

Enterprise Valuation from an ESG Perspective: A Case Study of BYD

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Abstract. With the rapid development of China's new energy vehicle industry, the impact of technological innovation, capital investment, and sustainable operation capabilities on corporate value is becoming increasingly prominent, while the traditional DCF model is still limited in reflecting ESG factors. This paper takes BYD as the research object, introduces ESG factors into the traditional discounted free cash flow model, and then modifies the revenue growth rate, weighted average cost of capital and perpetual growth rate, and compares the valuation results of the two models. This study finds that BYD's free cash flow in the early part of the forecast period was under continuous pressure due to high capital expenditures, and the present value of short-term FCFF will decrease slightly after ESG adjustments. However, the lower cost of capital and higher long-term growth expectations significantly improved the final value, increasing the enterprise value from RMB 244.424 billion to RMB 275.641 billion, an increase of approximately 12.77%, which indicates that the impact of ESG on firm value is primarily reflected in improvements in long-term capital costs and expectations of continued growth, rather than in increases in short-term cash flow.

Keywords: ESG, Enterprise Valuation, DCF Model, BYD, New Energy Vehicle Enterprises

1. Introduction

In recent years, China's new energy vehicle industry has developed rapidly, with enterprises generally exhibiting characteristics such as high R&D investment, strong growth potential, rapid technological iteration, and prominent green attributes. While their value depends on current profitability, factors such as technological innovation, market expansion, brand reputation, and sustainable operating capabilities also play a decisive role. As ESG gradually becomes an important factor in measuring the long-term value of enterprises, how to incorporate it into the valuation framework of new energy vehicle enterprises has become a problem that traditional enterprise valuation needs to further address.

Existing research generally supports that ESG performance and ESG disclosure can enhance firm value, but the pathways through which they work differ. Zheng et al. found that higher ESG ratings are beneficial to post-merger performance and transaction completion [1]; Rohendi et al. believe that competitive advantage is an important intermediary for ESG to enhance corporate value [2], while Metally et al. point out that corporate governance mechanisms such as audit committees and

sustainability committees strengthen this relationship [3]. In the automotive industry, Kim et al. found that governance transparency and social responsibility can increase purchase intention through brand value and corporate trust [4]; Fan and Fang found that ESG is significantly positively correlated with return on assets, and the governance dimension plays the most prominent role [5]. From the perspective of financing and long-term growth, Cruz et al. found that ESG is negatively correlated with the cost of equity and positively correlated with the cost of debt [6]. Tron et al. also showed that different financing channels have diverse and dynamic responses to ESG [7]. Kabir et al. further pointed out that reducing market risk is a crucial risk channel through which ESG affects financing costs [8]. Chai et al. found that ESG information disclosure can increase the sustainable growth rate (SGR), and media attention can strengthen this effect [9]. However, there is still a lack of a unified quantitative method for how to systematically incorporate ESG into the discounted cash flow (DCF) valuation model. Behr et al. pointed out that terminal value is highly dependent on steady-state assumptions, and fluctuations in operating and free cash flow will weaken the reliability of long-term forecasts [10]. Therefore, caution is still needed when mapping ESG to valuation parameters such as growth rate, cost of capital and perpetual growth rate.

This paper selects BYD as the research object. Since entering the automotive industry in 2003, BYD has formed a business system covering pure electric vehicles, plug-in hybrid vehicles, power batteries and energy storage systems, and has a strong accumulation of related core technologies, which is a strong industry representation. Its ESG practices are closely linked to its long-term competitiveness. According to BYD's sustainability report, the company continuously invests in new energy technology research and development. Meanwhile, it promotes green production, energy management, waste treatment, and carbon emission management. In terms of the governance dimension, a relatively perfect governance structure of listed companies has been established, and MSCI ESG has been rated AA since November 2022. According to the annual financial report of BYD in 2025, BYD's total assets in 2025 were 883.7 billion yuan and operating income was 804 billion yuan, but the asset-liability ratio reached 70.7%. The net profit attributable to shareholders decreased by 19% year-on-year. R&D investment increased to 63.4 billion yuan. Capital expenditure reached 157 billion yuan, and free cash flow was - 96.9 billion yuan. It shows the characteristics of scale expansion, high R&D investment, profitability and cash flow pressure.

Accordingly, this paper takes BYD as the research object. First, it uses the traditional DCF model to evaluate the company's value. On this basis, it combines BYD's ESG performance and its possible value impact path, and makes appropriate adjustments to key parameters such as revenue growth rate, WACC and perpetual growth rate. It also compares the valuation results of the traditional DCF model and ESG-adjusted DCF model, aiming to explore a feasible way to combine ESG factors with traditional valuation models and provide a reference for the valuation of new energy vehicle companies.

2. BYD enterprise value evaluation under traditional DCF model

2.1. Model selection

The common methods of enterprise value evaluation include the cost method, market method and income method. The cost method is mainly based on the value of existing assets of enterprises, which is suitable for enterprises whose asset value is easy to confirm and whose future income uncertainty is low. The market law selects comparable companies or transaction cases, but new energy automobile enterprises are quite different in technical route, brand positioning, market size and overseas layout, so enterprises are not completely comparable. DCF model (discounted free

cash flow model) mainly predicts the future free cash flow of enterprises and discounts it to the benchmark date to calculate the value of enterprises, which can better reflect the sustainable operation ability and future growth space of enterprises. As a leading enterprise in the new energy automobile industry, BYD has a relatively stable main business and cash flow foundation, and has the conditions to forecast future earnings. Therefore, this paper selects the DCF model, with stronger applicability as the traditional valuation method for analysis, and compares it with the ESG-revised valuation results later. The basic formula is:

$$\begin{aligned} \text{Enterprise Value} = & \text{Present Value of Free Cash Flow} \\ & + \text{Present Value of Terminal Value} \end{aligned} \quad (1)$$

The free cash flow formula is shown in formula (2), where T denotes the corporate income tax rate, D&A denotes depreciation and amortization, CapEx denotes capital expenditures, and ΔNWC denotes the increase in net working capital.

$$\text{FCFF}_t = \text{EBIT}_t (1-T) + \text{D\&A}_t - \text{CapEx}_t - \Delta\text{NWC}_t \quad (2)$$

2.2. Parameter determination

According to the analysis of BYD's 2025 annual financial report, although the scale of enterprises is still expanding, they are facing problems such as intensified price competition, declining profitability of bicycles and greater pressure on capital expenditure. Therefore, this paper does not simply use the data from BYD's past rapid growth stage, but makes a relatively conservative forecast combined with the latest financial performance. The specific parameters are shown in Table 1.

Table 1. Forecast of DCF-related parameters of BYD from 2026 to 2030

Parameters	2026	2027	2028	2029	2030
Revenue growth rate	5.0%	4.0%	3.5%	3.0%	3.0%
Capital expenditure / Operating Revenue	14.0%	12.0%	10.0%	9.0%	8.0%
Depreciation and amortization / Operating Revenue	5.5%	5.8%	6.0%	6.2%	6.3%
Increase in Working Capital / Increase in Revenue	10.0%	10.0%	10.0%	10.0%	10.0%
EBIT rate	5.5%	5.5%	5.6%	5.6%	5.7%
Income tax rate	25.0%	25.0%	25.0%	25.0%	25.0%
WACC	8.0%	8.0%	8.0%	8.0%	8.0%
Perpetual Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%

In terms of revenue growth rate, BYD has seen an increase in revenue, but the growth rate has slowed down significantly. This paper sets the revenue growth rate of 2026 at 5.0%, which is between the overall revenue growth rate and the core automobile business growth rate. Subsequently, as industry competition intensified and the revenue base expanded, the growth rate gradually moderated until the company entered a phase of relatively stable growth, settling at 3.0% ultimately.

In terms of capital expenditure, capital expenditure is predicted with reference to the proportion of capital expenditure in operating income in recent years. Considering the periodic characteristics of capital expenditure, it is assumed that with the gradual completion of early investment and the stabilization of expansion rhythm, the proportion of capital expenditure in operating income will decrease year by year—specifically, adjusting the ratio from 14% down to 8%.

Regarding depreciation and amortization, BYD holds a substantial volume of fixed assets, construction-in-progress, and intangible assets; that is, depreciation and amortization have a significant impact on free cash flow. Through the percentage of sales method, combined with the characteristics of the company's large capital expenditure scale, it is assumed that the future depreciation and amortization amount will increase with the expansion of its asset scale.

Regarding working capital, this paper estimates the increase in working capital based on the historical ratio of working capital to operating revenue, while also taking into account projected revenue growth. Due to BYD's strong supply chain management ability and industry status, the pressure on working capital is relatively controllable, which is predicted to be 10% of the revenue increase. The perpetual growth rate is used to predict the long-term value of enterprises entering the stage of stable development. Since companies typically struggle to sustain a growth rate exceeding that of the macroeconomy over the long term, this rate is generally set at or below the long-term GDP growth rate.

The new energy vehicle industry retains long-term growth potential. However, with the increase in market penetration, industry competition intensifies, and subsidy policies are gradually phased out, and the long-term growth rates of companies are gradually stabilizing. Considering the slowdown of BYD's revenue growth, the decline of gross profit margin and the high capital expenditure in 2025, this paper sets the sustainable growth rate at 2.5%.

WACC (weighted average cost of capital) is used to reflect the cost of debt capital and equity capital of enterprises. The specific parameters are shown in Table 2. The calculation formula is:

$$WACC=W_d \times K_d \times (1-T)+W_e \times K_e \quad (3)$$

The cost of equity capital is typically calculated using the CAPM model, which is:

$$K_e=R_f+\beta \times (R_m-R_f) \quad (4)$$

R_f represents the risk-free rate. β indicates the firm's sensitivity to market risk. $R_m - R_f$ represents the market risk premium. The parameters and the basis for their specific values are presented in Table 2, as shown below.

Based on the long-term government bond yield, public market data, and the level of equity market risk compensation for the risk-free rate, β , and market risk premium, respectively, the cost of debt capital is calculated to be 8.6%. The cost of debt capital is set at 3.0%, based on BYD's actual financing costs, and the proportions of debt and equity capital are determined according to the company's capital structure. The WACC is calculated to be approximately 7.84% and is set at 8.0% for this study.

Table 2. WACC-related parameters and basis for parameter selection

Parameter	Value Used in This Study	Basis for Selection
Risk-Free Rate (Rf)	2.0%	Based on the yields of long-term Chinese government bonds, with conservative rounding
Beta (β)	1.10	Based on BYD's beta reported by publicly available financial platforms, with appropriate adjustments for industry volatility and competitive risks in the new energy vehicle sector
Market Risk Premium (Rm-Rf)	6.0%	Based on the equity risk premium of the Chinese stock market, the risk premium of the CSI 300 Index, and common valuation practices
Cost of Equity (Ke)	8.6%	$2.0\% + 1.10 \times 6.0\% = 8.6\%$
Cost of Debt (Kd)	3.0%	Based on BYD's bank borrowing rates, bond coupon rates, and financing costs of lease liabilities, with appropriate rounding
Corporate Income Tax Rate (T)	25.0%	Assumed to equal the statutory corporate income tax rate for simplicity
Weight of Debt (D/(D+E))	Approximately 12.0%	Estimated based on BYD's interest-bearing debt and market capitalization
Weight of Equity (E/(D+E))	Approximately 88.0%	Derived as the complement of the weight of debt

2.3. Enterprise value estimation

According to the above process, the prediction results can be obtained, as shown in Table 3.

Table 3. Traditional DCF valuation of BYD, 2026–2030 unit: RMB 100 million

Item	2026	2027	2028	2029	2030
Operating Revenue	8442.00	8779.68	9086.97	9359.58	9640.37
Net Operating Profit After Tax	348.23	362.16	381.65	393.10	412.13
Depreciation and Amortization	464.31	509.22	545.22	580.29	607.34
Capital Expenditures	1181.88	1053.56	908.70	842.36	771.23
Increase in Working Capital	40.20	33.77	30.73	27.26	28.08
FCFF	-409.54	-215.95	-12.55	103.77	220.16
Present Value of FCFF	-379.20	-185.14	-9.97	76.28	149.84
Terminal Value	/	/	/	/	4102.99

Table 3. (continued)

Present Value of Terminal Value	/	/	/	/	2792.43
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During the forecast period, FCFF in each year is discounted according to WACC, resulting in a total present value of -34.819 billion RMB. Upon the conclusion of the forecast period, the company is assumed to enter a stable growth phase, and the sustainable growth model is used to calculate the final value. Therefore, the enterprise value of BYD at the end of 2030 under the traditional DCF model is calculated to be RMB 244.424 billion.

3. Enterprise valuation of BYD from an ESG perspective

3.1. ESG-Based adjustment scheme

Because the quantitative impact of ESG factors on enterprise value is difficult to accurately calculate, this paper avoids constructing a complex and precise ESG indicator system. Instead, it adopts a more cautious approach as an alternative to making significant adjustments to multiple valuation parameters. Based on the traditional DCF model, only minor adjustments are made to the core parameters: future cash flows, the discount rate, and the perpetual growth rate.

3.1.1. Revenue growth rate

BYD's main business is closely aligned with green and low-carbon sectors, such as new energy vehicles, power batteries, and energy storage, which is consistent with China's "dual carbon" goals (achieving carbon peaking and carbon neutrality) and the green transformation of the automotive industry. As a leading enterprise in the new energy automobile industry, it has strong advantages in technology, sales, supply chain and brand. Better ESG performance can optimize the brand image of enterprises to a certain extent, improve consumers' recognition of product quality, safety and social responsibility, and help to enhance consumers', investors', and partners' confidence in the long-term development of enterprises, thus bringing revenue growth. Accordingly, this paper slightly increases the income growth rate of traditional DCF by 0.5 percentage points. The specific data are adjusted from 5.0%, 4.0%, 3.5%, 3.0% and 3.0% in the traditional DCF model from 2026 to 2030 to 5.5%, 4.5%, 4.0%, 3.5% and 3.5% respectively after ESG revision.

3.1.2. WACC

Strong ESG performance can indirectly lower a company's cost of capital by improving its risk profile and financing credibility. For the new energy vehicle industry represented by BYD, strong green credentials help secure financing support such as green loans and green bonds, thereby alleviating the financial pressure associated with expansion. In this paper, the WACC used in the traditional DCF model is slightly lowered from 8.0% to 7.8% to reflect the positive impact of ESG performance on financing costs and the capital market risk premium, while avoiding an overstatement of the impact of ESG on the discount rate.

3.1.3. Perpetual growth rate

BYD possesses strong attributes associated with the green industry, along with significant technological expertise and brand advantages, which contribute to enhancing its long-term

competitiveness. This paper slightly raised the sustainable growth rate to 2.8%, reflecting that good ESG performance can support long-term value growth of enterprises to a certain extent in the stable stage.

3.2. Enterprise valuation under ESG adjustments

According to the above process, the prediction results can be obtained, as shown in Table 4.

Table 4. DCF valuation of BYD under ESG adjustments, 2026–2030 unit: RMB 100 million

Item	2026	2027	2028	2029	2030
Operating Revenue	8482.20	8863.90	9218.45	9541.10	9875.04
Net Operating Profit After Tax	349.89	365.63	387.17	400.73	422.16
Depreciation and Amortization	466.52	514.11	553.11	591.55	622.13
Capital Expenditures	1187.51	1063.67	921.85	858.70	790.00
Increase in Working Capital	44.22	38.17	35.46	32.26	33.39
FCFF	-415.32	-222.10	-17.02	101.31	220.89
Present Value of FCFF	-385.27	-191.12	-13.59	75.02	151.73

3.3. Comparative analysis of valuation results

Under the traditional DCF model, BYD's projected Free Cash Flow to the Firm (FCFF) for the years 2026 through 2030 stands at -40.954 billion, -21.595 billion, -1.255 billion, 10.377 billion, and 22.016 billion RMB, respectively. The consistently negative FCFF during the early part of the forecast period is primarily attributable to the company remaining in a high-investment expansion phase, characterized by substantial capital expenditure. As the ratio of capital expenditure to operating revenue gradually declines, FCFF turns positive from 2029 onwards, indicating a progressive improvement in the company's ability to cover capital expenditures with operating cash flow.

Under the ESG-adjusted DCF model, the FCFF for the respective periods is -41.532 billion, -22.210 billion, -1.702 billion, 10.131 billion, and 22.089 billion RMB. Although the ESG revision increases revenue growth and leads to an increase in operating income, EBIT and depreciation and amortization, higher revenue growth also leads to an increase in capital expenditure and working capital occupation, so free cash flow did not improve synchronously during the forecast period.

The positive impact of ESG adjustments is more significant in terms of long-term corporate value. This shows that when enterprises are in the expansion stage, the growth expectations brought about by ESG factors may not immediately produce higher short-term free cash flow, but may increase short-term capital pressure due to related new investment demand. Under the traditional DCF model, the present value of the terminal value is 279.243 billion RMB. After the ESG adjustment, it rises to 311.962 billion RMB, an increase of approximately RMB 32.719 billion, which far exceeds the 1.504 billion RMB decline in the present value of FCFF during the forecast period. The primary reason is that the ESG adjustment lowered the WACC from 8.0% to 7.8% while raising the perpetual growth rate from 2.5% to 2.8%. A lower WACC reduces the discounting of future cash flows and simultaneously narrows the spread between the WACC and the perpetual

growth rate in the perpetual growth model. The higher sustainable growth rate further improves the growth expectation of cash flow in the stable period. ESG adjustments amplify a company's long-term value through the combined effect of two parameters.

It can be seen that the impact of ESG factors on BYD's enterprise value has term differences: in the short term, it is mainly manifested in the increase of capital investment and working capital demand, which forms a certain pressure on free cash flow. In the long term, the terminal value is enhanced by lowering the cost of capital, improving risk expectations, and boosting the capacity for sustained growth. Ultimately, the long-term terminal value increases by approximately 32.719 billion RMB; after offsetting the 1.504 billion RMB decline in the present value of cash flows during the forecast period, the enterprise value rose from 244.424 billion RMB to 275.641 billion RMB, and a net increase of 31.217 billion RMB, or approximately 12.77%. Based on this, the valuation results of this study indicate that the value effect of ESG factors manifests more in the improvement of long-term cost of capital and expectations for sustained growth, rather than in the enhancement of short-term corporate cash flows.

4. Conclusion

Taking BYD as an example, this paper incorporates ESG factors into the traditional DCF valuation model and compares the differences in corporate value between the traditional DCF model and the ESG-adjusted DCF model. The above research indicates that BYD remains in a phase of high investment and rapid expansion. Consequently, the free cash flow is projected to remain under pressure in the near term due to substantial capital expenditures. ESG factors do not directly improve short-term cash flow; rather, their impact on corporate value is primarily reflected in an improved financing environment, lower cost of capital, enhanced market recognition, and elevated long-term growth expectations. Under the traditional DCF model, the enterprise value stands at RMB 244.424 billion. After ESG adjustment, it rises to RMB 275.641 billion, increasing by approximately 12.77%. It can be seen that the appropriate inclusion of ESG factors in the valuation of new energy automobile enterprises will help to reflect the long-term value more comprehensively.

This paper also has certain limitations. Quantifying the precise impact of ESG factors on corporate value is inherently difficult. Rather than constructing a complex ESG evaluation framework, this paper applies minor, somewhat subjective adjustments to revenue growth rates, WACC, and perpetual growth rates. Meanwhile, this paper only selects BYD as a case, and the research conclusion from a single sample has certain limitations on the universality of the industry.

In terms of practical implications, new energy vehicle enterprises should continue to strengthen green technology R&D, product safety, supply chain management, information disclosure, and corporate governance. ESG factors should be incorporated into the assessment of long-term operating capabilities, thereby translating sustainability capabilities into long-term corporate value. In addition to focusing on profits and cash flow, investors and assessment agencies should also give due consideration to a company's ESG rating, green financing capacity, and R&D investment. Future research could expand the sample of enterprises and develop more detailed and rigorous ESG quantitative indicators and systematic parameter adjustment methods to enhance the objectivity and applicability of valuation results.

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