

A Study Relationship between Firm Performance and Dividend Policy by Fuzzy Regression: Iranian scenario

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Abstract

Fuzzy regression analysis is an extension of the classical regression analysis that is used in evaluating the functional relationship between the dependent and independent variables in a fuzzy environment. Accounting dividend is the most important information used by decision makers in the economic analysis. This research investigated corporate governance and dividend policy in listed company's Tehran Stock exchange by fuzzy regression during 2010 and 2012. The results indicated that significant and positive relationship exists between financial performance (stock returns) and dividend policy and also there was a significant and negative relationship exists between economic performance (EVA) and dividend policy. Furthermore, a significant relationship exists between controlling variable (size) and dividend policy.

Keywords: Economic added value, Dividends, Fuzzy Regression, Firm Performance, Adjusted Firm Performance.

1. Introduction

Accounting Profit is one of the most important criteria in evaluating performance, however, this criteria has limitations. Accounting profit by using various methods for evaluating inventory, research and development expenses, amortization can be manipulated. Furthermore, cost of capital does not be used in calculating of accounting profit. For solving these problems, a new index called economic added value was introduced for performance evaluating by Stewart and Stern (1989). Economic added value is equal of operating income minus cost of capital. In evaluating performance based on traditional accounting profit is used only cost of financing by debt. While, in evaluating economic added value is used both cost of financing by debt and equity.

Robbie Lewis (1995) described EVA as a non- conventional measure of company's after-tax profits, minus a total annual cost of capital. Traditional financial measures such as net operating income (NOI) and earnings per share (EPS) do not capture all aspects of a company's economic profits, the largest which can be the cost of capital. EVA is a tool used to manage financial performance. Simply stated, it is the true economic profit after all costs are recaptured, including interest, taxes, and a charge for employed capital all tree which are not necessarily used in more conventional measurement tools. EVA measures both the profitability and the growth of a business. Conceptually and technically, EVA is simple; however it does require the basic knowledge of traditional financial formulas and terminology. Economic Value Added (EVA), when applied properly in a company, impacts all departments and decisions. The equation for EVA as well as the adjustments that must be made to current accounting practices is the basis for an understanding of EVA. The success of EVA is displayed as companies that have implemented EVA to varying degrees are compared with companies that have not implemented EVA. Once the argument for the overall superiority of EVA is made, traditional performance measures and current accounting practices are evaluated. Then, the importance of creating value within corporations becomes apparent. Finally, a detailed example of the implementation process that took place several years ago at Harsco argued in favor of all companies adopting EVA.

2. Dividend Policy:

Dividend policy has been controversial subject in finance field. Scholars have focused on this subject over five decades. Dividend policy is important from two aspects: 1- Dividend is essential factor on investing of companies. If we have higher dividend, internal resources of company for investment projects will decline and it will increase need of exterior resources, therefore, it can impact prize of the company's stock. 2- Many of stockholders are seeking to cash dividend. Thus, Managers for maximizing benefits of shareholders always must balance between interests of shareholders in order to chance opportunistic investment and pay cash dividend of shareholders. Companies can spend annual net income to cash dividend or use it for other objectives like repay debt or to finance new investment. Increase of dividend can lead to pay cash to shareholders.

3. CEO Duality:

CEO duality, the practice of one person serving as both the CEO and chairperson of the board of directors, has been at the center of great interest to both academic researchers and practitioners for the last two decades (Peng and Zhang, 2007). Agency theory suggests separation of duties may lead to efficient monitoring over the board process (Jensen, 1993). Bowen et al. (2002) and Mohd Saleh et al. (2005) indicate that there is a negative relationship between financial reporting quality and CEO duality. On the other hand, Farinha et al. (2009) showed that, there is no significant relationship between CEO duality and audit report.

4. Hypotheses:

H₁: Significant relationship exists between performance (stock returns) and dividend by fuzzy regression.

H₂: Significant relationship exists between performance (EVA) and dividend by fuzzy regression.

$$DPS = \beta_0 + \beta_1 RET + \beta_2 EVA + \beta_3 SIZE + \epsilon_i$$

We used following models in order to test the hypothesis:

$$DPS = \tilde{A}_0 + \tilde{A}_1(RET) + \tilde{A}_2(EVA) + \tilde{A}_3(SIZE) + \tilde{A}_4(LEV)$$

$$x_1 = RET, x_2 = EVA, x_3 = SIZE, Y = DPS.$$

Based on objective function it can be said that $A_0 = (a_0, S_0)$ and $A_i = (a_i, s_i)$ $i=1,2,3$ also

$$z = 2 * 710S_0 + 2S_1 \sum_{j=1}^{710} |x_{1j}| + 2S_2 \sum_{j=2}^{710} |x_{2j}| + 2S_3 \sum_{j=3}^{710} |x_{3j}|$$

Minimum of the objective function z Due to the restrictions and limitations of the 1420:

$$(1-h)S_0 + (1-h)(s_1|0| + s_2|0.209972| + s_3|0.1189|) - a_0 - a_1(0) - a_2(0.209972) - a_3(0.1189) \geq -(-0.03852)$$

$$(1-h)S_0 + (1-h)(s_1|0| + s_2|0.209972| + s_3|0.1189|) - a_0 - a_1(0) - a_2(0.209972) - a_3(0.1189) \geq -0.03852$$

Minimum of the objective function z Due to the restrictions and limitations of the 1420

$$i = 1, 2, 3, 4 \quad a_0, a_i$$

Table 1: Output of Lingo Software

h	S_3	Objective function
0.1	4.621064	434.7406
0.2	5.198696	489.0832
0.3	5.941367	558.9522
0.4	6.931595	652.1109
0.5	8.317914	782.5331
0.6	10.39739	978.1664
0.7	13.86319	1304.222
0.8	20.79479	1956.333
0.9	41.58957	3912.666

Other S_i do not above mentioned are equal 0

$$a_0 = 0.024267 \quad a_1 = 0.01491049 \quad a_2 = -0.2173589 \quad a_3 = 0.5448206$$

By replacing coefficients which are obtained in the regression model of the independent variables, the output value of the fuzzy are vague and it will be symmetric triangular fuzzy, therefore, by MATLAB by COA method; we are making it out to defuzzification. Finally, we can achieve MSE of the model by comparing the fitted model with the actual values. Following, the final regression model is a model that minimizes MSE in among other regression models. Output of the software MATLAB are listed in the following table:

Table 2: Output of MATLAB Software

h	A_3	MSE
0.1	0.1547	0.0237
0.2	0.1329	0.0237
0.3	0.1125	0.0237
0.4	0.0934	0.0237
0.5	0.0755	0.0237
0.6	0.0586	0.0237
0.7	0.0427	0.0237
0.8	0.0277	0.0236
0.9	0.0135	0.0235

According to above table minimum **MSE** and objective function are happened when $h = 0.9$
Thus, fuzzy regression will be as follow:

$$Y = (0.02, 0) + (0.014, 0)x_1 + (-0.21, 0)x_2 + (0.54, 4.7)x_3$$

We will have after defuzzification:

$$Y = 0.024267 + 0.014x_1 - 0.21x_2 + 0.054x_3$$

Common Stock Return

$$= \frac{\text{Market value in the end of the year} - \text{Market value in first of the year} + \text{Dividend payout} - \text{Capital raising}}{\text{Market value in first of the year}}$$

Market value in the first of the year = Number of shares * Share prize in the first of the year

Market value in the end of the year = Number of shares in the of the year * Ratio of shares in the of the year

Dividend Payout = Cash Dividend * Number of Shares in

Capital Raising = Percentage of Capital Raising *

EVA: Economic value added is a fashionable management performance measure pioneered by Stern Stewart & Company, a management consulting firm. EVA emphasizes the residual wealth creation in a company after all costs and expenses have been charged including the firm's cost of capital invested. In its simplest terms, EVA measures how much economic value in dollars; the company is creating, taking into account the cost of debt and equity capital. EVA is simply calculated as follows (Abdeen and Timothy Haight 2011):

$$\text{EVA} = \text{Net Operating Profit after Taxes} \left\{ \begin{array}{l} \text{Weighted Average} \\ \text{Cost of Capital} \end{array} \times \begin{array}{l} \text{Debt and} \\ \text{Equity Capital} \end{array} \right\}$$

ROE: Return on assets is used to assess the ability of company's managers in using available resources efficiently. Management is expected to use available resources in way that the maximum efficiency achieved. Interest expense and taxes does not affect in the manner of applying the asset. Furthermore, ROE use as indicator for measuring financial health.

ROE is calculated by taking the profit after tax and preference dividends of a given year and dividing it by the book value of equity (ordinary shares) at the beginning of the year. Average equity can also be used. Equity would consist of issued ordinary share capital, plus the share premium and reserves.

Size: the log of total assets

5. Conclusion:

The results indicated that significant and positive relationship exists between financial performance (stock returns) and dividend policy and also there was a significant and negative relationship exists between economic performance (EVA) and dividend policy. Furthermore, a significant relationship exists between controlling variable (size) and dividend policy.

6. Implication:

In according to develop economic added value and familiarize investors, shareholders and managers following suggestions are proposed:

1. Using economic added value as a criterion for management rewards and it impacts on company performance.
2. Investigate relationship between economic added value and
3. Investigate relationship between economic added value and adjusted economic added value.
4. Investigate relationship between economic added value and traditional criteria with economic added value.
5. Stock exchange organization should companies listed in stock exchange make to like EPS; using EVA for periodic prediction.

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