	0.0159
Net income to sales	31.44031	0.0067
Return on Assets	-8.192013	0.0192
Coefficient of determination (R2)	0.118971	
Coefficient of determination (R2) Adjusted	0.102136	
F statistic	7.066880	
Significance level F statistics	0.000000	
Watson statistic camera	1.913224	
Chi-square test (Lagrange multipliers)	1.142400	
Chi-square statistic is significant	0.141550	

The results of the regression of Atkast which is significant in the regression fit. The significance of the regression analysis (Test F) is used. According to the data in Table 3 Since the level of statistical significance F (0.00000) is less than 0.05; therefore, goodness of fit of the model, the F-statistic is significant, resulting in significant regression. In total, it is estimated regression equation. Watson camera was used to test the independence of statistics. Watson camera serial correlation between regressions testing in general remains to test it. In this model, the value of this parameter is equal to 1.913 shows there multicollinearity between consecutive residues. In this study, the White test was used to detect the difference in terms of disruption. Chi-square statistic is significant that represents the Lagrange multiplier 0.141550 shows that, the null hypothesis is not rejected at 5% level of homogeneity of variance and the variance difference there. According to Table 3, the coefficient of determination is equal to 119/0. Coefficient of determination shows approximately 12% of variability (return on equity) can be prevented by the independent variables (Current ratio, asset turnover ratio, fixed asset turnover ratio, the ratio of net income to sales and return on assets) explained. The independent variables, 12% of the predicted stock returns. The regression coefficients in Table 3 according to the return on equity and return on assets with fixed asset turnover ratio are negative and significant. The current ratio between stock returns, asset turnover ratio of net income to sales, there is a significant positive relationship. Predict stock returns based on financial ratios adjusted for general price index based on the least squares regression in this study, the ratios for predicting stock returns last year to predict stock returns this year has been used and the method of least squares regression (OLS) estimate the return on equity.

To predict stock returns with financial ratios adjusted based on the general price index regression model (2) was used:

Model (2) $R_{it}=16+46.\ ACR_{it-1}+13.3\ AAT_{it-1}+1.5AFAT_{it-1}+5ANPM_{it-1}+8AROA_{it-1}+\varepsilon_{it}$

To select the type of model we shall see better Pooled model or fixed effects model, which the Chow test (F test or binding) occurs. In this test, the null hypothesis and against it the way it is presented on the following page:

H0: the Pooled = all intercepts are equal.
H1: At least one of the intercept = fixed effects model was different.
Chow test results for model (2) are shown in Table 4.

Table 4: The Chow test for model (2)

Test sectional fixed effects	Statistics	Degree of freedom	Significance level
F statistics	12.542514	(4,471)	0/0000
Chi-square statistic	48.686000	4	0/0000

As you can see, the null hypothesis is rejected on the same latitudes. Therefore, at this stage, the fixed effects model is selected as the preferred model. However, the fixed effects model should be tested against the random effects model. Hausman test was used for this work. In this test, the null hypothesis and its contrast is as follows:
H0: = random affects model, there is no correlation between the explanatory variables and the individual effects.
H1: = fixed effects model, the individual effects and the explanatory variables are correlated.

Table 5: Results of Hausman test for model (2)

Sectional stochastic effects Tests			
Tests	**Chi-square statistic**	**Degree of freedom**	**Significance level**
Random time	13.297996	5	0207/0

The Hausman test for model (2) is shown in Table 5.
As you can see, the null hypothesis that there is no relationship between the individual effects and the explanatory variables may be rejected.
So we need to estimate the model (2) the method used fixed effects.
The results (2) are shown in Table 6.

Table 6: Estimation results of model (2)

Dependent variables: return on equity
Time period: 2007-2012 Year- company number: 588

Variables	Coefficients	Significance level
Constant coefficient	15.96734	0.0217
Current ratio	4.662279	0.0042
Asset turnover ratio	13.32016	0.0448
Fixed asset turnover ratio	-1.498155	0.0220
Net income to sales	5.071164	0.0106
Return on Assets	7.895510	0.0128
Coefficient of determination (R2)	0.1518847	
Coefficient of determination (R2) Adjusted	0.135640	
F statistic	9.369376	
Significance level F statistics	0.000000	
Watson statistic camera	1.906054	
Chi-square test (Lagrange multipliers)	1.536375	
Chi-square statistic is significant	0.123440	

According to the data of Table 6 Since the statistical significance F (0.00000) is less than 0.05, therefore, indicators of goodness of fit of the model, the F statistic is significant, and the regression results are significant. Watson statistic camera was used to Tests independence. In general Tests camera serial

correlation between residues Watson regression Tests as well. In this model, the value of this statistic is approximately 1.906 indicates that there is no multicollinearity between consecutive residues.
Significant chi-square statistic, which represents the Lagrange multiplier which shows 0.123440, the null hypothesis of homogeneity of variance was not rejected at the 5% level and therefore there is no variance anisotropy.

According to Table 6, the coefficient of determination is equal to 0.152. Coefficient of determination shows approximately 15% of the variability (return on equity) can be prevented by the independent variables (current ratio, asset turnover ratio, fixed asset turnover ratio, ratio of net income to sales and return on assets) explained.

The independent variables predicted 15% of the stock returns.
Table 6 According to the current ratio adjusted regression coefficients between stock returns, asset turnover ratio, the ratio of net income to sales and return on assets and a significant positive relationship exists. The negative correlation between stock returns and fixed asset turnover ratio is significant.

Predictability of Stock Returns Based on Financial Ratios Based on Historical Cost through Neural Network

In this study, the ratios for predicting stock returns last year for this year has been used to predict stock returns multilayer feedforward neural networks using multilayer perceptron methods generally (MLP) is called, stock returns based on the model (1) is estimated. Above the Law learning for neural network training is used Psantshar error. The law consists of two main routes.

The first path is called the path went this route vector input into multi-layer perceptron (MLP) and the impact exerted by the middle classes moving to the output layer. Output vector is formed at the output layer, the actual response of multilayer perceptron (MLP) to form. The route network parameters are considered fixed and unchanging second is called the return trip. In this way, the opposite way is parameters perceptron (MLP) and adjusted fit changing.

This adjustment is done in accordance with the error corrected. The error signal at the output layer of the network is formed. The error vector is equal to the difference between the desired response and the actual response of the network.

Error value, then calculate, on the way back from the output layer and the network layer in the distributed network. Because the current distribution, weighted synapses in the opposite direction of the communication takes place, the word Psantshar error correction to the distribution of network behavior is selected.

Network parameters are adjusted so that the actual response of the network is much closer to the desired response. Learning algorithms used in this study, the error propagation algorithm, and then to learn faster than backward error propagation algorithm is then used.

Curve predicted by the neural network output and actual output values for training data model (1) is shown in Figure 1. The plot of predicted values on the Y axis and X axis is the observed values. Ideally, these values should be approximately 45 degrees along the line that starts from the origin, as well. As you can see, the network has good performance in predicting stock returns.

Figure 1 yields the predicted and actual values output by the neural network for training data model (1)

Summary of model (1) is shown in Table 7. Sum of squared errors are shown in this table. This is the error function that the network tries to take over the operation of it to the lowest.

The error associated with the dependent variable, the dependent variable is the ratio of the sum of squared errors, the sum of squared errors null model where the dependent variable is the average value of the predicted value for each item is used.

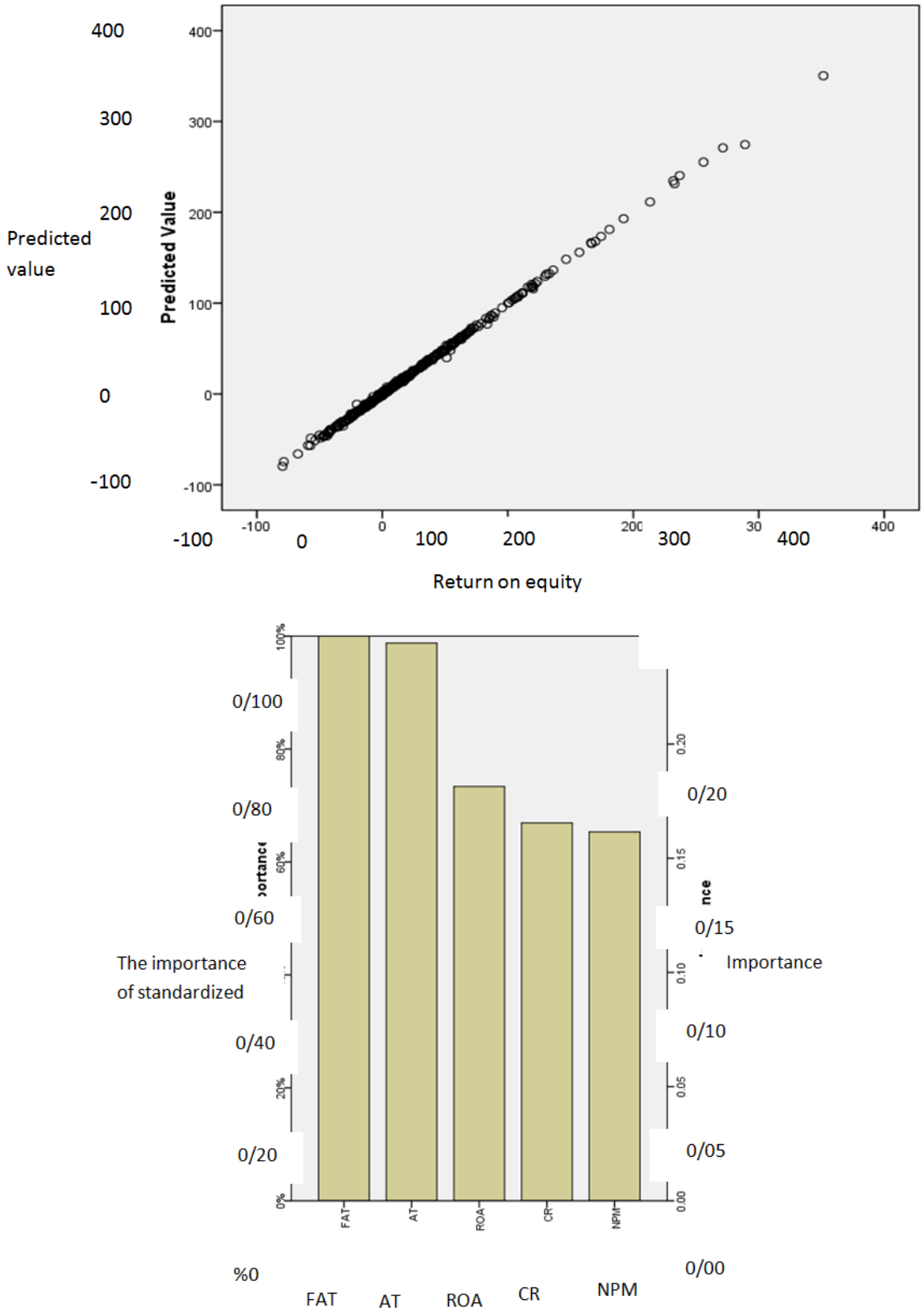

Figure 2: The importance of the independent variables in the model (1)

Predict stock returns based on financial ratios adjusted for general price index based on neural network In this study, the ratios for predicting stock returns last year to predict stock returns this year has been used multilayer feedforward neural networks using multilayer perceptron method generally (MLP) is called, return on equity based on the model (2) is estimated.
Yield curve predicted by the neural network output and the actual values for the training data model (2) is shown in Figure 3. The graph of the predicted and observed values on the Y axis is the X-axis.
Ideally, this would amount to approximately 45 degrees along the line that starts from the origin, as well.
As you can see, network performance is very good at predicting stock returns.

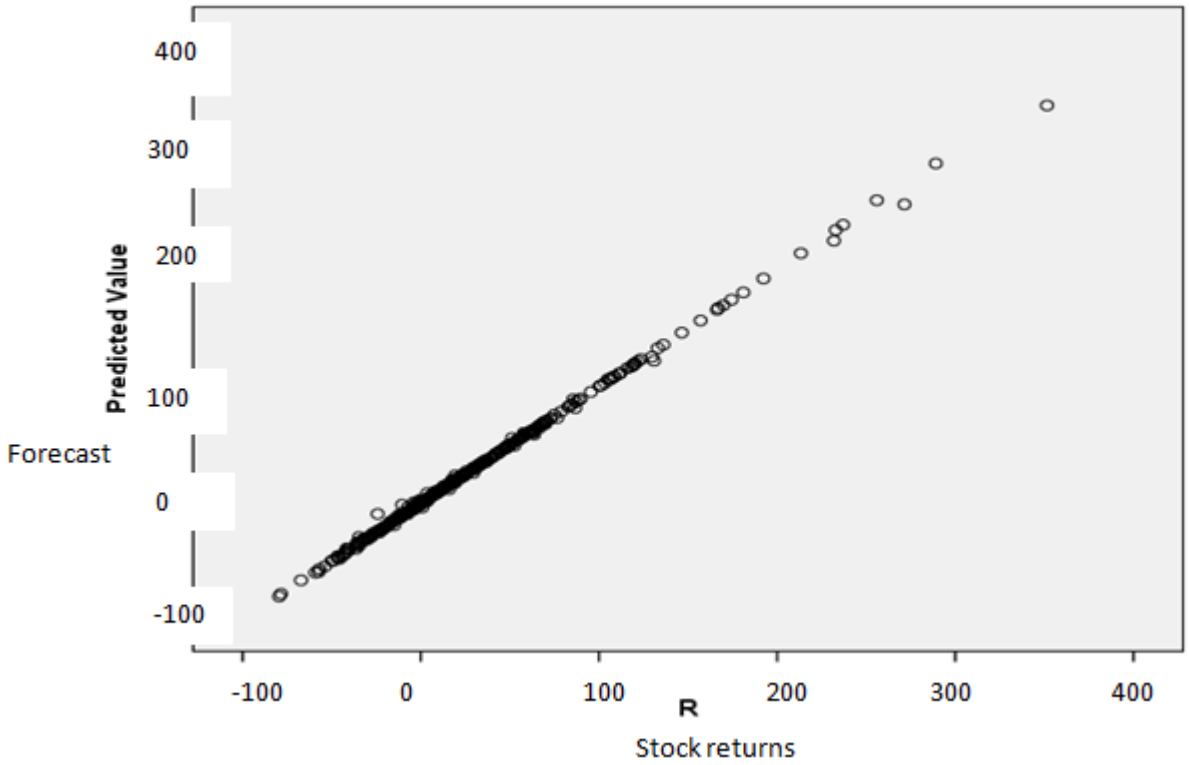

Figure 3: The output predicted and actual values output by the neural network for training data model (2)

Summary of model (2) is shown in Table 8. Sum of squared errors are shown in this table. This is the error function that the network tries to take over the operation of it to the lowest. The error associated with the dependent variable, the dependent variable is the ratio of the sum of squared errors, the sum of squared errors null model where the dependent variable is the average value of the predicted value for each item is used.

Table 7: Summary of Model (2)

Education	Sum of squared errors	0/196
	Relative error	0/001
	Stopping rule used	Training error ratio (0.001) to obtain
	Training time	00:00:57.375

Dependent variable: R

Independent variables and their impact on the efficiency of the model (2) are shown in Figure 4. Accordingly, the variables are adjusted based on the general price index, variables, net profit margin, return on assets, current ratio, asset turnover ratio and fixed asset turnover ratio, respectively, are of the greatest importance and impact.

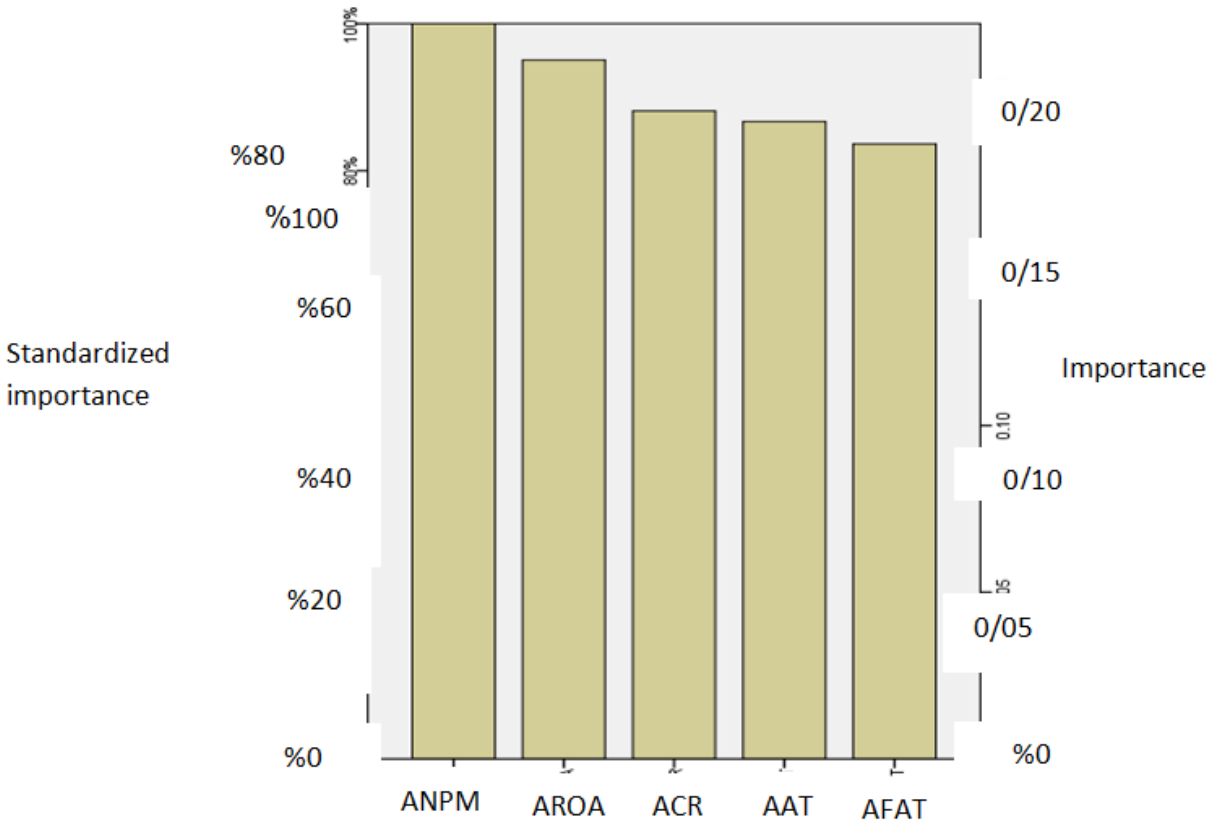

Figure 4: The importance the independent variables in the model (2)

Table 9: Comparison of predicted stock returns based on financial ratios based on the historical cost and ratios adjusted for general price index based on the least squares regression and neural network

Performance evaluation criteria	Root mean square error (RMSE)	The mean absolute error (MAE)	The mean absolute percentage error (MAPE)
Predict stock returns based on financial ratios based on the historical cost of the least squares regression	70/06331	41/42983	485/29690
Predict stock returns based on financial ratios based on the general price index by least squares regression	70/03096	41/34554	465/76590
Predict stock returns based on financial ratios based on the historical cost through the neural network	62/54335	30/12962	430/30092
Predict stock returns based on financial ratios based on the general price index from the neural network	57/19489	25/51681	417/80076

Compared to predict stock returns based on financial ratios and ratios based on historical cost adjusted for general price index based on the least squares regression and neural networks predict stock returns based on financial ratios based on the historical cost and ratios adjusted for general price index based on the least squares regression and neural network using the root mean square error performance measures (RMSE), the mean absolute error (MAE) and mean absolute percentage error (MAPE) is compared in Table 9.

According to Table 9, show the performance evaluation criteria that predict stock returns financial ratios based on the general price index to predict stock returns financial ratios based on historical cost (in both methods, least squares regression and neural networks), is preferred. The first hypothesis (prediction of stock returns using financial ratios based on adjusted prices are more accurate than forecasts based on historical cost) confirmed. The neural network predicts stock returns based on the financial ratios of least squares regression method. (Based both on historical cost and general price index), is preferred. The second hypothesis (prediction of stock returns using financial ratios through artificial neural networks to predict stock returns using ordinary least squares regression is more accurate) confirmed.

The results showed that the design of an artificial neural network model for predicting stock returns for firms listed in Tehran Stock Exchange is possible the third hypothesis was thus confirmed.

RESULTS AND DISCUSSION

Results

In this study the prediction of stock returns using financial ratios based on historical cost compared to modified expense (accounting for inflation) was studied with neural network approach. Results Descriptive statistics for the variables showed that the average return on equity in the companies surveyed is 29.168. As observed ratios adjusted based on the general price index is lower than the ratios have been modified. For example, the average return on average assets and return on assets adjusted to 0.112 based on the general price index that reflects the 0.094 is that the denominator of this ratio are assets based on the general price index adjustment and have been updated this has led to reduced yields and adjusted. The results predict stock returns based on financial ratios based on historical cost through least squares regression shows between return on equity and return on assets with fixed asset turnover ratio is negative and significant. Between stock returns and the current ratio, asset turnover ratio and the ratio of net income to sales, there is a significant positive relationship. The results predict stock returns based on financial ratios adjusted for general price index by least squares regression showed that the current ratio-adjusted stock returns, asset turnover ratio, the ratio of net income to sales and return on assets and a significant positive relationship exists. The negative correlation between stock returns and fixed asset turnover ratio is significant. The results predict stock returns based on financial ratios based on historical cost through neural network showed the network has good performance in predicting stock returns variable and fixed asset turnover ratio, asset turnover ratio, return on assets, current ratio and net profit margins, respectively, are of the greatest importance and impact. The results predict stock returns based on financial ratios adjusted through neural network based on the general price index showed the network has good performance in predicting stock returns and the variables are adjusted based on the general price index, variables, net profit margin, return on assets, current ratio, asset turnover ratio and fixed asset turnover ratio, respectively, are of the greatest importance and impact. Compared to predict stock returns based on financial ratios based on historical cost and ratios adjusted for general price index based on the least squares regression and neural network by using root mean square error performance measures (RMSE), the mean absolute error (MAE) and mean absolute percentage error (MAPE) showed expected stock returns based on financial ratios based on the general price index to predict stock returns financial ratios based on historical cost (in both methods, least squares regression and neural networks), is preferred. The first hypothesis (prediction of stock returns using financial ratios based on the projected cost of the modified historical cost is more accurate) confirmed. The neural network predicts stock returns based on the financial ratios of least squares regression method (based on the historical cost basis and general price index), is preferred. The second hypothesis (prediction of stock returns using financial ratios

through artificial neural networks to predict stock returns using ordinary least squares regression is more accurate) confirmed. The results showed that the design of an artificial neural network model for predicting stock returns for firms listed on the Stock Tehran exchange is possible and, therefore, the third hypothesis was confirmed.

Table 10: Summary of results of testing hypotheses

Hypotheses	Result
First hypothesis: prediction of stock returns using financial ratios based on more accurate price forecasts based on historical cost is modified.	Approved
Second hypothesis: the prediction of stock returns using financial ratios predict stock returns through artificial neural networks using ordinary least squares regression is more accurate.	Approved
The third hypothesis, design an artificial neural network model for predicting stock returns for firms listed in Tehran Stock Exchange is possible.	Approved

Comparing these results with Qblyntayj investigation showed that the prediction of stock returns using financial ratios through artificial neural networks to predict stock returns using ordinary least squares regression is more accurate. The result of the research results Refenes *et al.*, (1994), Yim (2002), Panahiha (2000), a sphere and Norosh (2003), and Chavoshi (2003), Azar and Karimi (2009) and Sinai and Colleagues (2005) is consistent. The results of research on the prediction of stock returns using financial ratios based on historical cost with the results Namazi and Rostami (2006) is consistent. The results of research on the prediction of stock returns using financial ratios based on the results of the modified price Nikbakht and Tnani (2007) and Dastgir and Colleagues (2003) is consistent.

Recommendations based on Findings

According to the results of the exchange and capital markets, investment firms and other financial institutions offeredo predict the future trend of the market is better than artificial neural network model is used.

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