EVA’s Influence on the State-Owned Enterprise’s Investment Behavior

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Abstract. EVA (Economic Value Added) performance measurement has been implemented in Chinese state-owned enterprises for three years since 2010. EVA performance measurement’s influence on the enterprise’s investment behavior was empirically analyzed with the sample of state-owned listed companies. The results showed that the enterprise’s investment behavior were subject to significant influence after the implementation of EVA performance measurement. The implementation of EVA has significant positive influence on investment behavior. It stimulates managers to choose investments that can really improve corporate value and then effectively guide their investment behavior. Therefore, EVA performance measurement helped the state-owned enterprise’s investment behavior more scientific and rational.

Introduction

The State-owned Assets Supervision and Administration Commission of the State Council (SASAC) has established the interim method of evaluating the performances of top executives of the state-owned enterprises and the supplementary regulations of evaluating the annual performances of the top executives of the state-owned enterprises in succession, and has implemented performance evaluation of top executives of the state-owned enterprises since 2003. Considering high speed of development of globalization, SASAC established the modified 22th file the interim method of evaluating the performances of top executives of the state-owned enterprises, claiming Economic Value Added (EVA) of all the state-owned enterprises must be evaluated from the third term [1]. The file emphasizes on promoting enterprises’ value creativity, upgrading the benefit for investors and shareholders, confirming the hedging and appreciation of the state-owned assets and actuating enterprises to pay attention on the long-term, stable and sustainable development.

EVA analyzed the wealth creation for shareholders from the view of economics, which is in fact a concept of economic profit. It discussed how to calculate and analyze operating profit after tax subtracting costs consisted of debts and equity and formulates rules that how to calculate and adjust costs of capital. As it emphasizes the problem of calculating and adjusting cost of equity capital, EVA is looked as the better financial methods of representing enterprises’ creativity of value and profitability by academic circles. Stewart and some other people think that EVA is better than other methods in terms of representing enterprises’ real economic profit[2]. Fortune claims that EVA is the most popular financial idea. Peter Drucker pointed that the popularity of EVA represented the needs of analysis of total factor productivity on Harvard Business Review [3].

Traditional interest-oriented evaluation system is not good enough to make more reasonable investment decisions. EVA, considering all the cost of capital including debts and equity, is a good measure to be introduced to evaluating manager’s performance. Up to now, EVA has been implemented for a whole assessment term since 2010. So we use empirical analysis to examine what effects EVA has on listed state-owned enterprise’s investment behavior.
Literature Review

As a financial index of measuring enterprise’s economic value, EVA has been paid attention on by scholars at home and abroad since its coming out. Firstly, some scholars studied on EVA performance measurement index validity. Chen and Dodd tested EVA from different angles, but they both thought that we can improve the enterprise’s stock returns through increasing EVA and EVA contained incremental information compared with traditional accounting evaluation index [4]. Lehn and Makhija proposed that the relevance between stock return and EVA was stronger than the relevance between stock return and average ROA, ROS or ROE, and that EVA could improve the enterprise’s internal performance and amend incentives[5]. Stephen discussed three ways of measuring performances, pointed out the effective method was EVA and concluded that creating wealth needed to increase EVA index value[6]. Joel and Joseph reviewed some problems occured when using EVA and discussed the cost of implementing it[7].

In the domestic, Hui Xiao et al. studied all the A-shares listed companies and analyzed how EVA created value for shareholders, concluding that EVA reflected the real internal value of shares of listed companies, helpful for investors to deepen understanding of companies’ value [8]. Yan Zhao and Jinlong Chen applied EVA index to evaluate state-owned companies’ performance, finding that EVA and traditional accounting performance index bear the same consistency on the relative effectiveness, certifying that using EVA to evaluate state-owned companies’ performance was scientific and effective [9].

Secondly, some researches were done to study the effect that EVA has on companies’ investment and financing. Pettit studied portfolio strategy based on EVA, dividing listed companies into four quadrants, which are superstar, expensive, turnarounds and bargins, to provide basis for investment decisions [10]. Rogerson analyzed how investment incentives were affected by alternative distribution rules under the condition of distributing investment expenditure and pointed out the only distribution rule managers could choose when made effective decisions was EVA or residual income(RI) [11]. Stoyu et al. analyzed the effectiveness of using EVA as index of assessing portfolio and found that companies with negative EVA had more return than those with positive EVA [12]. Baber et al. thought that the more investment opportunities an enterprise had the stronger was the correlation between its performance and payment. Moreover, if investment opportunity was a part of evaluating the enterprise value, the rewards should be based on market-oriented index rather than traditional accounting assessing index [13]. This exactly shows the spirit of evaluating the performances of top executives of the state-owned enterprise.

Furthermore, Xianzhi Zhang and Qi Li studied the effect of implementing EVA evaluation taking state-owned enterprises for instance, finding that excessive investment significantly decreased after the full implementing of EVA evaluation [14]. Guohua Chi et al. found that EVA evaluation increased companies’ value through restraining excessive investment [15]. Erik thought that Chinese companies calculated EVA with a capital cost(5.5%) lower than rate of return market required, as a result it affected the companies’ investment and financing decisions. Hence, he proposed that there was a long way to go to really evaluate the companies’ performance by EVA [16].

In conclusion, there were quite a lot of studies on the effectiveness of EVA performance measurement and EVA is approved to be a good performance measurement. However, literatures of studying the effect which EVA has on the company’s investment decisions are rather limited. Although there are some studies discussing this problem, the studying period is very limited. There has been three years since the full implement of EVA in Chineses state-owned enterprises, the data are more sufficient and the effect will be more obvious. So this paper will analyze this problem in detail.
Research Hypothesis and Research Model

Research Hypothesis

Traditional accounting income index, based on the accrual basis, cannot reflect the enterprise’s real operating performance exactly, as the calculating process just considers debt costs such as interests without considering cost of equity. This would lead to the enterprise’s short-sighted investment, paying too much attention on short-term performance rather than projects which possibly decrease current profits but will help the enterprise’s long-term development. For example, when the enterprise’s overall goal is to increase return on equity, departments with good performance have no interests to spend more on capital investment because they worry about their return on equity decline if evaluated by traditional accounting return index. So, even new projects have good development prospects, they won’t be willing to invest. It is the short-term speculation caused by traditional accounting measurement that leads to the uncoordinated proportion of long-term investment and short-term investment. It weakens the enterprise’s motivation of pursuing long-term strategy goals and is against long-term sustainable development.

In fact, enterprises not only undertake the responsibility of paying debts (such as paying interests) but also undertake the responsibility for using equity. So the costs of equity should be considered. If returns cannot match the investors’ required profits, investors will withdraw capital then invest to other enterprises. Therefore, when enterprises make operation, investment decisions, both costs of debts and costs of equity should be considered. This is exactly the important contents of EVA measurement.

EVA considers costs of capital, offering more efficient standard of performance measurement and encouraging enterprises to use current capital more efficiently. Thus, any proprietor should manage capital more attentively, considering how to improve the ability of managing capital, how to improve the efficiency by reorganizing assets, how to display the full capacity of manufacturing, and how to pursue healthy and profitable growth rather than blindly introduce new project or get involved in new industry to expand the scale. Dealing well with these problems is helpful for increasing liquidity of assets and turnover rate of funds. So, EVA links the interests of investors and the operator performance together, effectively reducing operators’ manipulation of earnings and relaxing the gaming between investors and operators. Furthermore, EVA changes the enterprise’s decision criterion, strengthens the relationship between strategy and inspiration and urges operators to comprehend markets forwardly, offering a good tool for enterprises’ future investment decision. Thus, the state-owned enterprises may have more scientific and reasonable investment decisions after implementing EVA performance measurement. Then we propose the hypothesis 1:

H1: The implementation of EVA has significant effect on the listed state-owned enterprises’ investment behavior.

Research Model

In 2006, Richardson applied investment model to predict the quantity of capital investment and therefore measured the behavior of companies’ over-investment. The investment model was accepted at home and abroad through relative empirical studies. In this paper, we analyze whether the implementing of EVA has significant effect on Chinese listed state-owned enterprises’ investment or not, using Richardson’s model for reference. We develop model (1) as followed:

\[
Inve = \alpha + \beta_1 EVA + \beta_2 Stre + \beta_3 Leve + \beta_4 Grow + \beta_5 Cash + \beta_6 Size
\]

(1)

In model (1), \(Inve\) represents inputs of enterprises’ investment. EVA is dummy variable, representing whether enterprises use EVA performance measurement or not, for example, enterprises have not implemented EVA performance measurement before 2010, so the variable value is 0; after implementing EVA performance measurement in 2010, it is 1. \(Stre\) represents stock return ratio, reflecting enterprises’ profitability. \(Leve\) represents asset-liability ratio, reflecting enterprises’ debt level and degree of risk. \(Grow\) represents growth opportunity, making assets growth rate be
representative variable. *Cash* represents free cash flow, reflecting enterprises’ profit quality, with the reason that free cash flow is not affected by accounting measurement, avoiding deficiency of accounting income index in evaluating the enterprise performance to a large extent. *Size* represents enterprises’ assets size, used to control the enterprise scale.

**Empirical Research**

**Sample Selection and Variable Description**

This paper takes central state-owned enterprises in Shanghai and Shenzhen stock market as samples, choosing the period before implementing EVA performance measurement (2007~2009) and after that (2010~2012) as study period. The data is from database of financial statement and database of financial index on CSMAR Solution. To eliminate the effect of extremum on the regression result, this paper limits data between $\mu - 3\sigma$ and $\mu + 3\sigma$. Besides, we reject incomplete data and get 1141 sample observations finally. Variables and corresponding descriptions are showed in table 1.

| Variable | Name | Definition |
|----------|------|------------|
| *Inve*   | Volume of investment | cash outflow in investment activity-cash inflow in investment activity |
| *EVA*    | Economic value added | dummy variable, equal to 0 in 2007~2009, equal to 1 in 2010~2012 |
| *Stre*   | Stock profitability | (dividend per share + terminal stock price-initial stock price)/market price per share ×100% |
| *Leve*   | Asset-liability ratio | total liabilities/total assets ×100% |
| *Grow*   | Asset growth ratio | (year-end total assets-initial total assets)/initial total assets×100% |
| *Cash*   | Free cash flow | (retained profits + interest cost +non-cash cost)-working capital added-capital expenditure |
| *Size*   | Scale of enterprise | corporate assets |

**Descriptive Statistical Analysis**

Descriptive statistical analysis on variables is shown in table 2.

| Variable | N  | Minimum       | Maximum       | Mean  | Standard Deviation |
|----------|----|---------------|---------------|-------|--------------------|
| *Inve*   | 1141 | -2.649E9    | 6.118E10   | 2.078E9  | 5.717E9          |
| *Fina*   | 1141 | -3.806E10   | 4.165E10   | 9.840E8  | 4.8721E9         |
| *EVA*    | 1141 | 0             | 1            | .52     | .500              |
| *Stre*   | 1141 | -.889        | 7.177       | .296    | 1.010             |
| *Leve*   | 1141 | .037         | 1.303       | .545    | .206              |
| *Grow*   | 1141 | -.547        | 7.609       | .154    | .327              |
| *Cash*   | 1141 | -6.031E10   | 1.132E11   | 1.544E9  | 7.8677E9         |
| *Size*   | 1141 | 2.260E8     | 6.517E11   | 2.725E10 | 6.448E10         |

As the dimensions of the mentioned variables are different, this paper nondimensionalizes data to decrease the effect on analysis of regression.

**Regression Result Analysis**

To verify the proposed hypothesis, it analyzes state-owned enterprises’ investment with regression analysis. The validity result of regression model 1 is showed in table 3.
Table 3. Validity result of regression.

| model | $R$ | $R^2$ | adjusted-$R^2$ | standard error of estimated value | Durbin-Watson value | F-value | Sig. |
|-------|-----|-------|----------------|----------------------------------|---------------------|---------|------|
| 1     | .811 | .657  | .655           | 0.587                            | 1.861               | 362.350 | .000 |

Significance testing result shows that F-value is 362.350 and significance value is 0.000, indicating that this regression model has statistical significance. Coefficient of determination $R^2$ is 0.657 and adjusted- $R^2$ is 0.655, indicating that imitative effect of regression model is good. Durbin-Watson value approximates 2, indicating that serial correlation doesn’t exist among variables.

We analyze samples by regression analysis, getting regression coefficient and t-test value of each variable, showed in table 4.

Table 4. Regression coefficients.

| Variable | Not Standardized Coefficients | Standardized Coefficients | t | Sig. |
|----------|-------------------------------|---------------------------|---|------|
| (Constant) | -5.4E-16 | .017 | .000 | 1.000 |
| EVA      | -.086 | .019 | -.086 | -4.522 | .000 |
| Stre     | -.066 | .019 | -.066 | -3.441 | .001 |
| Leve     | .012 | .018 | .012 | .655 | .513 |
| Grow     | .066 | .018 | .066 | 3.693 | .000 |
| Cash     | .401 | .020 | .401 | 19.623 | .000 |
| Size     | .523 | .021 | .523 | 24.710 | .000 |

From the above table it can be seen that standardized coefficient of EVA is -0.086 and Sig. of t-test is 0.000, indicating that when significance level is below 0.01, there is negative correlation between EVA and the volume of investment. It also indicates that implementing EVA performance measurement significantly affect central state-owned enterprises’ investment decisions. As decision criterion, EVA is better than any other method reflecting enterprises’ real economic profit, what’s more, connecting with value creation. When using traditional accounting income index to measure enterprises’ performance, managers just consider cost of debt with the thought if only the return of a project exceeds cost of debt, the project would be profitable. It will impel enterprises to expand investment eagerly resulting in damaging shareholders’ interests. After implementing EVA performance measurement, managers will consider both debt cost and equity cost and choose projects that really create value. If only pursue investment scale ignoring equity cost, EVA will decrease inevitably leading to influence managers’ performance and salary. Thus, EVA can guide enterprises’ investment behavior, prompt managers to make decisions consistent with shareholder benefit and stimulate managers choose investment really creating value.

Conclusion

Since the implementing of EVA performance measurement in Chinese state-owned enterprises in 2010, there has been a whole evaluation term. What is the effect on earth? How does it influence enterprises’ investment behavior? This paper takes the listed state-owned enterprises as samples, studying above-mentioned problems during the period that three years before the implementing of EVA performance measurement and three years after it. We find out that the implementing of EVA has significant influence on enterprises’ investment. Capital cost is the important factor should be considered in operating activities. For example, when making strategy plan or merger strategy, it is necessary to calculate whether the prospective earnings will exceed all costs or not.

Managers will strive to increase EVA value in many aspects, for instance, improving capital return, decreasing capital cost rate, increasing investment when added return exceed added cost or decreasing investment when selling capitals whose cost exceeds return, to create value for shareholders. To be specific, managers can choose projects that the expected return exceeds the cost of invested capital.
They can also improve the efficiency of current capital and production equipments. They can also sell the capitals whose return cannot match its cost and weed out nonprofit business.

To summarize, EVA performance evaluation plays an important role in agent problems in the current market. On one way, EVA can not only measure the performance and evaluate the management state of an enterprise, but also combine the interests of managers and the value of enterprise together, thus creating wealth for all the stakeholders. On the other way, EVA is able to make it easier for the non-financial managers and common employees to accept the decisions of the enterprise if a financial management system based on EVA is established. And then, the enterprise can establish a clear and accurate relationship among the strategy selection, capital investment, daily decision and stakeholder’s value.

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