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Predicting Operating Profit with Economic Value Added Components: Empirical Evidence from Iran

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Economic value added is a critical criterion in making financial decisions and investors have always been trying to make use of its ability in order to predict the profitability power of companies. This study aims to investigate the predictive ability of the components of economic value added in predicting next period's operating profit in companies accepted in Tehran Stock Exchange. In order to do this, 119 companies were selected among the population whose necessary information in the specified six-year period (87 - 82) was available. After that, information related to four independent variables was studied. The subsequent period's operating profit was considered as the dependent variable. Simple regression was chosen as the statistical technique to test the hypothesis. Correlation test of hypotheses was taken according to Pierson's method. The results show that the operating profit after tax, capital amount and return on assets have the ability of predicting subsequent period's operating profit; however, the ability of operating profit after tax is more than others.

Key words: Economic value added, return on assets, cost of capital, capital employed, net operating profit after taxes, next period's operating profit.

INTRODUCTION

In accounting, factors such as profit, yield on stock, stock's price, bankruptcy and risk are predictable to some extent. Among these, prediction of profit holds special importance because it is one of the important motives for investing. Profit influences stock market greatly (Hendriksen and Berda, 1992:18). Therefore, one of the most traditional standards for evaluating the performance is accounting income which, in spite of its importance and vast application, has some shortcomings. The first shortcoming of accounting income is the possibility of manipulation. This shortcoming can be removed by some adjustments. But the second shortcoming is that this evaluation standard only considers the quantity of profit; however, in order to specify the real value of a company,

the quality of profit must also be taken into account (Stewart, 1991: 39-40).

To eliminate the mentioned shortcomings, a new standard called economic value added (EVA) was introduced by Joule M. Stern and Stewart (1989). The economic value added equals operating profit minus the cost of the capital used to attain that. According to Stewart, economic value added is the most important criterion which holds the most powerful connection with the stock's price in comparison to the traditional standards for performance evaluation (Stewart, 1991:66).

EVA indicates whether the operating profit is sufficient for the cost of capital employed or not. Stewart considers EVA as the result obtained for subtracting capital cost from net operating profit after tax (Stewart, 1991:90).

Considering the importance of the economic value added and profit in evaluating the performance, this article aims to investigate the ability of the components of EVA in predicting the operating profit of the subsequent

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period.

The paper is organized as follows: Firstly, a brief review of the concept, benefits, and limitation of EVA is presented. Then Literature review, methodology of the research, hypotheses, proposed model and deals with data analysis are then described. Also, the results obtained are presented in the preceding section. Finally, Discussion and conclusions derived from this research are presented.

THE CONCEPT, BENEFITS AND LIMITATION OF EVA

Economic value added is not a strategy, but it is a way with which we can measure the results. Economic value added index was firstly put forth, in a clear and unambiguous form by Stern Stewart (1989) to deal with the challenges the companies face in measuring financial performance. In the book "financial decision", Stewart deals with value added using statistics and figures of valid U.S. companies; he discusses the shortcomings of the traditional standard of performance evaluation that is, profit, earnings per share, profit growth etc. and shows that the economic value added can be one of the most credited standards in evaluating the companies. In summary, it can be said that economic value added is the result of the difference between return on assets and cost of capital multiplied by the capital employed. In other words, the difference between return on assets and the cost of capital used to establish this return, results in production of (negative or positive) economic value added for the company. Therefore, EVA means the value resulted from the surplus of operating income of the company over its capital costs (Stewart 1991). However, by value, the difference between incomes and costs, that is accounting (book monetary) income is not meant; but the economic income or residual income is considered. The difference between accounting (book monetary) income and economic income is that the economic income is the balance between economic costs and incomes which, in such a case, costs also include accounting (book monetary) costs and the cost of lost opportunities. The above mentioned definitions can be described as follows:

$$\text{Costs} - \text{Incomes} = \text{Accounting (book monetary) income}$$
$$\text{Costs of capital} - \text{The overall income resulted from capital} = \text{Economic income}$$

In general, EVA indicates whether the operating profit resulted from ordinary activities of an enterprise has the ability of covering the capital costs spent to derive that or not. If the operating profit of the company is more than the capital employed, then the company has positive EVA that is ($\text{EVA} > 0$). Positive EVA shows that in the eyes of investors, the value of the company is more than the book value of it. Therefore, investors will be more eager

to invest even an amount more than the book value of the company because in such conditions, the company's shares can be sold cost-effectively (with a price higher than the nominal price); this increase in price is a result of the built value for the company. On the other hand, if the company has a negative EVA ($\text{EVA} < 0$), that is the operating income is less than the capital cost, it will face a decrease in value and in case of sale, the company will be sold with devaluation (a price less than the nominal price); in such situations, the investors will be unwilling to invest. EVA can be useful in;

1. Capital budgeting
2. Performance evaluating
3. Establishing the service compensation' system

EVA can be used internally or externally. In summary, the internal application of EVA includes;

- i) Management tool for evaluation of performance (Chow, 1997)
- ii) Comprehensive standard for profitability (Druker)
- iii) A tool for explicating the relation of ownership to company's management (Rogerson)
- iv) A tool for conforming the costs and incomes (Rogerson and Leftkowitz, 1999)

In summary, the external application of EVA includes;

- i) A tool for investing (Leftkowitz, 1999)
- ii) A criterion for predicting shares' price (Tillbam, 1997)
- iii) A framework for financial management (Morris, 2001)
- iv) A framework effective in organizational behavior and improvement of the quality of employees work (Morris, 2001)

EVA has multiple advantages, the most important of which can be summarized as follows (Stewart, 1991): 1. EVA makes senior managers responsible for something that is mostly under their control (return on assets and cost of capital are influenced by their decisions), not for criteria such as the value of stock market which they feel is not totally under their control. 2. EVA is influenced by all the decisions of companies' managers. (It will affect decisions related to capital employed, profit distribution and the decisions related to financing and cost of capital).

3. EVA, as an internal criterion for evaluating the performance of the company, can show best the success of the company in increasing the value of shareholder's investment. 4. EVA indicates that the value of the company is directly dependent on the performance of management. 5. EVA is connected to the Market Value Added (the value of shares is a function of the predicted future EVA). 6. EVA, as a criterion for assessing performance, is less in danger of accounting falsification. In other words, using some kinds of adjustments can minimize the deviations derived from accounting estimates and methods. However, it should be mentioned that EVA has some

disadvantages, some of which are as follows:

1. EVA is usually measured on the basis of historical values; therefore, it can be misleading. In other words, without assessing long-term investment decisions, analysis of EVA can bring incorrect results.
2. Sometimes, analysis of EVA is impractical. As a general rule, analysis of EVA is not suitable for newly established companies and investment companies.
3. In order to analyze EVA, the recognition of all resources used in the company is necessary. Although, some of the possessions used in the companies' activities are unnoticeable and the recognition and evaluation of them are difficult.
4. This criterion can not be used to compare companies or enterprises of different size. This shortcoming can be eliminated by standardizing EVA. This can be done by choosing a year as basic year and assuming the capital of this year as 100.

LITERATURE REVIEW

Economic value added is an index based on value-based management which deals with controlling the overall value made in a business and is considered a deciding factor in predicting the profit. Stewart (1991) studies EVA as a yardstick for evaluating company's performance and also as a tool for executive evaluation by discussing EVA; because EVA only reflects the growth of value added in one company after considering capital cost. Tully (1993) published detailed discussions about the advantages of EVA and a long list of companies that had accepted EVA as a performance evaluation tool for their company. Kefgen and Mahoney (1996) indicated that EVA can be used as an encouraging factor in modern measurement standard. After implementing the basics of EVA in a motivational project, the consultants of a hospital suggested that the hospital performance put forth an easy system which was acceptable by the company shareholders. These studies could not show the real value and genuine definition of EVA when compared to traditional performance assessment tools in a detailed and experimental way.

Garrod and Rees (1999) studied 4 indices that is return on equity, net profit, profit distribution and share's price in order to predict changes in profit. For the purpose of recognition of the effect of accounting standards, a comparative study was carried out in Germany, the U.K. and France which have substantially different accounting systems. The results show that the defining power and predictive ability of these four variants in the three countries was important in the net profit change during the subsequent two years.

Domestic evidence

Ghorbani (1998) in a research on profit change vis-a-vis

value added change studied these two parameters in manufacturing companies affiliated to Industrial Development and Renovation Organization of Iran (IDRO). The results show that there is no meaningful linear relation between the change in profit and the change in value added in the studied companies. On the other hand, it was concluded that in the complex of manufacturing companies affiliated to IDRO, there is no meaningful difference between average growth of profit and average growth of value added indicating the surplus of value added compared to the profit growth.

Setayesh (2003) carried out a research under the title of the predictive ability of net profit and operating profit. The results showed that predicting profitability by shareholders is based on operating profit. In other words, operating profit is considered a better basis for predicting profitability by investors. Noravash et al. (2004) studied the relation among "operating cash flow, operating profit and EVA" and the wealth of shareholders. The results indicated that EVA is a better criterion for predicting operating profit and measuring wealth made for shareholders.

Noravash and Mashayekhi (2004) investigated the cumulative and relative information content of EVA and cash value added against accounting income and operating cash flow. The result of their investigation showed that there was a meaningful relation between the changes in accounting income and changes in EVA in all the studied companies, regardless of the industry they were related to, while there was no meaningful relation between accounting income and the changes in cash value added.

Mashayekh and Shahrokhi (2007) analyzed the precision of profit prediction by managers and factors affecting that; and concluded that in profit increase situation, companies have a higher precision in comparison to profit decrease situation. Furthermore, the prediction of managers in profiting companies has fewer mistakes in comparison to loss-making companies and the size of company is effective in the precision of profit prediction. Moreover, increase in size results in increase in prediction precision because it seems that larger companies are richer in information and finally, the precision of prediction is different among different industries.

Rastgari (2007) studied the information content of EVA for predicting profit. He concluded that the current period's operating profit, operating cash flow, and EVA have the ability of predicting next period's operating profit but the predictive ability of operating profit is more than others. In addition, investigating the increasing information content indicated that compared to current period's operating profit, EVA does not have increasing information content. Operating cash flow contains increasing information content and in two years of the studied period, it has improved the predictive ability to some extent. The results of this investigation regarding

EVA's increasing information content versus operating cash flow confirm the research carried out by Machuga et al. (2002).

International evidence

Machuga et al. (2002) was concerned with the investigation of information content of EVA in predicting Earnings Per Share (EPS) for a sample of 4382 U.S. companies (1981-1996). In this research, the ability of EVA, current year's profit, cash flows and yield for predicting EPS were studied and the results indicated that EVA has increasing information content in comparison to operating cash flows, accrual and yield in predicting profit.

Hornigren et al. (2003) showed that determining EVA is very similar to assessing residual income. They compared EVA and residual income and considered growth in EVA superior to residual income.

Austin (2005) studied EVA as a model for pricing and monopolistic policies in benchmarking mechanism in New Zealand's airline companies. He tried to reach a monopolistic and legal pricing by determining the capital cost and positive EVA. This hypothesis was tested by studying the EVA of New Zealand's airline companies in a period of time from 1995 to 2000 and the accounting income of the companies was compared to the value added results. The outcome and credibility of EVA was tested as a model for pricing and making other operating decisions of the mentioned companies. The conclusion was that accepting EVA as a method for evaluating the performance and controlling the profit is a suitable strategy for New Zealand's airline companies.

Palliam (2006) paid attention to the content of EVA in his research. He tried to show that EVA is more related to the capital return and company value than current profit, and the information content of EVA can prove this. 33 companies without EVA and 75 companies using EVA were randomly selected and their relation to variables including income, profit, capital, return on equity, company's market value, EPS, return on assets and cost decrease percentage in a given period of time was studied in several matrixes. However, in the course of study, measuring profit return and return on assets posed some problems. The findings indicated that, compared to other criteria, EVA is not solely effective in improving growth rate and profit of return on equity and EVA is more unstable than return on assets but it has a direct relation with return on equity return rate. Furthermore, the results showed a weak relation between EVA and prediction of shares' performance and increasing return on equity. And finally, a huge difference was spotted between the companies using EVA and companies lacking it.

Wet (2008) made a research under the title of "variables of determining the shareholders' value in companies accepted in stock market" in Pretoria

University, South Africa. He believed that in managerial decisions, there are some variables which affect the shareholders' wealth. Therefore, it is necessary to recognize these variables and to determine their effect in a quantitative manner. After recognizing the variables affecting the value of return on equity, value added was introduced as an internal scale for value-making for shareholders. The findings show that there is a close connection between market value added and cash flow; however, this study shows a weak connection between market value added and EPS or market value added and dividend of each share and finally, it is concluded that the credit of shares evaluation should be assessed according to profit or dividend and correlation between EVA and Market value added is more than other variables.

Kim (2009) carried out a research, the purpose of which was to compare and measure the application of six factors: three of them related to assessing the performance and value of the company including Economic Value Added, Refined Economic Value Added and Market Value Added; the other three related to the company's income including return on assets, return on equity and operating cash flow. He made a comparison between his own findings in two different time periods (1985 - 2004) and (1995 - 2001) and Stewart's findings. The results proved the positive application of EVA and REVA in measuring the performance of different wards of the hospital. According to the findings, REVA and MVA balance market's value by means of common positive factors. Therefore, REVA and MVA are two key factors that can act as suitable criteria for evaluating the performance of hospital companies. Furthermore, the findings indicated that the traditional criteria for evaluating performance such as return on assets, return on equity and operating cash flow cannot be more useful than REVA and MVA. Because each traditional criterion for performance evaluation is useful in one ward of the hospitals while modern criteria have proved useful in all wards.

DATA AND METHODOLOGY

This study is inductive and makes use of past information and historical financial statements. This study is also a correlative study since it seeks to investigate the relation between dependent and independent factors. It is a periodic study because it studies a specific period of time and it can be an applied research. In order to gather theoretical information, library research was selected and the books in the libraries together with articles found in internet were used. The population of this research was companies of Tehran stock market which were active in the six-year period of (1382-1387). Moreover, the companies' financial year should finish on 29th of Esfand and the selected companies should not be investment companies. The companies should not change their financial year during the specified period and should have constant activity during this period. The chosen companies should not be financial or broker companies and they should provide the researcher with companies' financial statement (including

accompanying notes). According to the list received from Tehran's stock market, there were a total of 119 active companies during this six-year period that fulfill all the requirements of this study. Therefore, the observations were 714 cases.

Data analysis

EVA indicates whether the operating profit is sufficient for the cost of capital employed or not. Stewart considers EVA the result of subtracting capital cost from net operating profit after tax (Stewart, 1991:90).

In other words, EVA is a basis for establishing a complete financial management system.

$$EVA = Nopat - Capital \text{ Cost} \Leftrightarrow \\ EVA = Nopat - (Cost \text{ of } Capital \times Capital \text{ employed})$$

If we assume the return on assets as net operating profit after tax to capital, the formula will be as follows:

$$r = \left(\frac{Nopat}{Capital} \right) \Rightarrow EVA = (Return \text{ on assets} - Cost \text{ of capital}) \times Capital \text{ employed}$$

Considering the subjects and in order to fulfill the purpose of this study, 4 hypotheses were designed and tested:

Hypothesis 1: Return on assets can predict next period's operating profit.

Hypothesis 2: Cost of capital can predict next period's operating profit.

Hypothesis 3: The amount of capital employed can predict next period's operating profit.

Hypothesis 4: Net operating profit after taxes can predict next period's operating profit.

And the statistical method in this research is regression; the hypotheses were tested by simple linear regression and the regression model applied to each hypothesis is as follows:

First hypothesis: $Olt = a + bRt - 1$

Olt: Operating profit of subsequent period

Rt-1: Current year's return on assets

Second hypothesis: $Olt = a + bWACt - 1$

WACt - 1: Current year's cost of capital

Third hypothesis: $Olt = a + bCAPITALt - 1$

CAPITAL t-1: Current year's capital

Forth hypothesis: $Olt = a + bNOPATt - 1$

NOPATt - 1: Net operating profit of current

Therefore the dependent variables in this study are return on assets ,cost of capital, the amount of capital employed and net operating profit; the independent variable is the operating profit of the subsequent period. The variables are defined as follows:

Return on assets

Return on assets derives from dividing net operating profit after tax to capital. This rate measures the productivity of the capital employed regardless of the financing method or accounting

variances resulted from accrual entries, conservatism concept and without considering unsuccessful attempts to capital. This rate can be directly compared to cost of capital of the company to determine creation or elimination of company's (Stewart, 1991).

Cost of capital

In order to determine cost of capital in Tehran's stock market, the following formula was used (Azhdari, 1380):

Cost of capital = (Earnings per share/Cost per share × Return on equity in the first period/capital in the first period) + (Costing liabilities/Capital in the first period × Financing costs/ Mean costing liabilities)

In the formula above, costing liabilities include long-term debts and

current liabilities which have interest. Increase in capital equivalents will be added to the tax reserve and employees' termination benefit reserve after tax. Decrease in capital equivalents will be subtracted from operating net profit after tax. Furthermore, capital equivalents are added to the capital.

Capital employed

The book value of return on equity together with book value of liabilities with interest. In other words, capital means all costing financial resources available to the company.

Capital amount: Shareholders' value decrease reserve + Inventory value decrease reserve + Liabilities with interest + Total amount of return on equity + (payable costs) The debt for accrued costs + Employees termination benefit reserve + Allowance for bad debts (Stewart, 1991).

Net operating profit after tax

Since there are some differences between accounting income and economic income, figures of net operating profit are adjusted according to equivalent return on equity and in the end, it shows the amount of profit that can be distributed among financiers in cash.

Net operating profit: the cost of value decrease of inventory + tax saving interest expense – interest expense + net accounting income after tax + accrued costs + the cost of employees' termination benefit + the cost of bad debts + the cost of value decrease of investing (Stewart, 1991).

Operating profit

This profit is the result of company's major activities and is attained after subtracting operating costs of sales (Stewart, 1991).

RESULTS

In order to analyze the hypotheses, dependent and independent variables were studied and measured at first. Then, the ability of each independent variable in predicting the operating profit of subsequent period was analyzed. To do this, Pierson's model and simple regression were used. The results are described below:

Testing first hypothesis

"Return on assets can be use to predict the subsequent

Table 1. Regression statistics

R	R2	AdjR2	Standard error
0.462	0.213	0.205	48064.7619

Table 2. The estimation of coefficient

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	28080.115	8802.957	0.462	3.190	0.002
Return on assets	39965.755	7876.234		5.074	0.000

Table 3. Regression statistic

R	R2	AdjR2	Standard error
0.065	0.004	-0.006	58303.9469

Table 4. The estimation of coefficient

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	61707.588	12474.796	0.065	4.947	0.000
Cost of capital	10528.889	16611.349		0.634	0.528

period's profit". According to Table 1, correlation coefficient between next period's operating profit and return on assets is equal to 0.462 and the possibility of this is zero, which is less than 0.05. Therefore, with a certainty of 95%, it is confirmed that there is a meaningful relation between variables. Finally, considering the first hypothesis' coefficient of determination which equals 0.213, it can be concluded that around 21% of the dependent variable's change (subsequent year's profit) can be described by independent variable (return on assets) and the first hypothesis is confirmed. The coefficients are reported in Table 2. According to Table 1, Regression model fitted to the data: $OIt = 28080.115 + 39965.755Rt - 1$

Testing second hypothesis

"Cost of capital can be use to predict the next period's operating profit." According to Table 3, correlation coefficient between next period's operating profit and cost of capital is equal to 0.065 and the possibility of it is equal to 0.528, which is bigger than 0.05. Therefore, with a certainty of 95%, it is not confirmed that there is a

meaningful relation between variables. Furthermore, the second hypothesis' coefficient of determination is 0.004. This means that around 0.04% of changes in next period's operating profit are definable by cost of capital which is very low and finally, cost of capital doesn't have the ability to predict next period's operating profit and the second hypothesis is rejected.

The coefficients are reported in Table 4. According to Table 3, Regression model fitted to the data: $OIt = 61707.588 + 1052.89 WACt - 1$

Testing third hypothesis

"The amount of capital employed can be use to predict the next period's operating profit." According to the Table 5, correlation coefficient between next period's operating profit and capital amount equals 0.699 and the possibility of this is zero, which is less than 0.05. Therefore, with a certainty of 95%, it is confirmed that there is a meaningful relation between variables and regarding correlation coefficient, the amount of capital can predict next period's operating profit. Moreover, the coefficient of determination of third hypothesis is equal to 0.488 which means

Table 5. Regression statistic

R	R2	AdjR2	Standard error
0.699	0.488	0.483	37421.5828

Table 6. The estimation of coefficient

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std.Error	Beta		
(Constant)	12747.958	6775.991		1.881	0.063
The amount of capital employed	0.766	0.083	0.699	9.267	0.000

Table 7. Regression statistic

R	R2	AdjR2	Standard error
0.462	0.213	0.205	48064.7619

Table 8. The estimation of coefficient

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std.Error	Beta		
(Constant)	-1.684E-02.588	0.012		-1.369	0.174
Net operating profit after taxes	1.290	0.000	1.000	9379202.4	0.000

around 48% of the changes in dependent variable (next period's operating profit) is definable by the independent variable (capital amount) and finally, the third hypothesis is confirmed. The coefficients are reported in Table 6. According to Table 5, Regression model fitted to the data: $OIt = 12747.95 + 0.766 \text{ CAPITAL}$ t-1.

Testing fourth hypothesis

"Net operating profit after taxes can predict next period's operating profit." According to the Table 7, correlation coefficient between next period's operating profit and net operating profit equals 0.786 and the possibility of this is zero, which is less than 0.05. Therefore, with a certainty of 95%, it is confirmed that there is a meaningful relation between variables and regarding correlation coefficient, the net operating profit after tax can predict the next period's operating profit and the coefficient of determination of fourth hypothesis is equal to 0.618 which means that around 61% of the changes in the dependent variable (next period's operating profit) is definable by the independent variable (net operating profit). Finally, the

fourth hypothesis is confirmed. According to Table 8, Regression model fitted to the data: $OIt = -0.0168 + 1.290 \text{ NOPAT}_{t-1}$

Survey assumptions of the linear regression model

According to Kolmogorov-smirnov test > 0.05 , the data can be accepted as normal. Also, based on the runs test > 0.05 , independency of residuals was accepted.

DISCUSSION AND CONCLUSION

This study indicates that the net operating profit after tax has a strong connection with predicting next period's operating profit and the proof of this is the research carried out on 119 companies accepted in Tehran's stock market in a six-year period (82-87) and the coefficient of determination of 61% showed that net operating profit after tax is the most suitable choice regarding the prediction next period's operating profit in comparison to amount of capital employed 48%, return on assets 21% and cost of capital 0.4%.

Although Stewart (1999) has considered cost of capital one of the crucial and effective variables in calculating EVA, the result of this study indicated that cost of capital has a trivial impact on predicting next period's operating profit, value of the net operating profit after tax and then return on assets have a key impact on predicting the profit of the subsequent period accordingly.

According to results and in order to encourage the use of the economic value added to attract attention to its components and to familiarize the investors, shareholders and managers with this modern standard, the following researches are suggested: 1. Due to the capabilities of EVA and its components in evaluation and assessment of managers' performance and predicting the profit of companies, it is recommended that this index should be used together with other indices for evaluating the performance of managers, predicting profit and determining the real value of companies. 2. In this research, stock market's formula was used to determine cost of capital. Other models may bring different results. 3. Other criteria can be used to predict the profit used in Tehran stock market and those criteria can be compared with the components of EVA regarding their efficiency and effect on predicting profit and the value of companies' market shares. 4. Due to the high ability of net operating profit after tax, capital amount and return on assets in predicting accordingly the next period of operating profit, these variables can be the proper criteria for capital allocation, designing reward system, increasing capital and pricing for the companies that are accepted in Tehran's stock market. 5. Considering that the economic value added alongside the performance evaluation is a suitable and considerable base in evaluating the company's performance and that it is a basis that covers the shortcomings inherent in the accounting criteria and regarding that it has high efficiency, it can be used to evaluate the performance of companies especially those that are accepted in the stock market.

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