

Impacts of ESG Factor on Corporation Evaluation: Evidence from BYD's Acquisition of Xi'an XIVO Bus

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Abstract. As a matter of fact, ESG factor shows a great importance in corporation valuation. This paper combines the collective consciousness of global sustainability to find a new way of valuing companies in terms of their expressiveness in the three directions of environment, social responsibility, and corporate governance and conjunction with the traditional income approach. The role of ESG factors is incorporated into calculating the operating revenue growth rate by taking the acquisition of Fresh XIVO Bus Group by BYD Company Limited, one of the most ESG-representative new energy automobile companies in China, as an example. Firstly, we compare the profitability of the enterprise before and after the acquisition to discuss the impact of ESG behaviors on the enterprise, then construct a DCF model to predict the cash flow performance in the next five years after the acquisition, and finally indicate the market value of the enterprise under the role of ESG through discounting. According to the analysis, strong ESG performance has helped BYD offset some of the pressures that existed due to the retreat of government subsidies. BYD will start with a slight deceleration but continue to thrive over the next five years.

Keywords: ESG, DCF model, cooperation evaluation.

1. Introduction

The providing policy, carbon peaking in 2030, and carbon neutrality in 2060 goals of the Chinese government have recently boosted most enterprises attaching importance to their ESG performance. Additionally, worldwide, investors gradually build their consciousness on sustainable development competitiveness while they assess a company's market capitalization. Instead of utilizing traditional evaluation methods, financial institutions taking the capability of protecting the environment (E), corporation governance(G), and social responsibility(S) on board as the new way of judging the criterion of the market value of current companies particularly in merge and acquisition (M&A). Thereby, in Chinese industries, remarkable ESG competency enterprises such as a bank, internet company, and new energy production organization are the typical cases which be capable of studying with a disparate valuation method and calculation logic.

Hu and Han, the researchers of the school of applied economics of the Chinese Academy of Social Sciences, verified the role of ESG in energy-efficient model transforming and upgrading of enterprises based on a multi-temporal double-difference method [1]. They found that the grade on ESG enables the promotion of the external information of corporations in the bond of the market and per companies. Then accelerate the enterprises' further eco-friendly progression via releasing financing constraints, mitigating agency issues, and increasing the engagement of innovation ability. Moreover, M&A can be defined as a sharp approach to soaring the companies' compactness of ESG with the equably forgoing ahead on environmental protection and less carbon emission. Therefore, Pu adopted the discrete dependent variable model, mixed regression, and Cox proportional risk regression model to study the impact of social responsibility on the success rate, duration, and long- and short-term performance of M&A deals and concluded that the more peerless the fulfillment of CSR, the more executive the likelihood of M&A initiated by the company, and the more sophisticated the performance of the company's M&A in the long term [2].

In consideration of the adjustment of market value after M&A is restructured, an extensive thesis applying the income approach and configuring the discount cash flow (DCF) model as their research methodology to predict the future capitalization value of a company with a conspicuous ESG property, for instance, the new energy vehicle companies and the speculation period is within five years in principle. On account of the prime operating revenue of the new energy vehicle industry growing leap and bound at present few years without interference from season factors, Song came up with the DCF model and comparable company valuation method to program the future five years cash flow and main finance index for BYD Company Ltd [3]. With the greening of China's financial markets, more financial institutions are incorporating ESG factors into their business rating criteria. Wang, Chen, and He's results have revealed that ESG provides an objective and comprehensive aid to the reference of a company's non-financial metrics and can potentially affect a company's intrinsic value over time in terms of share price increases, financing costs, etc. [4]. In a study of ESG factors that reshape firm value and risk, Mohanty, Odette, and Mike add alpha to the step of calculating the CMPA regression model when applying the DCF model to study how ESG reduces firm systemic risk, thereby further reducing the idiosyncratic risk of investing in ESG businesses [5]. Meanwhile, Xu argued that DCF models are more likely to be applied to evaluate uncertainty, and they discovered that investors are more responsive to analysts' investment opinions, as evidenced by DCF models. Thus, it is also more credible and informative in the context of ESG factors altering the valuation pathways of firms [6].

Consequently, this article introduces a DCF valuation model based on the long-term plan of global enterprises to reduce and decarbonize carbon emissions. It takes BYD, an excellent representative of China's ESG enterprises, as a case study to comprehensively analyze the ESG actions behind its acquisition of Xi'an XIVO buses. The paper compares BYD's earnings performance before and after the acquisition process through relative valuation and explains the impact of ESG factors on the company's financial indicators. Separately, this article estimates the value of BYD in the next five years after the ESG factors are implemented from an investor's point of view and provides a cash flow statement and other critical financial data. Combined with the current hotspots, the authors incorporate the fluctuation of ESG factors into the traditional valuation method, which lays a solid foundation for future modifications in the valuation method of enterprises in similar industries.

2. Case Description

BYD was founded in 1995 its headquarters is in Shenzhen, China. Initially, BYD was a battery manufacturer, but with the insight into the new energy vehicle market, the spread of the ESG concept, and the increasing global environmental awareness, BYD gradually shifted its focus to electric vehicles, and has made outstanding achievements in this field. Hitherto, BYD has become one of the world's largest pure electric passenger car manufacturers. As a leading company in China, BYD is representative of both market share and car quality due to its deep investment in the new energy sector [7]. Its acquisition target in this case is Xi'an XIVO Bus, which was founded in 1994 and jointly funded by Xi'an Aircraft Industry (Group) Co. and Volvo Bus Corporation. In 2011, Volvo withdrew from XIVO and Xifei took over all the shares. Since then, the shareholding of XIVO Bus has undergone several changes. By the end of 2021, the controlling stake had been transferred to Xi'an Hi-Tech Group. On 30 September 2021, the total assets of Xi'an XIVO Bus Company were RMB 245 million, with the total liabilities being RMB 86,159,300, and the net assets only remain at RMB 159 million. In 2022, due to the continuous improvement of the economic situation, the competition in the automobile field became more intense. As a result, XIVO encountered difficulties in survival.

BYD (002594) disclosed the third quarterly report of 2022 on 29 October. During the first three quarters of 2022, the company gained a total operating income of 267.688 billion RMB, increased 84.37% year-on-year; net profit of 9.311 billion yuan, up 281.13% year-on-year; net profit of 8.365 billion yuan from deduction of non-net profit, up 843.66% year-on-year; Net cash flow from operating activities was 91.037 billion yuan, an increase of 185.62% year-on-year; during the

reporting period, BYD's basic earnings per share were 3.2 yuan and the weighted average return on net assets was 9.43%.

At present, sustainable development has become a major task of national economic and social development, and in the context of China's in-depth promotion of "carbon peak, carbon neutral" strategy, green low carbon is the key area of sustainable development, but also the main direction of transformation and upgrading of listed companies [8]. Since BYD's new energy commercial vehicle industry scale continues to expand, as is advocated by ESG philosophy, the enterprise not only seeks to diversify its products, targeting from the originally cheap and cheerful national car to electric buses to cater to future market demand. In addition, its industry site extends to the west of China, casting its eyes on Shaanxi, where new energy cars embrace the status of 'Star Products' in order to stimulate local consumption. On 9 November 2022, BYD deployed a new energy automotive parts and components base project in Baoji, reaching a balance between environmental protection and corporation expansion, meanwhile acting as preparation for the upcoming acquisition. Two weeks later, the Xi'an Public Resource Trading Centre issued a transaction announcement that BYD had successfully acquired 100% of the equity interests in Xi'an XIVO Bus Company Limited (hereinafter referred to as XIVO Bus) held by Xi'an GAOKE Group Company Limited, at a transaction price of RMB 165 million. On the one hand, the acquisition of BYD as a qualified receiver preserved the former old Sino-foreign joint venture, on the other hand, demonstrated BYD's determination and vision to continuously expand its R&D base of new energy technology as well as its original intention to comply with the development of ESG elements.

From a short-term perspective, the acquisition of XIVO Bus promoted BYD explosive growth in operating income in the fourth quarter; from a long-term perspective, BYD's acquisition can, on the one hand, expand its layout in the field of new energy buses and constrained in the upstream industry chain [9], carry out the ESG concept, and promote the green and sustainable development of commercial buses. On the other hand, the transferee (BYD) needs to commit to the construction of a production base of new energy vehicles in accordance with the industrial land use plan of the High and New Tech Zone, with an investment scale not being less than RMB 5 billion. XIVO Bus has successively bid for three pieces of industrial land located near Cao Tang Si Road in Xi'an Hi-Tech Zone, totaling 716.51 mu, through a total of RMB 203 million in two years from 2019 to 2020). The resolution on the construction of the new energy production base in the rider reflects BYD Company's long-term commitment to the construction of the field of clean and environmental protection in the future. The resolution on the construction of the new energy production base in the rider reflects BYD long-term commitment to clean and environmental protection and profound impact of ESG elements on corporate value as an important factor in value creation. Against the backdrop of globalization, He and Zeng explore the implementation of ESG in Mengniu Dairy through the way of a case study, concluding that the application of ESG techniques can significantly improve a company's operating conditions [10]. Before the acquisition, according to BYD Q3 2022 financial statements, BYD's operating profit by the end of 2022 had soared to around \$12bn, and its share price would have risen further. Overall, the acquisition is a win-win co-operation. After the acquisition, in the fourth quarter, BYD achieved an operating income of 156.373 billion yuan, an increase of 120.40% year-on-year; achieved a net profit of 7.311 billion yuan, an increase of 114.30% year-on-year. In the context of ecological civilization construction, Yu and Wang use panel data to study the impact of corporate ESG components on corporate value and conclude that more social responsibility and improved corporate governance performance will increase corporate value, and environmental violations have a certain negative impact on corporate value [11].

This paper also calculates BYD static price-earnings ratio (PE), price-to-book ratio and the company's earnings per share (EPS) since the first quarter of 2023 and its first three quarters of the specific values and trends of changes in reaction to the role of the ESG factor in financial indicators, as is shown in the Fig. 1. Based on the results, the company's financial changes in the fourth quarter are tremendous because of the increase of corporation value and stock price. The fourth quarter of the company's price-earnings ratio is lower than the first three quarters; the price-net ratio of the

fourth quarter of the company is lower than the first three quarters, too. One can conclude that after the acquisition, the company witnessed accelerating development Xiangyu analyses the impact of ESG ratings on Lenovo Group's corporate value through case studies and concludes that improved ESG ratings can indirectly increase corporate value by lowering the cost of corporate finance and securing corporate market share [12]. All in all, the acquisition of the XIVO buses, not only broadens the layout of the company BYD in the field of ESG but enhances the overall competitiveness of the enterprise.

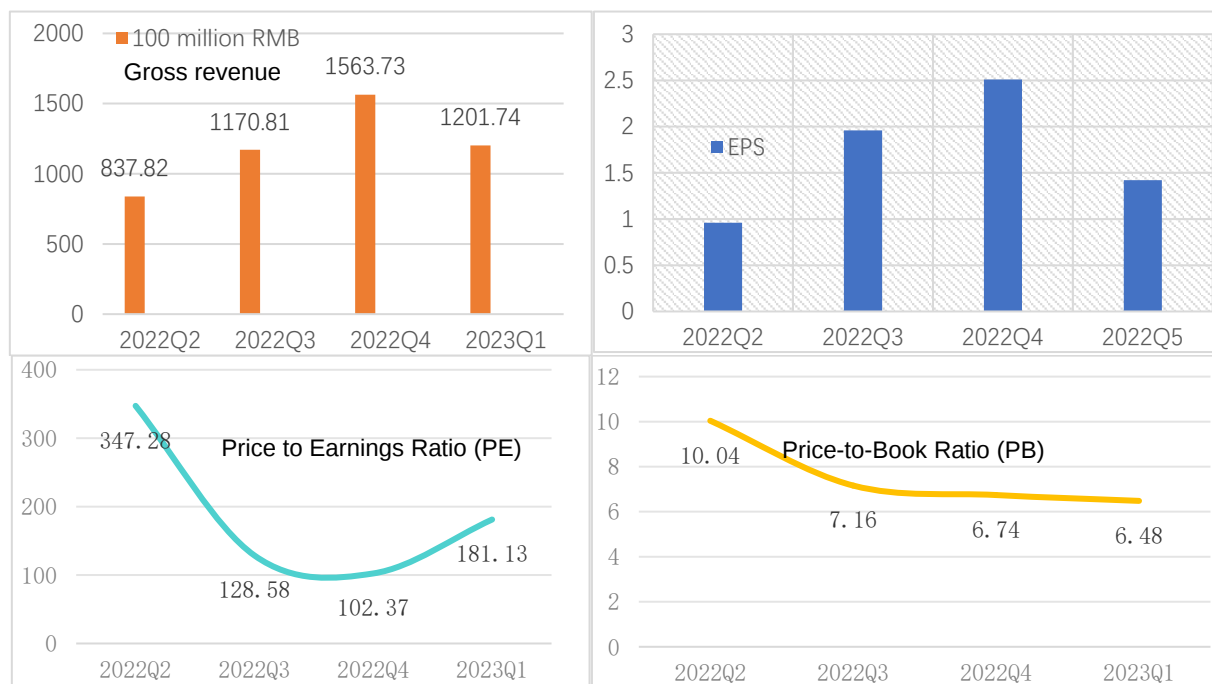


Figure 1. Finance Performance of BYD.

3. Evaluation Analysis Based on ESG Factor

Before calculating free cash flow, it is essential to shed light on the impaction details from three ESG layers [13]. Through the acquisition of Xi'an XIVO bus company, BYD has promised their supplement agreement which XIVO requires BYD to invest five billion RMB in the construction of the new energy foundation place for reoperating the commercial vehicles from XIVO's property. It implies that the attached ESG capability benefits via this case enable be quantified as different financial subjects on the balance sheet, income statement, and cash flow statement.

As depicted in the Fig. 2 with the results of BYD's acquisition of XIVO Bus Co., it can be demonstrated that it has a long-term horizon and intention on environmental, social, and corporate governance, and it has an immediate impact on financial metrics such as non-operating income, operating income, capital expenditures, taxes, D&A, etc. According to BYD's ESG report disclosed in 2022 [14], the BYD Cube energy storage products and AURO P high-efficiency photovoltaic components developed by them have considerably improved the efficiency and service life of the batteries of new energy vehicles, and after the acquisition, these technologies are likely to continue to be applied to the assembly and modification of new energy commercial vehicles of XIVO Bus. This approach will result in higher sales revenue and royalty income which will impact BYD's operating and non-operating income. Nonetheless, most of the other ESG-related events come from non-operating income, such as subsidies for R&D expenses from the Xi'an government [15], tax rebates for new energy vehicle companies, and income from additional carbon credits for high-tech companies. BYD further elaborated in the report that they signed a contract for rate-occupying cooperation with Tencent's Carbon Neutral Laboratory of the Sustainable Social Value Business Unit in December 2022, and the income generated from technology exchange and investment in each

other's laboratories will also be accounted for in the non-operating revenue as an impact of ESG. Obviously, the non-operating revenue represents the most comprehensive and logical index among the whole subjects which influences EV (enterprise value) through EBIT (Earnings Before Interest and Tax). It is also an important factor that investors should differentiate and adjust their estimated multiples in their calculations.



Figure 2. The impacts of corporate ESG behavior on financial accounts.

4. Anticipation of BYD's FCFF and Other Financial Indicators.

4.1. Data Selection and Method

Considering that BYD completes its acquisition of SIV Bus in November 2022 (Q4) and its different ESG actions in each quarter throughout the year, we have selected the financial data in the first quarter of 2023 and its first three quarters (Q2, Q3&Q4 in 2022), where the role of the ESG factors has already had an effect on business, to form an annual data as a historical basis for ensuing corporate valuation calculations. In addition, this paper argues that due to the current market share of up to 34.3%, BYD is a representative company of China's new energy automobile industry, and their ESG performance can basically reflect the sustainability of China's new energy automobile industry, so it is necessary to divide the influence of the immense ESG factor by quarter.

The rationale behind the DCF model is the belief that cash flows have different values at distinct phases because cash has less purchasing power in future times. Therefore, DCF model provides a more accurate estimate of value. After the completion of the acquisition, the construction of the new energy base and the expansion of technology in the new operating environment possibly generate cash flows that trend differently than before, which include consideration of synergies from the

merger, changes in sales growth rates, cost optimization, and so on. A more mathematically accurate market value of BYD Company after the ESG behavior can be obtained by utilizing the DCF model.

4.2. Incorporation of ESG Factors in the Calculation of Growth Rates

As analyzed in the previous section of the article, non-operating revenue, as the main financial indicator showing the ESG factors, was included by the authors in the calculation of the growth rate of BYD's total operating income in the forecasted next five years (2024-2028). Here, the weighted average method is used to calculate the estimated year growth rate, and the ratio of other non-operating revenue to gross revenue is regarded as the weight for 4 quarters i.e., the contribution of ESG factors to the growth of revenue quarterly. The average annual operating income growth rate over the next five years under the influence of ESG is projected to be 14.38% based on historical data, demonstrating a company with a strong development trend. According to the current market penetration rate of BYD has exceeded that of comparable companies such as Tesla and has a tendency to reach a bottleneck and enter sluggish growth, this paper assumes that their future revenues would not replicate the outstanding performance in 2022. Hence the authors use the growth rate of 14.83% for the linear regression calculation of operating income for the next five years. The results are listed in Table. 1.

Table 1. ESG Weighted & Estimated Quarterly Growth Rate (Data resource: Futu Niuniu financial platform & BYD financial report (2022FY &2023Q1)).

	23Q1	22Q4	22Q3	22Q2	22Q1
Other non-operating revenue (100 million RMB)	1.42	5.27	2.9	2.21	/
Gross revenue (100 million RMB)	1201.74	4240.61	2676.88	1560.07	668.25
ESG weight	0.0011	0.00124	0.00108	0.00142	/
Int	0.2	0.3	0.2	0.3	/
Quarter gross revenue growth rate	0.71	0.58	0.71	1.33	/
Quarter growth rate (with ESG weight)	0.14	0.17	0.14	0.40	/

4.3. BYD's FCFF estimation in 2024-2028

According to the estimations listed in Table. 2, the forecasted FCFF for 2024-2026 is negative. It is believed that after intensifying its investments in the overseas market from 2022 onwards, BYD's additional operating expenses and necessary expenditures will have a significant impact on its short-term working capital. Moreover, considering the slow growth rate of the market penetration of BYD's commercial vehicles, a substantial portion of the company's free cash flow might be allocated towards market operations and overseas market research in 2024-2026. BYD's strategic initiative to expand its commercial vehicle business might serve as a potential solution to counterbalance the potential sluggishness in the growth of passenger electric vehicle (EV) sales. This is particularly relevant in the context of China, the largest global market for EVs, discontinuing subsidies that were intended to assist consumers in purchasing EVs [16]. BYD's expansion of overseas business in the face of reduced policy and financial subsidies carries significant financial constraints and risks. Therefore, it is anticipated that BYD may face challenges in covering its investment and operating costs in the initial period. However, through DCF valuation and observation of the five-year forecast, it is found that FCFF gradually transitions from negative to positive over time. This transformation can be attributed to the positive changes in the company's business and financial aspects. Firstly, the company may implement a series of strategic initiatives related to ESG factors to increase sales and reduce costs. These initiatives lead to sales growth and improved profitability. As a result of higher sales and profit margins, the company can reduce its liabilities and lower its borrowing costs. BYD has already delivered 79 zero-emission all-electric buses to transportation authorities in the state of California, with an additional 122 buses currently in transit. The company currently serves 19 public transit customers in California and has supplied over 100 buses to both public and private entities in the state, with an additional 161 buses on order [17]. In the case of BYD and the California Air Resources

Board, BYD demonstrates its high regard for the environmental impact and actively promotes international cooperation. This will more effectively enhance its ESG ratings and facilitate collaboration with other foreign companies. It provides a strong basis for transforming the negative FCFF into a positive.

Although there is a phenomenon of subsidy reduction for new energy vehicles (NEVs) by the government, it is compensated by the ESG performance. In the long run, this does not affect BYD's future development. Additionally, the overall market and industry trends also contribute positively to the improvement of FCFF. Market demand growth, changes in industry competition dynamics, and government policy support create better opportunities for the company. These factors offer better sales prospects and market share, further enhancing FCFF. Despite there being inherently some uncertainty in the future forecasting of FCFF, considering the proactive performance of the company in business strategies, financial improvements, and market and industry trends, this essay has reason to believe that the transition from negative to positive FCFF is sustainable. This change provides an optimistic signal, indicating that BYD will generate cash flows and provide a robust foundation for future business growth and investment returns.

Table 2. Estimated FCFF & Permit Financial Indicators in 2024-2028.

	2024E	2025E	2026E	2027E	2028E
Gross operating revenue	3451.73	3934.98	4485.87	5113.90	5829.84
COGS	2679.86	2813.85	2954.54	3102.27	3257.38
Operating profile	771.87	1121.12	1531.32	2011.62	2572.45
Operating expenses	536.79	744.50	1032.60	1432.17	1986.37
EBIT	173.21	277.14	443.43	709.49	1135.18
Tax rate	0.25	0.25	0.25	0.25	0.25
D&A	25.49	26.61	27.78	29.00	30.28
Changes in NWC	60.00	52.33	63.11	76.11	91.79
CAPEX	538.66	565.59	593.87	623.56	654.74
FCFF	323.25	278.78	170.40	13.67	318.72

Table 3. Weighted average cost of capital (Date resource: Wind financial platform).

	2020	2021	2022	2023E
leveraged β	1.25	1.55	1.59	/
Equity	50,877,809.86	72,547,329.40	65,482,741.40	/
The market price of corporate debt	6,741,751.10	5,211,034.10	5,668,762.50	/
Cost of debt	4.43	4.14	5.61	/
Cost of equity	0.72	6.44	11.15	/
WACC	1.16%	6.28%	10.71%	8.50%

4.4. Discount Rate Calculation

The calculation of WACC is given as follow3s

$$WACC = \left(\frac{E}{D+E} \right) \times R_e + \left(\frac{D}{D+E} \right) \times R_d \times (1 - T_c) \quad (1)$$

Here, E represents the total market value of equity for the company, D represents the total market value of debt for the company, R_e represents the expected return rate on equity capital, R_d represents the expected borrowing cost on debt capital, and T_c represents the tax rate of the company. In the process of calculating R_e , this study employs the stock price return rate as the dependent variable and the index return rate as the independent variable. A linear regression model is constructed using the data from 2020 to 2022 to determine the slope, which is the final estimate of beta (β). The results are given in Table. 3. Based on the calculations and data collection, it is observed that the WACC value of BYD in 2020 is significantly lower compared to the other two years. This is due to the lower risk

profile exhibited by BYD in 2020, resulting in a lower expected return on equity capital, coupled with lower market interest rates during that period. In order to prevent erroneous calculations of future WACC values, this analysis excludes the 2020 data, which is treated as an outlier. Consequently, the average WACC calculated from the data of 2021 and 2022 is used for the subsequent five-year valuation of the company.

5. The Estimated Enterprise Value (EV)

By discounting each period's cash flow, we can obtain BYD's future market capitalization at the current price with the following equation:

$$EV = \sum_{t=1}^N \frac{CF_t}{(1+WACC)^t} \quad (2)$$

The future market value of BYD is 578.150 billion yuan, compared with the latest A-share market data [18], its current market value of 767.086 billion, this paper believes that in the new energy automobile market saturation and BYD's overseas operations under the influence of risky double factors, its market value will not be higher than the current or even reproduce the 2022 explosive soaring. This paper conservatively believes that its operating income will grow by around 14% under the promotion of ESG factors. Still, with the rising manufacturing cost of the whole new energy industry and its willingness to vigorously invest in the development of overseas markets, its net profit growth will be slow. It will be in a bottleneck in 5 years, but the operation condition will accelerate gradually in 5 years.

6. Conclusion

The specific data analysis involved in this study focused on examining the relationship between ESG factors and the financial performance of BYD. The results of the analysis revealed a significant correlation between strong ESG performance and positive financial outcomes for BYD. The company's emphasis on environmental impact and international cooperation, as highlighted in the case study with the California Air Resources Board, contributed to higher ESG ratings. These ratings, in turn, facilitated collaboration with other foreign enterprises, providing a solid foundation for transforming Free Cash Flow to Firm (FCFF) from negative to positive. The delivery of a substantial number of zero-emission electric buses and strong demand from public transit customers demonstrated BYD's market leadership and positioned the company favorably in the growing market for new energy vehicles in the state.

As the demand for new energy vehicles continues to grow worldwide, considering BYD's position as a leading Chinese new energy vehicle company, its domestic market share shows a trend of unstable growth. At present, BYD is at a crucial juncture of international investment, and its automotive products will be influenced by ESG factors to a certain extent. This study focuses on ESG factors as a key research subject and utilizes the acquisition of XIVO Motors by BYD as an important time point for the role of ESG. We estimate the valuation of BYD for the next five years. To achieve a harmonious development between the environment and the economy, companies need to assume greater ESG responsibilities and actively disclose non-financial information. Companies with higher transparency attract more investors, which, in the long run, can enhance their financial performance. BYD needs to adjust its investment decisions and enhance ESG performance based on its own financial operational status. Additionally, the prospects of the Chinese new energy vehicle market are highly optimistic, with government policy support and a growth trend in market demand, which will bring more development opportunities for BYD Automotive.

Author Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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