

Valuation of Value by Using the Residual Income (RI) Approach of the Listed Companies in Tehran Stock Exchange

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Abstract: The objective of the present study is to determine the economic value by using residual income formula of listed companies in Tehran Stock Exchange, so residual income is the measure of performance. The results of the hypothesis testing indicate that a significant difference between residual income and value of the firm is observed. In this study, the market value added changes criterion has been used to measure the value of the company. For this purpose, 121 companies have been selected from Tehran Stock Exchange through screening technique during a 7 years period from 1386-1392. The data has been collected through the companies' financial statements published on the Tehran Stock Exchange site. For data analysis, multivariate regression analysis has been used. The results obtained from hypothesis test indicate that no significant difference has been observed between free cash flow and the company's value. The results show that residual income can be used to determine the value of listed companies in Tehran Stock Exchange.

Key words: Tehran Stock Exchange, residual income, economic value of firm, companies, cash flow

INTRODUCTION

In recent decades evaluating the performance of business units is done more scientifically and more technically and forms most of the management literature, finance and accounting. Residual income model is a measure of performance evaluation and an internal planning and control tool that many studies have been conducted in the field of residual income and its determinants and its comparison with other models such as free cash flow and some evidences have been provided that indicate this approach is better. Residual income approach (net income) seeks to dynamics net income.

Researchers such as Foltam, Olsen and Myers demonstrated that the value of firm can be stated in terms of accounting variables. This approach led investors to focus increasingly on net income forecasting capability. Although, other papers have studied the relationship between residual income and other criteria for performance evaluation but the ability of this measure in estimating the value of companies listed in Tehran Stock Exchange has not been mentioned in other articles. Therefore, to help financial decision-makers and investors and creditors better understand and considering the practical aspects of the subject, the present study has been written entitled "valuation of listed companies in Tehran Stock Exchange using the Residual Income (RI) approach".

The changes in stock interest and price are effective elements on evaluation of companies and manager's situation and consequently on investor's actual and potential decisions. Additionally, the primary price determination for acceptance of company in stock exchange and internal planning and control of the company are elements and topics that have attracted the attention of managers and stock exchange. The above elements and groups and their reasons and objectives witness importance of the research and have a direct relationship with it.

The aim of this study is to investigate the role of actual quantities rather than the expected one, on determining the value of firms in the form of residual income valuation model. Other objectives of this study are as follows: To assist in the understanding and interpretation of accounting data by various interest groups in the market, To help understanding the relationship between accounting items and value of firm, To increase knowledge of people working in the profession about the quality of income flow.

Theoretical framework

The first variable

The value of firm: The company values can be defined in a classical sense as "ideas that help companies to have choices among alternative tools and objectives" or more technically, "the weight that decision makers of the

company have given to alternative objectives in their decisions” (Fernandez, 2015). Alternative objectives can include profitability from the viewpoint of accounting, stock returns, value for customers, market share, development of the company, employee satisfaction or criteria of corporate social performance (such as corporate image, environmental impact and tax revenues). Current or future values of these variables can create a compromise between short and long term goals. These items can be expressed as probabilities to hold different risk attitudes. Effectively, they can even include the weight that managers give to their own goals. Corporate behavior can be modeled as a balance between these alternative interests or (more formally), maximizing the expected value of the firm value function which has been defined in terms of the range of potential target variables. In a practical concept, what is important is whether the potential target variables affect corporate behavior and if so, how is this effect. If we consider the company as a legal artifact in that case it has no values itself. Therefore, its values must be determined from outside, by the main beneficiaries. Although, value variables may be considered as tool and target but is this classification impossible. Standard procedure may be to consider value creation for shareholders as a general objective and variables such as market share, cost efficiency, customer satisfaction and product guarantee as tools for that objective. But some managers may consider product guarantee and customer satisfaction as objectives. Some other might also consider value creation for shareholders as a prerequisite for doing their business prospects.

They may talk about objectives such as value for stockholders and justify their views by arguing that the product guarantee and customer satisfaction are tools for that objective. Here the problem is our need for a theory and causal explanation for relatively reliable prediction about the current values of a specific company. Therefore, company values theory should help to predict that which value variable will be effective in a specific company and a particular decision making field and how decision makers will emphasis on each objective. It is believed that a better understanding of the company values will improve our understanding of the company behavior. While companies often emit pleasing appearance value statements but typically these statements contain values that are not different from the values presented by other companies. In many cases, statutes and charters create extremely limited structure to influence the company activities. In this regard, Lensen refers to meaningless value statements of Enron and other big US companies. But some value statements may be very meaningful. On

the other hand, values may partly become known by discipline in behavior or through direct questioning of managers about the main factors which have been considered when they make main decisions. Public Companies and their managers aim to maximize equity value of stockholders (in other words, to maximize firm value and its stock). Maximizing company value requires optimal use of financial resources and achieving proportional returns and risk.

Market value added: Value added is defined in economic literature by Rogers. So Janen defines company as an entity or decision-making center for a stockholder which follows entity theory. in this case, the role of accounting is to provide reports which help different and interested parts be able to have a better understanding of results occur in a company during a financial period. So Janen has proposed the concept of value added in revenue measuring and assessing as an administrative tool for use in accounting due to the different groups interested in the information. He believes that calculating value added provide information more than profit and loss statement and balance sheet for users. This makes him the first writer in the field of using the concept of value added in accounting. Market value added can be considered as a measure of external performance. The market evaluates company performance by comparing the capital invested in the company with the market value of debt and stock market value. Market value of a company is equal to the sum of the equity market value of stockholders and the market value of its liabilities. Theoretically, this value is something that can be acquired from the market at any given moment. The market value added is the difference between the total market value of the entity and its economic capital (Manohar, 1999).

One of the objectives of the companies in the world today is creating value for stockholders. For this reason, managers are looking for a strategy to increase wealth and value. There are different methods to evaluate these strategies. On the other hand, the market value of a company shows that each share of the company will earn how much profit from asset sales. This variable can be obtained from the information released by the companies. As mentioned, this number somehow represents the current value of assets (Shin and Stulz, 1998). Speculation can be made about the status and future price of stocks by comparing it with the company value. Generally, the value of a firm is within its stock price and has not much difference with the stock price. But this slight difference is important in numerical analysis of companies. The market value reflects stockholders’ expectations of the

company stock. Determining market value of firm is placed in the group of company final products desirability. Final products desirability has a direct relationship with the companies' employees. Manpower satisfaction and desirability supply can improve productivity and consequently market value of firm (Chen *et al.*, 2009). The gap between market value and book value of firms has contributed to identify factors affecting the value of firms.

In theory, the market value added can be gained from the market at any given moment. The market value added is equal to the difference between total market value of the entity and its economic capital, i.e., the difference between market value of firm and invested and adjusted capital in firm.

$$\text{MVA} = \text{Market value of firm} - \text{Invested capital}$$

The market value added tolerance: Market Value Added tolerance (MVAt) is the dependent variable of the present study and is result from difference between market value added at the end of the year minus its market added value at the beginning of the year. The following equation represents this:

$$\Delta \text{MVAt} = \text{MVAt} - \text{MVAt} - 1$$

Market value added is also equal to the difference between market value of firm and book value of invested capital at the end of each period.

Residual income: RI Model is one of the most common terms that are used to evaluate performance. This term was introduced in 1950 by General Electric Company and was placed in the texts of management accounting from 4 decades ago. Although, the RI model has functionality and efficiency required for its use but in practice, was used a little for many years but in recent years has attracted more attention of the scientific community. RI valuation model is an income based approach. This model gives accountants a framework to analyze the company's performance in situation of accrual accounting. RI Model framework has provided a rich assortment accounting for educators (teachers) in order to discuss about economic factors determining the total equity value of ordinary stockholders. This model is informative and useful to investigate business factors that affect the future profitability.

RI Model defines total equity value of ordinary stockholders with terms such as book equity value of ordinary stockholders and net income which is obtained based on GAAP; therefore, it strongly supports ratio analysis.

The equation indicate that total equity value of ordinary stockholders is equal to the book equity value of ordinary stockholders plus the current value of expected future residual income:

$$P_t = \text{BV}_t + \sum_{n=1}^{\infty} \left(\frac{\hat{\text{RI}}_{t+n}}{(1+r)^n} \right)$$

Where:

- P_t = Total equity value of ordinary stockholders
- BV_t = The book value at the beginning of the period
- r = The cost of capital
- n = The number of years

$$\text{RI}_t = I - (r * \text{BV}_{t-1})$$

Where:

- I_t = The net income after taxes
- t = The current time period
- r = The cost of capital
- BV = The book equity value of stockholders at the beginning of the period

Multiplication of r and BV is equal to expected income level for the firm with given BV and according to the risk of industry loss.

RI can be positive or negative. If we expect that the company report an abnormally positive income, then the total equity value of ordinary stockholders must be more than BV and if we expect an abnormally low income it would be reversed. Theoretically RI Model is equivalent to DCF discounted cash flow model and both models originate from Original Dividend Discount Model (ODD) (which states that the total equity value of ordinary stockholders is equal to the current value of expected future income of stock). A considerable number of recent studies which have compared assessment and forecasting ability of RI and DCF methods, indicate that in equal conditions RI model is more accurate than DCF or even ODD models.

In other words, RI Model applies bilateral accounting records to monitor accuracy and relates measurement errors correction to the principle of conservatism in the accounting process rather than forcing analysts to eliminate the effects of accepted accounting principles. Using RI Model enables analysts in their predictions to pay attention to income prediction models rather than explain how to choose an accounting method will affect book equity value of stockholders in the current period as well as future incomes (Benton and Taylor, 2004). Control variables of the study are as follows.

Financial leverage: The ratio of total debt to total assets; Myers (1977) states that predicting value of firms which

have a high level of debt is more difficult than other companies. In previous studies, variability of income and leverage has been considered as the company's risk measurement criteria.

Firm size: Firm size is the natural logarithm of the total assets of the firm. Evidence in the literature suggests that the value of big companies is easier than small firms. Freyzer and Smith showed that big companies have more control over the market and this makes them more valuable.

Firm life: Studies have shown that whatever the firm life is longer, the firm is more valuable. Because calculating value of the firm and its prediction is much more difficult for newly-established companies compared to older companies. Glick showed that the values of firms that have no historical-operational background are probably low, because historical data is considered as one of the extremely important elements in measuring valuation process.

Type of industry: In the present study, 13 industries in Tehran Stock Exchange will be investigated. In screening investigation, the industry which includes <5 companies will be removed from the sample and is intended as a virtual independent variable. The aim is to measure moderating effect of industry type on the relationship between economic variables and the value of firm.

Hess have studied discounted cash flow and residual income valuation methods to determine the shift of above methods from payment value. In his study, companies have been classified in 20 portfolio including 69 companies from the New York Stock Exchange, American Stock Exchange and the National Association of Securities Dealers, then the value of firms have been estimated based on the above methods. The empirical results of this study indicate that the residual income method shows less bias in most of the surveyed companies during 1988-1998 than other valuation methods.

Penman and Sougiannis (1998) have studied and observed the stock prices using residual income in a prestigious portfolio. The difference between the estimates of valuation models varies in the range of 70-170% of the real value of companies.

Cupertino *et al.* (2013) investigated the cash flow, residual interest and dividends discounted in the evaluation during the years 1995-2004 in Brazilian companies and came to the conclusion that cash flow method has more explanatory power compared to other methods and can better estimate the value of the commercial entity.

Penman and Sougiannis (1998) shows how residual income model can be used as a cost effective evaluation model. This model estimates the intrinsic value per share using the book value per share on the current period balance sheet and predicted incomes. In residual income model, stock price of a firm is a function of the sum of book equity value of stockholders, predicted accounting incomes and normal incomes. So that normal incomes can be calculated using the cost of capital and book equity value of stockholders at the beginning of the period. Therefore, two of the three main factors in the residual income model can be calculated and obtained (the cost of capital cannot be calculated precisely but it can be estimated by analysts) as a result, judgmental adjustments of analysts are not required.

Mahmoodabadi and Bayazidi have studied the explanatory power of residual income valuation models and abnormal earnings growth in valuation of firms. It has been found that in general, and in different industries, there is not a significant difference between the explanatory power of these two models for valuation of firms and in almost all cases, the residual income valuation model has relatively higher explanatory power in valuation of firms.

Poorheydari studied the information content of accounting income and book value of the company in determining the price of stocks of listed companies in Tehran Stock Exchange during 1386-1375 and concluded that, firstly, value of the firm is determined by income; secondly, the main explanatory power of the sum of income and book value of the company is because of income; and thirdly, the book value of the company has not a good explanation power compared to income per share.

So, we are going to know whether there is a significant relationship between residual income and market value added.

MATERIALS AND METHODS

In this study, correlation, regression and ANOVA analyses were used and the methodology of the research is Ex-Post Facto (through the use of past information). In cases where investigation of the relationship is between a dependent variable and one or more independent variables that is estimated based on this relationship and using historical data, parameter (parameters) for independent variable (variables) and predict by providing a model that in use of data section will be fully explained. To provide literature, the use of English references, books, articles and previously written dissertations is placed on the agenda. In this study, to learn about

Table 1: Sampling method based on the above restrictions

Companies	Restrictions
488	Companies listed on Tehran Stock Exchange by the end of 1392
34	Financial intermediation and insurance companies
93	Companies that the end of their financial year does not end in Esfand
131	Companies that have had interruption operational for >4 months or during the investigation period have had financial year change
107	Companies that their information is not available or have been removed from stock exchange
121	The companies remained in Statistical sample

concepts, definitions and methods related to the study in theoretical literature as well as studies conducted on other countries, the necessary information is gathered through internet searching and referring to investigations and studies in the field. By referring directly to the center archive of Tehran Stock Exchange, the data related to hypotheses test is collected through bulletins and monthly magazines published by the stock exchange congaing the monthly and daily data on transactions as well as Tehran Stock Exchange and www.rdis.ir sites. For classification, calculations and data processing Excel software will be used and EVIEWS Software will be utilized to test the hypotheses. Tadbir-Pardaz and Rahaward-Nowin Software are also among sources that will be used to collect data (due to the provision of appropriate data from financial statements of companies). This is an applied study. The research design is Quasi-experimental using Ex-Post Facto (through past information). The Ex-Post Facto method is used when researcher investigates the subject after occurrence of events; moreover, there is no possibility of the manipulation of independent variables. Data collection needed for the research is an essential step and should be clearly defined and specified in terms of its importance. The data collection phase is the beginning of a process in which researcher collects library and field findings and then summarizes the results through classification and analyzes them and evaluates his compiled hypotheses and ultimately, concludes and find the research answer by reliance on them. In other words, researcher on the basis of collected data discovers the truth as it is. Therefore, data validation is very important because invalid data prevents to discover the truth and the researcher's problem is not understood well and a misguided and wrong picture will be presented on it. To maintain the credibility of collected data, the investigator should carefully collect the correct data. In this study, the library method is used to collect data and information. In library section, research literature from Persian and Latin books and journals. The research data is collected through sample companies' data referring to the financial statements, explanatory notes, weekly and monthly reports of Stock Exchange and using Tadbir-Pardaz and Rahaward-Nowin Software.

In this study, we have a primary population and a secondary one as a result of the exercise of limitations.

Our primary population is all firms listed on Tehran Stock Exchange. The statistical population has decreased by applying a number of limitations. The limitations are The end of the financial year must be twenty nine according to Iranian fiscal year. Prior to 1386 must be listed in Tehran Stock Exchange. Should not to be one of the investment and financial intermediation companies. During the period under investigation (1392-1386) the fiscal year must not change. Their information must be always available during the period under investigation.

The statistical sample of the study will be determined after applying the above restrictions. Based on the above criteria, 121 companies were identified. Then all of the information needed for the study was collected from the Tehran Stock Exchange databases, Tadbir-Pardaz and Rahaward-Nowin software and stock exchange publications. It should be noted that statistical sample in the present study is the statistical sample of the company's remaining after applying the restrictions (Table 1).

RESULTS AND DISCUSSION

In this study, the regression model obtained from the process of researching regression model significance and variable coefficients are analyzed as well as correlation analysis and variance analysis and the hypotheses will be approved or rejected. Remarkable that in all tests the significance level has been considered equal to 5% ($\alpha = 0/50$). Additionally, in test section, hypotheses will be investigated in the form of regression model. It should be noted that in this study, we will use suitable regression models for investigation of research hypotheses considering F-Limer value and based on Hausman test (Table 2).

The probability of F-Limer statistic in Table 3 is more than significance level (5%) therefore, combined data method is appropriate for testing the third sub-hypothesis.

According to pooled residual income fixed effects regression model, the effect of residual income on market value added is positive (0.021) during research period and is significant according to the probability of t-statistic (0.0221). This indicates that residual income has a significant positive effect on market value tolerances. Results also show that financial leverage, firm size, firm

Table 2: F-Limer test results

Data selection and patterns (models)	Test	Test statistic value	Degrees of freedom	Test statistic
Pooled data versus combined data	F-Limer	61/2	(952 æ 119)	1467/0

Table 3: Pooled residual income fixed effects regression model for market value added

$$\text{Model: } \Delta\text{MVA}_{it} = \alpha_{it} + \beta_1 \text{RE}_{it} + \beta_2 \text{LEV}_{it} + \beta_3 \text{Size}_{it} + \beta_4 \text{Age}_{it} + \beta_5 \text{Dum}_{it} + \varepsilon_{it}$$

Variables	Regression coefficients	t-statistic	Probability of t statistic
Constant	0/5100	1/77	0/016
Residual income	0/0210	2/51	0/0221
Financial leverage	0/0190	3/02	0/0165
Firm size	0/0390	2/22	0/03982
Firm life	0/0437	2/17	0/0328
Type of industry	0/0410	2/11	0/04902

life and type of industry had a significant positive effect. F-statistic results show that the model is significant in general and has no autocorrelation problem according to the Durbin-Watson statistic. In addition, the results of the adjusted coefficient of determination indicate that during the study period, 0.513% of market value added tolerances had been influenced by independent and control variables of the study. According to the significant impact of residual income on market value tolerances, the third sub-hypothesis is confirmed.

CONCLUSION

This hypothesis was investigating whether residual income has a significant effect on market value added or not? To examine this hypothesis, proper combined/pooled regression models have been selected using F-Limer and Hausman tests; and based on the findings, in fixed effects pooled regression model the effect of residual income on market value added is positive (0.021) and is significant according to the probability of t statistic (0.0221) and about 0.513% of market value tolerances had been influenced by independent and control variables. Also, the effect of financial leverage, firm life, firm size and type of industry was positive and significant. We can conclude that residual income has a significant effect on the market value added and the hypothesis is not rejected. Therefore, residual income can estimate the value of companies listed in Tehran Stock Exchange.

Study of residual income showed that this variable is associated with market value added tolerances and has the efficiency required identifying and assessing created value for investors. Evaluation and orientation of residual income to estimate and determine value of firm has increased tend to models which directly evaluate the company and it should be said that when residual income is used in a certain (limited) period, it will enhance explanatory power of performance in the equation of value of firm. Therefore, more future profitability of the company compared to firm's expected returns ensures increased

value of company via market returns (market value added), that is lead to change these values. It can also be said that residual income method helps investors and analysts to determine and estimate market value added tolerances. It is worth noting that the results of this research are aligned with Cupertino *et al.* (2013), Penman and Sougiannis (1998).

LIMITATIONS

The scientific and research studies often face with some restrictions that endamage the stability and reliability of the research findings. However, researcher's effort should be in this direction that while maintaining the scientific value of the study, seeks solutions to fix or cope with limitations. In this study, there were also limitations and problems in the process of doing the research that the most important of which are mentioned as There is no consensus on the definition of the company's value, as a result, there are different methods to measure it based on different views. In this study, an attempt is made to use market value added changes through diversification of criteria and using criteria agreed upon by most of the researchers, so that the stock price changes become more evident. With regard to the statistical population limited to the companies listed in Tehran Stock Exchange which their fiscal year end in Esfand, extending results to other companies should be done carefully.

SUGGESTIONS

General and executive suggestions are as follows This research is carried out based on information provided in the audited financial statements of the companies. Thus, it is obvious that its results react by the accuracy of the information contained in the financial statements. Tehran Stock Exchange utilized these criteria, along with other criteria in assessing companies' shares so that investors could consider these criteria in selecting stocks using the pattern of stock exchange.

Suggested topics for future researches is that Given the importance of the quality of accounting information, particularly accounting earnings, it seems that doing further studies and consideration of other aspects will help to clarify this issue. This research could serve as a model for future studies. The summaries of proposed topics for future researches are as follows. This study was carried out upon all companies listed on the Stock Exchange in Tehran and without separation of companies in terms of industry type that it is recommended that in the future studies, results are evaluated separately for each industry. The time period of the study is seven years that it is recommended that in future researches, in the case of exciting required data, the time period of the study gets longer. The investigation of the relationship between economic value added and traditional accounting criteria, and market value-added. In future researches, more stable model can be provided for the value created for shareholders through addition of corporate governance mechanisms to independent variables.

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