Journal of Economics and Public Finance
ISSN 2377-1038 (Print) ISSN 2377-1046 (Online)
Vol. 11, No. 1, 2025
www.scholink.org/ojs/index.php/jepf

Original Paper

Research on the Value Assessment of Paper Manufacturing Enterprises Based on Green EVA under Dual-Carbon Background

Xinyue Tai & Qian Li

School of Economics and Management, Southwest Forestry University, Kunming, Yunnan 650224, China

Corresponding author: Qian Li.

Abstract

Under the dual-carbon background, China's government actively promotes carbon emission reduction, and the value connotation of high-energy-consuming and high-emission paper enterprises has also changed. The value of a paper company not only includes the traditional economic value, but also should consider the environmental benefits due to the policy-driven. Based on the traditional EVA model, this paper introduces Monte Carlo simulation to determine the predicted EVA value, and combines it with the analysis of the environmental benefits of paper enterprises to further improve the green EVA environmental performance evaluation system and measure the value of the environmental contribution of the enterprise, and finally combines it with the case study of XH stock to verify the scientificity and reasonableness of the method, so as to more comprehensively reflect the comprehensive value of the enterprise.

Keywords

paper company, green EVA, enterprise value assessment

1. Introduction

Under the dual-carbon background, China's government environmental protection policy has been strengthened, “Pulp and Paper Industry Pollution Prevention and Control Feasible Technical Guidelines”, “Paper Industry Pollution Prevention and Control Technical Policy” and other documents have been issued to encourage enterprises to take the green low-carbon road. High pollution, high energy consumption of the green transformation of paper enterprises to bring environmental value is often ignored. The current value assessment of paper enterprises mostly use the income approach, based on financial data is often based on the assumption that future earnings are fixed growth, so that the forecast is biased. At the same time, the environmental benefits generated by measures taken by

paper enterprises to reduce negative impacts on the environment and even proactively protect environmental resources in their business activities have not been taken into account.

There are many results for the value assessment of paper-making enterprises belonging to heavy pollution industries. Wang Shuo (2019), for example, discusses the rationality of the EVA model in the assessment of paper companies. Wang Xinyu (2012) and others used the integration of EVA and BSC methods to comprehensively assess the overall value of paper companies. Green EVA can better reflect the value generated by economic, environmental protection and sustainable development, and has been introduced by scholars for enterprise value assessment. Green EVA is an EVA calculated based on expected eco-efficiency, which measures the efficiency of resource utilization and environmental impact of enterprises in the production process. Shen Xiaochi (2015) constructed a green financial evaluation system of enterprises to assess enterprise value. Yang Tingrong (2017) constructed a green evaluation system using resource energy utilization and pollution gas emission indexes, and verified that the environmental contribution difference can be adjusted to the impact of traditional EVA by taking coal enterprises as an example. In assessing the value of paper enterprises, Gao Ting (2022) explored the relationship between carbon disclosure and enterprise value, confirming that paper enterprises can improve corporate reputation and value from the environmental protection aspect. Liu Kun et al. (2018) verified a significant positive correlation between environmental responsibility fulfillment and the cost of equity capital with a sample of A-share listed companies in the paper industry.

In summary, when assessing the value of paper companies should also pay attention to the impact of the environment on them. The impact of paper-making enterprises on the environment includes water, waste gas, solid waste pollution, etc. Therefore, the GEVA evaluation system can be amended to better assess the value of paper-making enterprises. This paper constructs the GEVA environmental performance evaluation system according to the characteristics of paper-making enterprises, quantifies the environmental benefits of enterprises, and improves the assessment of the overall value of paper-making enterprises in the context of dual-carbon.

2. The Choice of Paper Enterprise Value Assessment Method

2.1 Characteristics and Value Composition of Paper-making Enterprises

With the advancement of the dual-carbon goal, papermaking enterprises are experiencing the transformation of green and low-carbon development. In addition to the economic value driven by the profitability of the business, the value of the paper enterprise also includes the environmental benefits created by its environmental protection activities. Under the influence of environmental policies related to carbon emissions, paper companies take appropriate measures to reduce water, waste gas, solid waste pollutant emissions, these measures will bring an increase in environmental protection costs in the short term. However, in the long run, the implementation of these emission reduction measures will improve the negative impact of enterprises on the environment, so that the subsequent treatment costs

are reduced, and the increase or decrease in environmental benefits depends on the net value of its positive and negative changes. In this paper, according to the analysis of the characteristics of the paper enterprise, the enterprise value should include the economic value, as well as the value of environmental contribution considering the environmental benefit impact factors, in order to consider the overall value more comprehensively.

2.2 Paper Enterprise Assessment Methods and Ideas

This paper is based on the income approach, the EVA is adjusted to GEVA and then discounted to get the paper enterprise value. Firstly, the accounting profit is adjusted on the basis of the net profit index with the characteristics of the industry, including R&D expenses and various impairment provisions. The Monte Carlo simulation method is then used to improve the uncertainty embedded in each key parameter and conduct an in-depth study.

Secondly, the environmental contribution value part will take into account the environmental impact factors of the actual sewage discharge of paper enterprises, combined with the actual situation of the type of pollutants discharged by paper enterprises, in order to construct a green EVA environmental performance evaluation system, using the Wall scoring method to evaluate the environmental protection activities engaged in by paper enterprises, and to increase or decrease the value of the actual environmental protection inputs of paper enterprises, so as to calculate the value of the contribution of the environmental protection.

3. Green EVA Enterprise Value Assessment Model Construction

3.1 Calculation of EVA

The EVA valuation model is essentially rooted in the core concept of the income approach, which introduces the core indicator of economic value added as a measure of future value creation, replacing the traditional cash flow considerations. NOPAT is net operating profit after tax; TC is total capitalization; and WACC is the weighted average cost of capital. The EVA calculation formula is as follows:

$$\mathrm{EVA} = \mathrm{NOPAT} - \mathrm{TC} \times \mathrm{WACC} \tag{1}$$

The use of EVA model needs to be combined with the characteristics of the paper industry, accounting adjustments to enterprise-related projects. The enterprise's related costs, such as research and development costs, construction in progress and other projects affecting profits are capitalized, which can effectively reduce the short-sightedness of enterprise managers.

3.2 Measurement of environmental contribution value

This paper draws on the idea of adjusting the environmental contribution proposed by Yang Tingrong and Ding Huiping in 2017 to construct an enterprise's environmental performance evaluation system, and utilizes the “Walsh Gravity Scoring Method” to measure the value of the environmental contribution based on the comparison of the enterprise's various actual environmental conditions with the standard value indicators. For those companies with excellent environmental performance, whose

environmental indicators exceed the established standards, the calculation of their green EVA will add an additional value-added portion due to environmental contributions on top of the traditional EVA, and the opposite is true for companies that do not meet the standards.

3.3 Paper Enterprise Value Assessment Model Based on GEVA

In order to accurately assess the intrinsic value of a paper company, it is usually necessary to consider the development stage of the company. Combined with the economic growth status of the paper company and the characteristics of steady development, this paper selects the two-stage growth model of the income approach to assess the value of the paper company. V denotes the value of the firm;I_0 denotes the initial investment in the firm;$GEVA_i$denotes the value of $GEVA_i$ in year i; WACC denotes the weighted average cost of capital; and g denotes the expected perpetual growth rate.The improved GEVA paper enterprise value assessment model is as follows:

$$V = I_0 + \sum_{t=1}^{n} \frac{GEVA_i}{(1+WACC)^i} + \frac{GEVA_{n+1}}{(WACC - g)(1+WACC)^n} \quad (2)$$

4. Case study of XH Corporation

In this paper, XH stock is selected as a case for analysis, with December 31, 2023 as the assessment point. Under the call of “double carbon” background, XH stock, as one of the key emission units, vigorously develops clean energy and actively implements pollutant emission reduction measures, so XH stock is taken as the case company in this thesis.

4.1 Calculation of EVA Value of XH Shares

Based on previous case studies, combined with the timeliness of the data, a 5-year period is selected as the assessment cycle. In this paper, the relevant data of the annual reports issued by XH shares from 2019 to 2023 are selected for assessment, and the relevant data are substituted into the formula to calculate the adjusted net operating profit after tax and total capitalization of XH shares, and finally the corresponding EVA value is obtained. When forecasting EVA, based on the probability distribution of the two key parameters of net profit after tax and total capital of the paper enterprise in the year 2019-2023, the two key parameters are forecasted by Monte Carlo simulation for 10,000 times.

The Monte Carlo assessment results are basically normally distributed, and the average value is chosen as the adjusted value in this paper. As shown in the above figure, the predicted net operating profit after tax in 2028 is 1239,110,100 yuan.

4.2 Calculation of Environmental Contribution Value of XH Shares

Based on the data disclosed in the ESG and financial reports of the enterprises, the environmental performance of XH shares is evaluated using the “Wall weighting method”, and the corresponding score is calculated. Based on XH's actual environmental performance from 2019-2023, the overall score of environmental activities will be calculated, and the value of excess environmental inputs exceeding national requirements will be adjusted.

In order to reasonably predict the value of environmental contribution in the period 2024-2028, this

paper uses the value of environmental contribution in the historical period as an average proportion of EVA of 0.79% to predict and get the value of GEVA in 2024-2028, and the prediction results are shown in Table 1:

Table 1. Calculation of GEVA Value of XH Shares in 2019-2023

Item/unit: million dollars	2024	2025	2026	2027	2028
Projected value of environmental contribution	201.98	233.08	285.72	371.46	511.85
Forecasted GEVA	25775.91	29745.15	36463.03	47404.10	65320.53

4.3 Overall GEVA Value of XH Shares

According to the data obtained above, the final overall value of XH shares is 23.655 billion yuan based on the calculation of the improved GEVA model formula considering environmental benefits, and comparing with the market value of the enterprise of 22.902 billion yuan at the time of appraisal, it can be seen that there is a difference of approximately 753 million yuan between the Monte Carlo-simulated GEVA value and the market value, and the error rate between the overall value and the market value is 3.28%, which is within the permissible range of error. The error rate between overall value and market value is 3.28%, which is within the permitted error range. It shows that the constructed enterprise value assessment model is reasonable and feasible.

5. Conclusion

In summary, this paper provides new assessment ideas and methods for the sustainable development of paper enterprises, and the assessment value considering the environmental impact factors is closer to the real value of the enterprise, so that the enterprise recognizes the importance of environmental protection for its long-term survival and development, and actively implements the environmental protection measures to enhance the environmental benefits, which will help the enterprise to realize the win-win situation of economic benefits and environmental benefits.

References

Gao Ting. (2022). Exploration of factors influencing the value of paper-making enterprises under the perspective of carbon disclosure. *China Forestry Economy*, *2022*(03), 81-84.

Liu Kun, & Zhou Yuxin. (2018). Research on the impact of environmental responsibility fulfillment on corporate value--an empirical study based on listed companies in paper industry. *China collective economy*, *2018*(28), 62-63.

Shen Xiaoci. (2015). Theoretical research on the framework of enterprise green financial evaluation system. *Economic and Social Exhibition*, *2015*(5), 58-60.

Wang Shuo, & Yao Huifang. (2019). Discussion on the application of EVA model based on the development of paper industry--Taking Chenming Paper as an example. *China Forestry Economy*, *2019*(06), 93-96.

Wang Xinyu, & Di Wei. (2012). An empirical study on corporate performance evaluation based on the combination of EVA and BSC--analysis based on the data of listed companies in paper and printing industries. *Accounting Newsletter*, *2012*(33), 53-55.

Yang Tingrong, & Ding Huiping. (2017). Green EVA: Economic value added based on expected eco-efficiency. *Journal of Northeastern University (Social Science Edition)*, *19*(02), 147-152+159.