

# Discussion of Capital Structure Decision-making Based on EVA Theory

Long Chengfeng and Ma Wei

Business and Administration School, North China Electric Power University, Beijing, China

**Abstract-**This paper deals with the capital structure decision-making based on Economic Value Added (EVA) theory. The paper first reviews the research achievement of the EVA and its relationship with the capital structure. The EVA could measure the real value created by business for shareholders, and has a positive relation with the quality of business capital structure. Secondly, taking a case as an example, the paper makes a claim that the EBIT-EPS method, one of the traditional capital structure decision theories, may guide the management of enterprises chosen inappropriate financing selection so that the EVA value may be damaged. Finally, EVA theory is used for making decisions on capital structure, by comparing EVA values under different financing solutions. It can achieve the target of enterprise which is shareholder value maximization, also make up the defects of traditional capital structure decision theories.

**Keywords-** EBIT-EPS method , Capital Structure Theory, EVA

## 1. Introduction

Shareholder wealth maximization is the generally accepted financial management objective by theoretical study and practitioners at home and abroad. The economic value added (referred to EVA, the same below) theory puts the cost of equity as an opportunity cost during the process of the calculation, which can reflect the real increase on the value of shareholder wealth, measure the value created by business for shareholders. The value of EVA and the quality of capital structure are a positive correlation, choosing the right capital structure decision is significant to enhance corporate economic value added. It is imperative to introduce the EVA theory to capital structure decision-making due to the use of EBIT-EPS method may harm shareholder wealth, following detailed analysis

## 2. Analysis of EVA and Capital Structure

Simply, EVA is the net operating profit after tax deducting all the capital costs. All the capital cost contains the cost of equity capital and the cost of after-tax debt capital, and is calculated as follows:

$$EVA = X_1 - X_2 \quad (1)$$

$X_1$ —net operating profit after tax

$X_2$ —all the capital costs

$$X_2 = v_1 \times X_3 + v_2 \times X_4 = (X_3 + X_4) \times v_3 \quad (2)$$

$X_3$ —after-tax debt capital

$X_4$ —equity capital

$v_1$ —the cost ratio of after-tax debt capital

$v_2$ —the cost ratio of equity capital

$$EVA = X_1 - (X_3 + X_4) \times v_3 \quad (3)$$

Assuming that net operating profit after tax, debt capital and equity capital be certain, the weighted average cost of capital is the only factor in deciding EVA, at this time the value of EVA and the weighted average cost of capital are a negative correlation. To maximize the economic value added, it is necessary to make the weighted average cost of capital lowest.

All materials of financial management will emphasize that, when the weighted average cost of capital is the lowest and the value of shareholder is the biggest, then the firm's capital structure is optimal. That is, the quality of capital structure and the weighted average cost of capital negatively correlated.

In summary, the right decision-making on capital structure can reduce the weighted average cost of capital, and then lift the EVA. Conversely, it will damage to shareholder wealth.

### 3. Capital structure decision-making based on EBIT-EPS method is not conducive to raise EVA

EBIT-EPS method is comparing the earnings per share of different financing options at the expected earnings level, and then select the program of which earnings per share is larger. Specific as shown below:

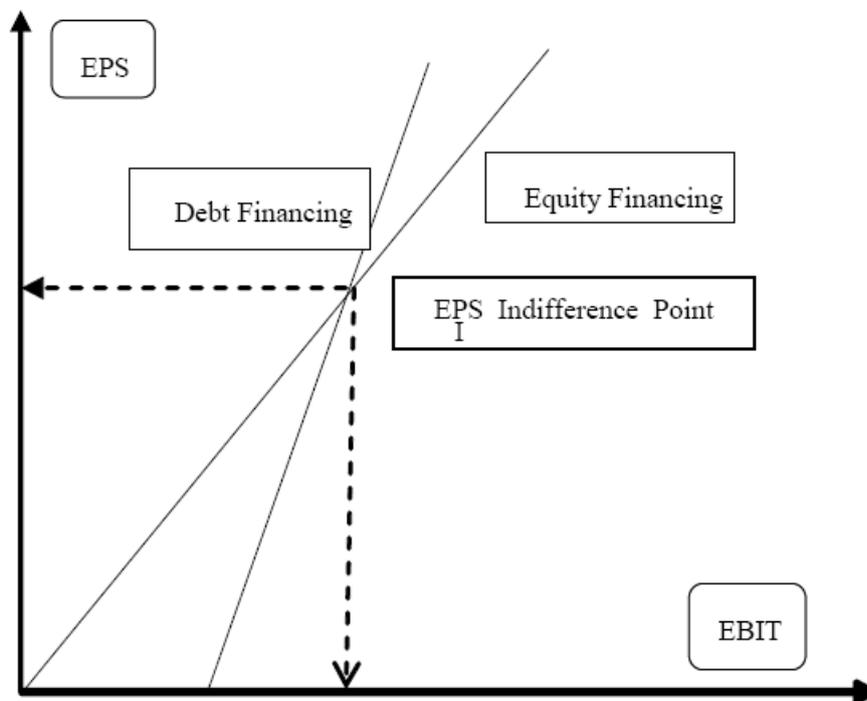


Diagram for EBIT-EPS method

There is a case using EBIT-EPS method on some authoritative teaching material as below. A company held original capital of 8.5 million yuan, of which 1 million yuan of debt capital (yearly interest rate of 9%, calling for ninety thousand yuan annually to pay interest), common stock capital of 7.5 million yuan (issues 500 thousand shares with 15 yuan per share), no preferred stock. The cost ratio of equity capital was 12%. Additional financing of 1.5 million yuan was needed due to expand business, and funding in two ways: (1) All issued will be common stock, and issue 50 thousand shares with 30 yuan per share; (2) All raised through the long-term debt (yearly interest rate of 12%, calling for 0.18 million yuan payment of interest annually). The income tax rate is 25%. Then,

$$EPS = \frac{(EBIT - 9)(1 - 25\%)}{55} = \frac{(EBIT - 27)(1 - 25\%)}{50} \quad (4)$$

EBIT = 2.07 million yuan. EPS = 2.7 yuan. Based on EBIT-EPS method theory, while EBIT > 2.07, the use of debt financing can increase earnings per share; when EBIT < 2.07, the use of equity financing can increase earnings per share; when EBIT = 2.07, both earnings per share the same.

From the calculation of the case, this paper indicates that, EBIT-EPS method has two aspects of defects as follows:

First, do not consider the financial risk of leverage to increase the cost ratio of equity capital after the debt capital increase. According to theory of capital structure, the cost ratio of equity capital will rise with the increase of corporate debt. Judging by the principle that risk equals return, necessary return rate that shareholders required should be higher than the one that creditors required. Therefore, in this case, the assumption that the cost ratio of equity capital is the same as 12% before and after financing is not satisfied.

Second, if the anticipated EBIT and the EBIT at the indifference point are equal, EVA under the way of common stock financing =  $(207-9) \times (1-25\%) - 900 \times 12\% = 40.5$  (million); EVA under the way of debt financing =  $(207-27) \times (1-25\%) - 750 \times 13.5\% = 33.75$  (million). The results can be seen from the above that, the EVA under the two financing methods are not equal, EVA of equity financing is greater than that of debt financing. EBIT-EPS method contradicts with the objective of maximizing shareholder wealth.

Thus, it is imperative to introduce the EVA theory to capital structure decision-making due to the use of EBIT-EPS method may harm shareholder wealth, following detailed analysis.

#### 4. Decisions on capital structure based on EVA maximization

It is fundamental to make decisions on capital structure based on EVA value maximization by calculating the weighted average cost of capital and EVA under the different financing options. And then the management can select the financing option of the lowest weighted average cost of capital and the largest EVA value.

Let the cost ratio of debt capital be fixed, the paper proposes to estimate the cost ratio of equity capital based on debt plus risk premium method. The calculation of this method is relatively simple, easy-to-business operations. It can reflect their respective financial risk of the different options and their financial impact on business conditions. According to experience estimated, the cost ratio of equity capital relative to debt risk premium rates is usually 3% -5%, the selection of intermediate values of 4%. When all the funds are raised through long-term debt, the cost ratio of equity capital is the sum of the cost of capital after tax and risk premium, that is

$$v_4 = 12\% \times (1 - 25\%) + 4\% = 13.5\% \quad (5)$$

$v_4$ —the cost ratio of equity capital

In a word, the most critical factor to influence the EVA is the interest rate of long-term debt financing way. It is credible to make the capital structure decision by contrasting its impact on the EVA.

Follow the previous case, when all the funds are raised through long-term debt, the cost ratio of equity capital is 13.5%. The calculation in accordance with the EVA will be as follows:

the  $EVA_1$  under the equity financing

$$= (EBIT-9) (1-T) - 900 \times 12\% = 0.75EBIT - 114.75$$

the  $EVA_2$  under the equity financing

$$= (EBIT-27) (1-T) - 750 \times 13.5\% = 0.75EBIT - 121.5$$

The paper would draw a conclusion that, when the cost ratio of equity capital is 12% and 1.5 million yuan for external financing, the EVA under equity financing options always greater than that of the long-term debt under the interest rate of 12%. Suppose further, if R is expressed as the interest rate when businesses financing in the long-term debt way, then analysis as follows:

$$EVA_1 = (EBIT-9) (1-T) - 900 \times 12\%$$

$$= 0.75EBIT - 114.75$$

$$EVA_2 = (EBIT-27) (1-T) - 750 \times [(1-T)R + 4\%]$$

$$= 0.75EBIT - 50.25 - 562.25R$$

The following conclusions could be drawn:

$$1) 562.25R + 50.25 = 114.75, R = 11.47\%$$

At this time, the value of EVA under the above two methods is the same.

$$2) 562.25R + 50.25 > 114.75, R > 11.47\%$$

In this case, the value of EVA under equity financing is always greater than that under debt financing, so equity financing options should be selected;

$$3) 562.25R + 50.25 < 114.75, R < 11.47\%$$

In this situation, the value of EVA under debt financing is always greater than that under equity financing, so debt financing options should be selected.

## 5. Conclusion

This paper deals with the capital structure decision-making based on Economic Value Added (EVA) theory. The paper briefly introduces the basic theory of the capital structure and EVA, and applies EVA in the capital structure decision-making. Finally, the paper proposes that the management of enterprises could determine the financing selection by judging the impact of the interest rate of long-term debt financing on the EVA, consequently, the financial risk and the cost ratio of equity capital are all taken into account. The results prove that this improvement is a feasible and effective method of capital structure decision-making. It can help the management to achieve the target of enterprise which is shareholder value maximization.

## 6. References

- [1] Hao Hong, Yang Lingfei. Interpretation of assessment indicators of SASAC Economic Value Added (EVA). International oil economy. No. 4, 2010
- [2] Zhao Jun. The Illuminations of SAC implementing Economic Value Added (EVA) evaluation. Communication of Finance and Accounting, 2009, No. 12
- [3] Jia Zhengyuan, Tian Li, Hong Haolin. Analysis of the financing efficiency about listed power companies based on EVA model. Communication of Finance and Accounting. No. 3, 2009
- [4] Zhao Xia. Brief Discussion about improvement of the EBIT-EPS method. Finance and Accounting Monthly. No. B5, 2003
- [5] Luo Shaode. Discussion about EBIT-EPS Method. Guangxi accounting. No. 6, 2003
- [6] Liang Yumei. Several issues about EBIT-EPS method. Group Economic Research. No. 7 on the fortnightly, 2006
- [7] Zhou Yonghua, Gao Qiongjie. Application about EVA valuation model in business valuation. Communication of Finance and Accounting. No. 2, 2009
- [8] Chen Yang. Analysis about management of enterprise value based on EVA. Golden Card Project. No. 3, 2009
- [9] Shen Weitao, Ye Xiaoming. Empirical study about the capital structure of listed companies based on EVA. Journal of Economic Research. No. 11, 2004
- [10] Liu Jun, Mao Daowei. The influence of EVA on Capital Structure - Empirical analysis based on panel data of listed SMEs in Western China. Statistics and Decision. 2006 August

- [11] Wang Yanni, Yuan Jiangli. Theoretical analysis of the relationship between EVA and capital structure. China Management Informationization. No. 7, 2009
- [12] Wang Yanni, Ren Haiyun. Constructing evaluation model Based on EVA method. Northwest Agriculture and Forestry University (Social Science Edition) . Volume 4 No. 3, May 2004
- [13] Financial Management and Cost Management of 2010 CPA Examination teaching material. Edit by the Chinese Institute of CPA.
- [14] Financial Management and Cost Management of 2010 CPA Examination Exam-oriented counselling and quanzhen simulation tests . Dong-ao accounting online
- [15] Zhang Wei, Yang Lei. Empirical Study of China's listed companies Based on EVA. Finance and Accounting Monthly . November 2007
- [16] Liao Baohua. Several issues should be paid attention to using the capital asset pricing model. Economic & Trade . June 2007