Predictability of stock returns using financial ratios in the companies listed in Tehran Stock Exchange

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ABSTRACT: As one of the complicated and interesting phenomena for both investors and analysts, stock return has always been a source of controversy in the financial markets. The assessment of correlation between financial ratios and their impacts on the stock return predictability is one of the issues often addressed in this area. The present study aiming to assess correlation between financial ratios and their impact on predicting stock returns for the companies listed in the Tehran Stock Exchange covers four financial ratios including price to earnings, book to market value, dividend yield, and capital gain. In order to test the research hypotheses, the historical data over a ten year period during 1998-2007 for the sample under study were extracted from the respective data bases. The results of data analysis using E-views Software as well as simple and multiple linear regression tests suggested that of the ratios under in question; book to market value and capital gain significantly affect stock return predictability and that stock return can be predicted by analyzing these variables.

Key words: stock returns, financial ratios, book value, market value, capital gain

INTRODUCTION

Stock market is one of the most important financial sources for companies to raise their assets, in which companies are allowed to publicize their business and obtain more capital in order to facilitate their development process. Liquidity in the stock market will enable shareholders to have easier access to liquidity which facilitates the sale of their stocks. Besides, the influential features of the stock exchange have made it a perfect place for companies and investors to raise funds in the capital market.

In the past two decades, economists and financial experts have been seeking to identify variables that are able to determine returns in the stock market. They have been always looking for parameters that have the capability of predicting future share prices as shareholders’ performance in stock market is by and large measured by the return on investment. Besides, stockholders are usually more likely to take risks when making investment and they seek to predict stock returns in order to maximize their interests. For scholars, an analysis of the behaviors of stock returns is one the most important investigations on the financial market which always receives much interest by investors in the stock market. Stock returns are associated with several factors; including financial ratios derived from accounting information. The accounting information will help investors to predict future events. In addition, financial scholars are often interested in examining the financial ratios to able to use them in predicting future stock returns. Studies performed in this area have shown that the size of the company, interest rate, the beta coefficient, the ratio of market value to book value, price-to-earnings ratio, and dividend yield have more predictability power than other variables. Accordingly, the present study aims to examine the effects of financial ratios for the prediction of stock returns in Tehran Stock Exchange by employing the following financial ratios:

| Price to earnings ratio (P/E); |
| The ratio of book value to market value (B/M); |
| Dividend yield (DY); and |
| Capital gain |

Literature Review

Since each stockholder considers the stock returns as an important factor when selecting his investment project, the focus of the present study is on the stock returns predictability using financial ratios. Financial ratios
have been used in many research and applied fields. Such ratios have been employed in applied studies to predict future successes and decisions and in research field to construct models. Analysis of stock returns behavior is among the most important financial market research which has received much attention form shareholders in the stock market. Of the numerous factors that are associated with stock return, two factors - capital gain and dividend yield - can be considered as the most important factors.

It is often said that investors who make short-term investments and speculators are active in the market due to capital gain while long-term investors do so for the sake of dividend yield.

In capital market, capital gain refers to stock prices change over a period as one the main factors of stock return. Stock prices change occurs when an investor sells his shares at a price higher than what he has bought. Besides, dividend yield is measured to forecast earnings per share for the investment made, including dividends paid per share divided by the market price per share. Some stockholders buy common stocks to make profit. Others focus on the rise of market price of the common stocks. Besides, dividend yield is used by some certain shareholders as a measure of the amount invested on common stock over a period. The present study examines the existence of a significant relationship between stock returns and the above financial ratios within the companies listed in Tehran Stock Exchange. Other financial ratios manipulated in this study are price-to-earnings ratio (P/E) as one of the oldest and widely used tools for valuing a company's stocks. An analysis of the impacts of price-to-earnings ratio indicates that stocks with a low price to earnings ratio yield higher returns than stocks with a high price to earnings ratio. Therefore, there is an inverse relationship between price-to-earnings ratio and return portfolio. In addition, a shareholder can make more profit by making a sound investment in stocks with a low price-to-earnings ratio. As a result, the price-to-earnings ratio can be a useful underlying variable to show stock returns over different periods in the stock market. Similarly, the ratio of book value to market value also shows that those stocks whose market value is higher than their book value are less profit making. P/E ratio is most commonly used ratio that is of significant value in capital markets for investors, analysts, portfolio managers, consultants, and others. The reason for why this ratio is so popular is its power to show the relation between market value and earnings per share in the form of a mathematical number. The aim of this ratio is to express the relationship between price that a shareholder pays to buy shares and the company's future prospect and its anticipated earnings.

Another ratio manipulated in the present study is the ratio of book value to market value which is obtained as the outcome of book value per share divided by the market value of that share. Book value per share represents the historical values per share. However, the market value per share is a reflection of the future cash flows that the company will earn. So if a company is so well organized and managed that is able to perform its roles and responsibilities efficiently its market value is greater than its historical and book values. The ratio of market value to book value per share shows investors’ opinions about the company’s past performance and reflects its future prospect.

Concerning the ratio of book value to market value, it can be said that since the measurement of the market price and earnings, book value, dividend yield, and stock prices is useful for predicting the stock price behavior and future returns, an analyzing person should be able to identify profitable business strategies based on profit, book value, and dividend yield.

A low ratio of book value to market value of stocks indicates that there are significant differences between book value and the market value of equities. A major cause of such difference is due to the fact that the company enjoys intangible assets and opportunities for growth and development (such as having information and economic rents, royalties, goodwill, skilled manpower, accumulated technical know-how ...) which have not been reflected in the companies' books but their values have been considered in stock prices. The opposite is also the case with the high ratio of book value to market value. Accordingly, the low ratio of book value to market price suggests less risks experienced by firms and consequently lower expected rate of return for investors and vice versa. Therefore, according to the above arguments and empirical evidence on the financial literature, it is reasonably expected that there is a positive relationship between the ratio of book value to market prices and stock returns in Tehran Stock Exchange.

Tehran Stock Exchange is an organization whose aim is to mobilize savings, directing them towards productive and useful investments for the benefit of Iranian society and economy. Therefore, a study of issues related to the organization is of special importance. Since Tehran Stock Exchange during its operation has been grappling with many ups and downs, the need for extensive studies in this field seems necessary because the goal of investors who invest in the stock market is to make more profit. Furthermore, corporate managers’ aim is to boost productivity by the optimal use of the existing financial resources. Given the significance of stock returns in increasing shareholder wealth, financial researchers are always looking for ways to increase the efficiency of the capital market. One of the measures that will lead to greater efficiency of this market is the more accurate
understanding and application tools and variables influencing stock returns which are is always the subject of much research in different countries. The issue has also been one of the shareholders and analysts' basic needs, leading to the identification of more effective strategies for the practitioners in the capital market.

About fifty years ago, Morris Kendall who was looking for random changes in the stock price over time, started to study the effects and predictability of past stock prices, followed by many studies on the predictability of other variables including financial variables which largely resulted in the investigation of the predictability of stock returns. The financial variables include price-to-earnings ratio, the ratio of book value to market value, and dividend yield along with various techniques used to measure interest rate. Although many studies have been done on the stock return predictability, most of these studies have been limited to developed countries, to the detriment of financial markets in the developing countries.

Stock return prediction as a very important topic, has always attracted the financial analysts' attention. One of the financial analysis techniques employed by analysts is the use of financial ratios. Given the importance of the issue, using methods of analyzing financial statements and benefitting from real data analysis, the present study aims to examine the predictability of stock returns by employing financial ratios including dividend yield (DY), price to earnings ratio (P/E), the ratio of book value to market value (B/M), and capital gain. Besides, this study is going to present such financial ratios as appropriate indices to be used for facilitating of decisions to be taken by stockholders and help users of financial statements to analyze financial ratios.

Research Background

Stock return prediction is an important matter which has always captured the financial analysts' attention. Today, the theory of stock return predictability has been turned into a widely accepted theory. One of the financial analysis techniques employed by financial analysts is the use of financial ratios. They use real data analysis and financial statements analysis to study the stock return predictability based on financial ratios. Such financial ratios are considered as appropriate indices to be used for facilitating of decisions to be taken by stockholders and help users of financial statements to analyze financial ratios.

A. Theoretical framework of the study

The basic financial statements include: balance sheets, profit and loss statements, accumulated profit and loss, cash flow, and notes to financial statements. The analysis of such statements raises the awareness of corporate managers, capital owners, stockholders, creditors, and investors about the current and future financial position of the company and allows them to make judgments about it.

Figures that represent the activities of businesses are usually in the form of detailed numbers. To use such figures it is needed to turn them in the form of intelligible, related, and possibly limited information so that the analysis of financial statements is useful and informative. Financial ratios can be determined through the use of accounting information contained in financial statements.

Humans’ inquiring mind is always seeking to detect the order that exists in phenomena around him and to find out the relationship among them and to observe the laws governing them in order to explain these phenomena and predict their behaviors. Such attitude aims to make accessible a coherent set of information in order to take better decisions. The necessity of financial information in human societies have always caused intellectual challenges of the financial information with the aim of providing desired and useful information to the decision makers and developing specific definitions and criteria for such information. For instance, many efforts have been made to discover the balance between different types of information. The use of financial ratios in making decisions gained popularity in the nineteenth century. However, “Balance Theory” had been formulated in human sciences before this happened. From that time on, financial ratios were started to be used in applied and research areas. Financial ratios have been used in applied studies to predict the future success of decisions taken. Furthermore, such ratios are used in theoretical research for the purpose of model construction. These efforts indicate that if the goals of establishing the relationship between financial information are clear and such information are presented in significant categories based on their function and nature, the creation of the relationship based on the financial ratios will be more robust. The first financial ratio used in the financial analysis was the current ratio that provided the most information needs of credit suppliers. Then an idea was proposed to present the relationships between the financial information in the form of a system. The idea resulted in the emergence of Dupont Triangle System which is still extensively used. These challenges viewed in terms of various aspects of business activities such as investment, operational, and financing decisions have kept, leading to various schools of financial ratios.

The history of using financial ratios analysis indicates the various uses of these ratios in different decisions taken. However, the basis of these ratios has not yet been studied theoretically. Most studies conducted on financial ratios are of an experimental nature and despite the tendency towards theoretical approaches; theoretical
investigations have not made progress as much as applied and experimental studies have. The main motive behind the use of financial ratios analysis is that it is possible to present financial information in the form of a compact set of ratios rather than detailed and comprehensive financial statements. Accordingly, efforts have been made to provide a summary of financial ratios that reflect the activities of done by an economic unit.

Due to the continuing use of financial ratios and numerous studies performed in this field, some scholars regard these challenges as the "schools of financial ratios analysis". According to Foster (1986), financial ratios have been often used due to following reasons:
To compare different companies over specific time periods;
To provide information that are able to test statistical hypotheses more efficiently;
To examine whether a ratio is a useful and applicable variable or not; and
To study rule-governed empirical evidence between financial ratios and to estimate or predict variables of interest.

Prior to the 19th century, a particular and pervasive principle was not used in financial reporting and business companies used to regard their accounting operations as confidential activities. Therefore, reporting procedures were used only in times the company owners and lenders demanded. Besides, since extensive investments did not make and public joint stock companies had not been formed yet, in most cases business companies used to be funded by few banks and investors. Ledgers and accounting reports were kept to be used by the management, lenders, and banks. Besides, banks and credit lenders were mainly interested in cash flows and the company's ability to settle its liabilities. This led to the development of the approach of financial ratio analysis especially in the U.S. as in the early 1870s commercial banks needed to examine companies' financial statements in order to grant them credit. But it was not so common till the 1890s where the volume and the flow of financial information increased largely. At the beginning, financial reports were prepared upon request and based on the required items.

Afterwards, such information was provided generally in tabular and comparative forms. Almost at the same time, the separation of current and non-current items and the analysis of various data sets started to become widespread. Although, in the 1980s a number of financial ratios were calculated and used, the current ratio is more important and thus has a lasting effect on the analysis of financial statements than the other ratios. In fact, the use of ratios to analyze financial statements began with the current ratio.

At the turn of the twentieth century, significant advances were made in the financial ratio analysis. Accordingly, three major developments are as follows:

Different ratios were developed and used.

A benchmark criterion was introduced for each ratio, the most common of which was 2:1 criterion for the current ratio.

A number of analysts addressed the need for the assessment of companies and the necessity of the evaluation criteria.

During this period, two major events had significant impact on the financial statements and the improvement of their content. These events were as follows:
The formulation of the first income tax law in 1913.
The establishment of the Federal Reserve System was in 1914 which refers as the U.S. Central Banking System.

Alexander Wall (1912) addressed the need for different ratios and necessity of the evaluation criteria to measure them. He started to collect information on financial information from and business documents records and published his results in a unique report as "Analysis of credit measures" in 1919. He divided companies into a number of categories based on the types of industries and geographical places and each category included 9 subgroups. He believed that such categorization will result in the emergence of different ratios. Accordingly, seven financial ratios were identified over unspecified periods within 981 companies.

Although Wall's observations are not welcome greatly based on current standards, his study is significant historically and, in fact, it provoked the use of different ratios each with an evaluation criterion instead of employing only a single ratio with an evaluation criterion.

In that period some developments were made concerning the use of ratio analysis for management purposes. In small firms, the ratio analysis became widely used in the form of profit margins and sales. However, these ratios began to use more extensively in industrial units. In 1919, Dupond Company started using Ratios Triangular System to assess operational results. In this system, the apex of the triangle is the ratio on return on investment (profit to total assets) and the two adjacent sides are the ratio of profit margin (profit to sales) and the capital turnover ratio (sales to total assets). The aim of this system was to provide a framework in which development and growth happen reasonably. This logic is also commonly used at the present time.
Nicholson (1968) studied the ratios of depreciation to price, price to sales, price to book value, and price-to-earnings and observed that portfolios with lower price-to-earnings ratio and those with lower ratios of depreciation to price and price to sales have a higher price rise.

Basu (1977) in a time period from April 1957 to March 1971 showed that in addition the size of the company and the stock's beta, price to earnings ratio also plays a great role in explaining average returns. He observed those stocks with a high ratio of profit to sales have significantly higher returns than stocks with low ratio of profit to sales and changes in Beta can not explain stock return changes so that even after controlling Beta, stocks with a lower ratio of profit to sales have higher returns than stocks with a high ratio of profit to sales.

The results of Ball’s (1978) study indicated that the ratio of profit to price represents unlabelled factors affecting the expected returns. Furthermore, stocks with higher expected risks and returns are more likely to have a higher profit to price ratio.

Benz (1981) suggested that stocks of companies with a low market value have a higher average return of stocks than companies with a high market value. He believed that the addition of the company market value to the regression between stock returns and stock Beta may help the difference in the companies' average return to be better explained. The results of his study indicated that the average return in small companies (with a low market value) has an incredibly high estimated Beta. In contrast, the average return in big companies has a low estimated Beta.

Rosenberg, Reed and Lanstein (1985) observed that stocks with a higher ratio of book value to market value have significantly higher returns than stocks with a low ratio of market value to book value.

Kim (1989) analyzed the effects of the company size and the ratio of profit to price on stock returns. In this study, the companies were categorized in 10 portfolios based on their market value which was taken as the company size. Smaller companies were placed at the first category while the bigger ones were put in the tenth category. Using the regression test, Kim examined the correlation of the company size and the ratio of profit to price with the stock returns and concluded that the average return is inversely related to the market value but it is directly related to the ratio of profit to price. In other words, companies with a lower market value have higher returns than those with a higher market value. Besides, the portfolio of smaller companies with a lower ratio of profit to price has higher average returns than the portfolio of companies with a higher ratio of profit to price.

Chan, Hamao, and Lackni Shak (1991) studied the relationship between stock returns and the four variables: the ratio of profit to price, ratio of book value to market value, the ratio of cash flow to price, and the company size form 1971 to 1988. The sample under study included productive and nonproductive companies. Besides, they measured the individual securities and portfolio returns. The findings of the study suggested that there is an important relationship between fundamental variables and expected returns in the Japanese market. In addition, the ratio of book value and market value was found to be statistically and economically as the most important variable among the four variables under study. It was also found that the predictability of the ratio of book value to market value is not a special phenomenon in January. The ratio of cash flow to price also had a significant and positive relationship with expected returns. Two other fundamental variables were the ratio of profit to price and the company size. The findings of the study confirmed the effects of the company size. In other words, the small companies in the sample under study had a better performance than big companies. After some modification was made to control market risk and other fundamental variables, it was noted that the ratios of profit to price, book value to market value, and cash flow to price had significant effects on expected returns, which seems interesting as the last two variables (the ratios of book value to market value, and cash flow to price) although are known well in the financial community, they received less attention in the academic literature than other variables such as the company size and the ratio of profit to price. In the sample under study, the stock portfolios with highest values of the ratio of book value to market value and the ratio of cash flow to price had 1.58% higher returns per month than the stock portfolios with lowest values of the ratio of book value to market value and the ratio of cash flow to price.

Fama and French (1998, 1995, and 1992) found strong support for the existence of the relationship between the company size, the ratio of book value to market value, and stock returns. Through single and multiple tests, they observed a positive and significant relationship between the ratio of book value to market value and stock returns and a negative relationship between the company size and stock returns. In fact, the writers were uncertain about the sensitivity of beta in the capital asset pricing model and found that main differences in stock returns are explained by two factors of the company size and the ratio of book value to market value.

Barbie, Mukherjee, and Reinz (1995) conducted a study under the title of "Do the ratio of sales to price and the ratio of book value to market value have more explanatory power for stock returns than the ratio of book value to market value and the company size? They found that in the time period from 1979 to 1991 the ratio of the book value of liability to market value of equities and the ratio of cash flow to price had no greater explanatory power for stock returns than the ratio of market value to book value. Besides, the market value of equities had no stable
explanatory power for stock returns. It was also noted that the ratio of sales to price is more preferable for explaining stock returns than the ratio of the book value of liability to market value of equities. The ratio of book value to market value and the market value of equity had no explanatory power for stock returns. On the other hand, the ratio of sales to price per share was a more reliable explanatory factor as this ratio is not affected by different accounting methods that may influence earnings and book value.

Mukherjee and Kim (1997) examined the relationship between returns and fundamental variables in Korea. The dependent variables included the beta coefficient for the ratio of book value to market value, book value of liabilities to market value of equities, the ratio of profit to price, the market value of equities, and the ratio of sales to price per share. The results of the study indicated that there is a positive and significant relationship between stock returns and the ratio of book value to market value, ratio of price to sales per share, and the book value of liabilities to market value of equities. However, there was a significant and negative relationship between stock returns. Besides, stock returns had a positive relationship with the ratio of profit to sale but it had a negative relationship with beta and these correlations were not significant. These results were consistent with the findings of other studies conducted in this area.

Puntiff and Schall (1998) studied the effects of the ratio of book value to market value on stock returns. They used the ratio of book value to market value to predict stock returns because the the market value represent the expected cash flow so the ratio of book value to market value represents the cash flow at the current level since when the discount rate changes, the price level and consequently this ratio will change. The results suggested that there is a general and positive relationship between the ratio of book value to market value of equities and returns. Besides, when the other variables are regarded as independent variables the ratio gains stronger predictability power to explain stock returns.

Liolen (2004) examined the predictability of stock returns using financial ratios including dividend yield, the book value to the market value, and profit to sales. He found that dividend yield has more power to predict stock returns than other variables.

Christos Floss, Shebar Jeffrey, and Yasin Ghulam (2005) examined the use of financial ratios to predict stock returns through linear regression and the Garch Test in the Greek Stock Exchange. The comparative results of time series models and the Garch testing models indicated that the ECM-GARCH Technique shows the correlations between variables more effectively and the technique can be the most appropriate method to predict stock returns using the ratios of price-to-earnings, dividend yield, and price to the book value.

Jiang and Lee (2007) studied the future excess returns and future profits by linear combination of logarithm of the ratio of book value to market value and the logarithm of dividend yield. They observed that the linear combination can predict future excess returns more efficiently than all logarithmic models of stock returns and the logarithmic model of the ratio of book value to market value alone.

Geller Aras and Mustafa Kemal Aylmaz (2008) conducted a study in Turkey as "The prediction of stock returns using financial ratios of price-to-earnings, dividend yield, and the ratio of market value to book value in emerging markets" and concluded that investors in emerging markets could potentially predict market returns for a one year period specifically by using the ratio of market value to book value and dividend yield at a high confidence level. On the other hand, it was noted that earnings-price ratio will play a small role in predicting stock returns.

Lee Chin and Li Hung Wong (2008) examined the predictive power of financial ratios i.e. book value to market value, dividend yield, and capital gain in the Malaysian Stock Exchange. The results showed that future stock returns can be predicted by the use of dividend yield. They found that stock returns have lower predictive power than dividend yield, suggesting that dividend yield in Malaysians companies under study is by itself capable of providing a beneficial business strategy based on the ratio of profit to price. It can also introduce a business strategy based on the combination of two factors of dividend yield and capital gain.

Kohi Avna and Toko Iwasako (2010) analyzed the prediction of stock returns using financial ratios in Japan. They found that the two ratios of price to earnings and dividend yield have greater power to predict stock returns. They also calculated monthly returns and examined the behavior of the price to earnings ratio using Robert Shiller's Test. They observed that this ratio shows a totally different behavior than dividend yield. Besides, it was noted that the predictive power of the ratio of price to earnings is less than the stock return predictability using dividend yield.

**RESEARCH METHODOLOGY**

The choice of research method depends on the research objectives, the nature of the problem under study, and operational facilities. So when the research problem, objectives and the scope are clear we can decide upon
the research methodology. In other words, by choosing the research methodology, the researcher wants to find out which methods may lead more accurately and quickly to finding answers to research question(s).

**Research Hypotheses**

The main problem in this study was to find out whether there is a significant relationship between stock returns and financial ratios in the listed companies in Tehran Stock Exchange or not. To this end, the following hypotheses were formulated:

- There is a significant relationship between stock returns and price-to-earnings ratio in the listed companies in Tehran Stock Exchange;
- There is a significant relationship between stock returns and the ratio of the book value to the market value in the listed companies in Tehran Stock Exchange;
- There is a significant relationship between stock returns and dividend yield in the listed companies in Tehran Stock Exchange; and
- There is a significant relationship between stock returns and capital gain in the listed companies in Tehran Stock Exchange.

**Research Variables**

A variable is a quantity whose value may change in different domains from one observation to another. So the requirement of conducting a research is to determine and define each of the research variables. The variables manipulated in the present study are divided into two groups of dependent and independent variables.

A dependent variable is one whose changes are affected by the independent variables. In this study, stock returns \( R \) in the companies listed on Tehran Stock Exchange is selected as the dependent variable that is calculated as follows:

\[
R_t = \frac{(1 + \alpha)P_{t+1} + DPS_t - P_t - C}{P_t}
\]

Where, \( R_t \) is the return on common stock during the period \( t \), \( P_t \) is the price of common stocks during the period \( t \), \( P_{t+1} \) is the price of common stocks during the period \( t+1 \), \( DPS_t \) is the common stock dividends during the period \( t \), \( \alpha \) is the percentage of capital gain, and \( C \) is the cash revenues when raising capital.

On the other hand, an independent variable is a feature of the social or physical environment that assumes certain values after being chosen, controlled, and manipulated by the researcher so that whose effects on other variable or variables can be discovered. In other words, independent variables are specific conditions or characteristics that the researcher actually manipulates them to prove their relationships to a phenomenon under observation. Independent variables examined in this study include:

- The ratio of book value to market value \( (B/M) \) which is obtained by dividing the book value of the stocks at the end of the financial year to the company’s stock market value at the end of the same year: \( B/M = \text{The market value/book value} \)
- Dividend yield \( (DY) \) is the dividend paid per share divided by the market price of each share: \( DY = \text{Dividend paid per share/the market price of each share} \)
- Price to earnings ratio \( (P/E) \) which is obtained by dividing the current price of each stock to its expected earnings: \( P/E = \text{Stock price/earnings} \)
- Capital gain that refers to stock price changes in a given period.

In addition, the following regression model was used to examine whether correlation coefficients of independent variables are significant or not:

\[
X_t = \alpha + \beta x_{t-1} + \epsilon_t
\]

Where, \( \beta > 0 \) and \( X_t \) is the financial ration in the period \( t \).

The stock return predictability is measured based on financial ratios using a simple linear regression model in the form of the following equation:

\[
R_t = \beta_0 + \beta_1 x_{t-1} + \epsilon_t
\]

Where, \( R_t \) is the stock returns in the period \( t \) and \( x_{t-1} \) represents financial ratios.

Correlation coefficients for the variables used in the above regression model were determined by the use of the linear regression model, ordinary least square (OLS) model, and R-square determination coefficient. Finally, the stock return predictability was determined through multiple linear regression model and the simultaneous effects of the independent variables on the stock return (the dependent variable).
RESEARCH METHOD

The present study is applied with regard to the goals it pursues and correlational and exploratory concerning its nature. Besides, the methodology used in the study is posteriori. A descriptive method was employed to collect the needed data. Finally, the study is a survey because of the way it was implemented.

The Scope Of The Study

The relationship between price to earnings ratio, dividend yield, the ratio of book value to market value, and the ratio of dividend yield to stock returns in Tehran Stock Exchange is examined in the present study.

A. Period Under Study

The study was conducted over a ten year period from the early 1999 to the early 2009.

B. Place Of The Study

Companies listed on the Tehran Stock Exchange.

Data Analysis And Findings

After descriptive statistics of the variables used in the model are determined, it is necessary to find out whether the variables are distributed normally or not. To do so, skewness and kurtosis test also known as Kuran test was used whose results confirm the normal distribution of the data. In this test, the null hypothesis was developed based on the normal distribution. A significance level of less than 0.05 indicates that the variables under study are not normally distributed.

<table>
<thead>
<tr>
<th>Latent variables of the model</th>
<th>The chi-square value of skewness and kurtosis test</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returns</td>
<td>790.4</td>
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<td>Price to earnings ratio</td>
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</table>

Given that all the significant levels are smaller than 0.05, the null hypothesis indicating the normality of distribution is confirmed. Therefore, the normality of the variables under study to estimate the unknown parameters is reliable.

In addition to the results of Kuran Test, Kolmogorov-Smirnov Test was also used to check the normality of distribution for variables under study. Through this test it is possible to determine whether the distribution of the sample is normal or not. Based on the null hypothesis, the mean of the construct under study follows the normal distribution. In contrast, the alternative hypothesis indicates that the mean of the construct under study does not follow the normal distribution. Therefore, if the test is significant the null hypothesis is rejected and the sample is not normally distributed.

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<tr>
<td>The ratio of book value to market value</td>
<td>363.3</td>
<td>199.0</td>
</tr>
<tr>
<td>Stock returns</td>
<td>571.3</td>
<td>169.0</td>
</tr>
</tbody>
</table>

When the significance level of the test is greater than the expected significance level (0.05), the null hypothesis, normality of variables, will be confirmed. As the following table shows, all the variables are normally
distributed because their significance levels have been reported to be greater than 0.05. Therefore, multiple regression tests will be run.

Pearson's correlation coefficient was used to examine the relationships between variables. However, before performing the regression test, the analysis of the main correlation coefficients in data processing and statistical modeling is common. The results of correlation coefficients are shown in Table 3.

As can be seen in the table, the calculated the correlation coefficient between the ratio of price to earnings and returns is 0.559 whose significance level is below 0.05 so the null hypothesis is rejected at 99% level of confidence. Therefore, there is a relatively strong and positive correlation between the two variables of the ratio of price to earnings and returns in the company under study. Accordingly, a change in one variable will lead to a positive change in the other in the same direction. Our results indicate that both variables are internally correlated so they can play a predictive role for each other in regression models.

Table 3. Correlations between variables under study

<table>
<thead>
<tr>
<th>The first variable</th>
<th>The second variable</th>
<th>Correlation coefficient (r)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price to earnings ratio</td>
<td>Return</td>
<td>0.559</td>
<td>0.010</td>
</tr>
<tr>
<td>Dividend yield</td>
<td>Return</td>
<td>0.117</td>
<td>0.143</td>
</tr>
<tr>
<td>Capital gain</td>
<td>Return</td>
<td>0.214</td>
<td>0.084</td>
</tr>
<tr>
<td>Book value of common stocks</td>
<td>Return</td>
<td>0.401</td>
<td>0.001</td>
</tr>
<tr>
<td>Market Value</td>
<td>Return</td>
<td>0.275</td>
<td>0.025</td>
</tr>
<tr>
<td>The ratio of book value to market value</td>
<td>Return</td>
<td>0.308</td>
<td>0.012</td>
</tr>
<tr>
<td>Stock returns</td>
<td>Return</td>
<td>0.044</td>
<td>0.744</td>
</tr>
</tbody>
</table>

Ns is not statistically significant, * The null hypothesis is rejected at 95% level of confidence ** The null hypothesis is rejected at 99% level of confidence.

As can be seen in the table, the calculated the correlation coefficient between dividend yield and stock return is 0.117, which is significantly greater than 0.05 so there is no sufficient evidence to reject the null hypothesis. Since the significance level is above 0.05 the null hypothesis is confirmed. As a result, there is no correlation between dividend yield and stock in the studied companies so any changes in one variable do not affect the other. The results indicate that both variables are not internally correlated so they cannot play a predictive role for each other in regression models. In other words, the correlation between these two variables is not large enough to be significant.

The calculated the correlation coefficient between capital gain and stock return is 0.214, which is significantly greater than 0.05 so there is no sufficient evidence to reject the null hypothesis. Since the significance level is above 0.05 the null hypothesis is confirmed. As a result, there is no correlation between capital gain and stock returns in the companies under investigation so any changes in one variable won't affect the other. The results indicate that both variables are not internally correlated so they cannot play a predictive role for each other in regression models. In other words, the correlation between these two variables is not large enough to be significant.

The calculated the correlation coefficient between the market value and returns is 0.275 whose significance level is between 0.01 and 0.05 so the null hypothesis is rejected at 95% level of confidence. Therefore, there is a relatively strong and positive correlation between the two variables of the market value and returns in the company under study. Accordingly, a change in one variable will lead to a positive change in the other in the same direction. Accordingly, both variables are internally correlated so they can play a predictive role for each other in regression models.

The calculated the correlation coefficient between the book value of common stocks and returns is -0.308 whose significance level is between 0.01 and 0.05 so the null hypothesis is rejected at 95% level of confidence. Therefore, there is a moderate and negative correlation between the two variables of the book value of common stocks and returns in the company under study. Accordingly, a change in one variable will lead to a positive change in the other in the opposite direction. Accordingly, both variables are internally correlated so they can play a predictive role for each other in regression models.

The calculated the correlation coefficient between stocks returns and return is 0.044, which is significantly greater than 0.05 so the null hypothesis is confirmed. As a result, there is no correlation between stocks returns and return in the companies under investigation so any changes in one variable won't affect the other. The results indicate that both variables are not internally correlated so they cannot play a predictive role for each other in regression models. In other words, the correlation between these two variables is not large enough to be significant. The regression coefficients can be estimated by having the correlational status of variables under study.
Stepwise multiple regression method was used to study the relationships in the model and to determine the significance level of independent variables at each step to be entered into the regression model if they were significant. The results of regression analysis showed that at each step two independent variables were added into the regression model to estimate the changes occurred in the dependent variable. Besides, the ANOVA indicated the model enjoys a good fit at the two steps of variable addition, confirming the high accuracy of the two steps. Because F value is significant for both steps and there is no considerable residual in the model.

As shown in the above table, it can be concluded that the calculated regression coefficients can accurately explain the predictable variances of the dependent variable by the independent variables that are entered in the model. At the end of the second step since there is no substantial residual in the model, the addition of other variables in the model is stopped. According to Table 5, totally 51% of the variance in the dependent variable is explained by the independent variables entered into the regression model and the remaining variance is related to the independent variables that are not possible to be analyzed in the present study. Therefore, the existing regression coefficients can predict up to 51% of the variance in the dependent variable. In addition, the value of Durbin-Watson Test is between 1.5 to 2.5, suggesting that there is no serial correlation which has not caused a serious problem for the regression function that is statistically significant. Therefore, the results of the regression function are reliable.

Based on the above diagnosis tests, regression coefficients of the variables added into the model to estimate changes in the dependent variable can be estimated. The results of regression steps to add independent variables for the purpose of estimating the variance of the dependent variable are shown in Table 6. As shown in the table, the first independent variable with the strongest power to explain the variance of the dependent variable is price-to-earnings ratio. In the second regression step, the second independent variable, ratio of book value to market value, was added into the regression equation and had significant role in explaining the dependent variable. Accordingly, the regression model can be formulated as follows by using non-standard coefficients and taking a constant value:

\[ Y = -17964.82 + 0.2108.16X_1 + 7.84X_2 \]

Using the standardized values to compare coefficients, the above equation will be written as follows:

\[ Y = 0.596X_1 + 0.426X_2 \ (R^2 = 0.514) \]

Where, \( Y \) is the yield, \( X_1 \) is the ratio of price to earnings, and \( X_2 \) is the ratio of book value to market value \((B/M)\).

The significance level of \( t \) compared to the regression coefficients show that its value is below 0.05. Therefore, the two variables of price-to-earnings ratio and the ratio of book value to market have a statistically significant effect on the dependent variable of dividend yield.

### Table 4. Results of ANOVA test for the overall fit of the regression model

<table>
<thead>
<tr>
<th>S.O.V</th>
<th>SS</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression function</td>
<td>2.642</td>
<td>1</td>
<td>27.88</td>
<td>0.000</td>
</tr>
<tr>
<td>Error function</td>
<td>2.306</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7.948</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression function</td>
<td>4.083</td>
<td>2</td>
<td>29.05</td>
<td>0.000</td>
</tr>
<tr>
<td>Error function</td>
<td>3.865</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7.948</td>
<td>57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 5. The dependent variable variance explained by the regression model

<table>
<thead>
<tr>
<th>Regression step</th>
<th>R</th>
<th>R Square</th>
<th>Adj. R Square</th>
<th>F change</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.577</td>
<td>0.332</td>
<td>0.320</td>
<td>27.88</td>
<td>1.817</td>
</tr>
<tr>
<td>2</td>
<td>0.717</td>
<td>0.514</td>
<td>0.496</td>
<td>20.50</td>
<td></td>
</tr>
</tbody>
</table>

### Table 6. Coefficients of independent variables entered into the regression model

<table>
<thead>
<tr>
<th>Steps</th>
<th>Model</th>
<th>Non-standard values</th>
<th>Standard values</th>
<th>t</th>
<th>Sig.</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta coefficient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>Constant</td>
<td>-4250.305</td>
<td>2997.385</td>
<td>0.577</td>
<td>-1.41</td>
<td>0.162</td>
</tr>
<tr>
<td></td>
<td>X1</td>
<td>2038.45</td>
<td>386.032</td>
<td>5.28</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>-17964.82</td>
<td>373979.37</td>
<td>---</td>
<td>-4.51</td>
<td>0.001</td>
</tr>
<tr>
<td>Second</td>
<td>X1</td>
<td>2108.161</td>
<td>332.80</td>
<td>0.596</td>
<td>6.33</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>X2</td>
<td>7.84</td>
<td>1.732</td>
<td>0.426</td>
<td>4.52</td>
<td>0.001</td>
</tr>
</tbody>
</table>

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In addition, VIF values were used to analyze multiple alignments of the variables to observe independent variables overlap conditions. In other words, the goal here was to determine to what extent the addition of the independent variables in the final step could reinforce their replacement effect. The results show that the variance bias values or VIF are smaller less than the critical value of 5. Consequently, each of the independent variables alone contains information whose entrance in the model is not possible by the use of other independent variables. Accordingly, the results of the regression model are very accurate and the can be used to test research hypotheses.

The results of multiple regression test were used to test the research hypotheses to analyze the relationship between returns and financial ratios in the listed companies in Tehran Stock Exchange as follows:

H1: There is a significant relationship between stock returns and price-to-earnings ratio in the listed companies in Tehran Stock Exchange.

As shown in Table 6, the value of the coefficient for the effects of the price to earnings ratio on returns is 0.596 which is statistically significant. Therefore, the null hypothesis is rejected at 99% level of confidence, indicating that there is a statistically significant relationship between these two variables. Due to this effect, price-to-earnings ratio is a statistically significant predictor of stock returns. Accordingly, it can be said that the most important financial ratio that has a significant effect on stock returns is price-to-earnings ratio which has the largest path coefficient and it can alone explain 33% of the variance in stock returns.

H2: There is a significant relationship between stock returns and the ratio of the book value to the market value in the listed companies in Tehran Stock Exchange.

As can be seen in Table 6, the value of the coefficient for the effects of the ratio of book value to market value on stock returns is 0.596 which is statistically significant. Therefore, the null hypothesis is rejected at 99% level of confidence, indicating that there is a statistically significant relationship between these two variables. Due to this effect, the ratio of book value to market value is a statistically significant predictor of stock returns. Accordingly, it can be said that the second most important financial ratio that has a significant effect on stock returns is price-to-earnings ratio which has the second largest path coefficient and together with the price to earnings ratio can explain 51% of the variance in stock returns. In other words, 51% of changes made in the stock return are predictable through the price to earnings ratio and the ratio of book value to market value.

H3: There is a significant relationship between stock returns and dividend yield in the listed companies in Tehran Stock Exchange.

As shown in Table 6, the value of the coefficient for the effects of dividend yield on returns is 0.057 which is not statistically significant. Therefore, the null hypothesis not rejected, indicating that there is no statistically significant relationship between these two variables. Due to this effect, dividend yield is not a significant predictor of stock returns. Accordingly, it can be said that dividend yield has no significant effect on stock returns.

H4: There is a significant relationship between stock returns and capital gain in the listed companies in Tehran Stock Exchange.

According to Table 6, the value of the coefficient for the effects of capital gain on returns is 0.131 which is not statistically significant. Therefore, the null hypothesis not rejected, indicating that there is no statistically significant relationship between capital gain and stock returns in the listed companies in Tehran Stock Exchange. Due to this effect, capital gain is not a significant predictor of stock returns. Accordingly, it can be said that capital gain has no significant effect on stock returns.

CONCLUSIONS AND RECOMMENDATIONS

One of the financial analysis techniques employed by financial analysts is the use of financial ratios. Accordingly, the present have employed real data analysis and financial statements analysis to study the stock return predictability based on financial ratios including price to earnings ratio (P/E), the ratio of book value to market value (B/M), dividend yield (DY), and capital gain; as these ratios are considered as appropriate indices to be used for facilitating of decisions to be taken by stockholders and help users of financial statements to analyze financial ratios.

The present study aimed to examine the effects of financial ratios for the prediction of stock returns in Tehran Stock Exchange by employing the following financial ratios:
- Price to earnings ratio (P/E);
- The ratio of book value to market value (B/M);
- Dividend yield (DY); and
- Capital gain
The present study was applied with regard the goals it pursued and correlational and exploratory concerning its nature. Besides, the methodology used in the study was posteriori. A descriptive method was employed to collect the needed data and the study is a survey because of the way it was implemented. The instruments were financial reports and other reports published by Tehran Stock Exchange. RAHAVARDE NOVIN Software (Version 3) was used along with websites containing information about the companies under study to collect the data. The study was conducted over a ten year period from the early 1999 to the early 2009 on a sample of 66 companies listed in Tehran Stock Exchange.

Then the concepts, financial ratios, and methods for predicting stock returns were discussed and a history of previous study was presented. Subsequently, the research methodology was explained and the predictability of returns (the dependent variable), the correlation between independent variables (price-to-earnings ratio, the ratio of book value to market value, dividend yield, earnings per share and capital gain) were estimated by linear regression test. The findings were discussed based on the collected data. The inferential statistics were used to analyze the data and the normality of variables was examined through skewness and kurtosis tests. Pearson’s correlation coefficient was used to examine the relationships between the variables under study. Besides, multiple linear regression model was employed to study the relationships in the model. Finally, stepwise regression technique was used to run multiple regression analysis to find out whether the variables are significant at each step and if so they were added into the regression model.

The relationship between stock returns and financial ratios were investigated by testing the following four research hypotheses:
The first hypothesis indicating that there is a significant relationship between stock returns and price-to-earnings ratio in the listed companies in Tehran Stock Exchange was confirmed.
The second hypothesis indicating that there is a significant relationship between stock returns and the ratio of the book value to the market value in the listed companies in Tehran Stock Exchange was confirmed.
The third hypothesis indicating that there is a significant relationship between stock returns and dividend yield in the listed companies in Tehran Stock Exchange was rejected.
The fourth hypothesis indicating that there is a significant relationship between stock returns and capital gain in the listed companies in Tehran Stock Exchange was rejected.

The following recommendations were made based on the findings of the study:
Since the results of this study suggested that there is an effective relationship between the ratio of price to earnings and the ratio of book value to market value of the stock returns, the stockholders are recommended to pay close attention to these ratios when forming their portfolios.
The focus on these ratios are understandable even for amateur investors who can easily calculate these factors by relying on the information they obtain from Tehran Stock Exchange or the related companies in order to make effective decisions to obtain optimal returns.
Other financial ratios and their role in predicting stock returns may be studied in a ten-year period.
Investigations should be performed by considering different industries.
Companies’ abnormal returns (excess returns) can be included in studies as a dependent variable.
The role of macroeconomic variables in predicting stock returns can be examined by future research.
Similar studies can be performed on other companies listed in Tehran Stock Exchange whose financial periods do not correspond to those examined in the present study.
Other methods such as logit regression models and neural networks can be employed to predict the stock returns over a ten-year period.

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