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Study on the Financial Performance Evaluation Based on EVA Model of BYD Auto

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Abstract: By analysing the financial data of it is found that BYD Auto, the traditional financial performance evaluation method may not be able to show the enterprise's operation status and value creation ability in a comprehensive way, based on which, the adopted economic value added (EVA) is as the evaluation index to make up for the shortcomings of method the traditional. The EVA theory is applied to the financial performance evaluation of BYD Auto, calculating the company's EVA and analysing its problems, making suggestions the future development of for BYD Auto, and further for providing certain the development of the automobile manufacturing industry reference and help.

Keywords: BYD Auto; EVA; Financial Performance Evaluation

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Introduction

In recent years, with the the real estate downward of , automobiles, as the second largest consumer product for all people, are in trend economy a higher and higher position, carrying an important after real estate economic and strategic consumer pressure . The automotive industry has also ushered in unprecedented development opportunities. On the one hand, the continuous innovation of battery technology and progress; on the other hand, the increasing support of the national policy, new energy have provided a favourable soil for the development of the automotive industry. In this context, how automotive companies can seize the opportunity to move towards the top of the industry is a question worth pondering. In the face of fierce market competition, enterprises need to maintain their competitiveness through a more accurate and effective financial performance evaluation system. Traditional financial performance evaluation methods, such as net profit, return on net assets, etc., although to a certain extent, can reflect the profitability of enterprises, but often ignore the cost of capital, and cannot fully reflect the real value creation ability of enterprises. Economic value added (EVA), as an emerging financial evaluation tool, can more accurately measure the real of enterprises by considering the cost of capital profitability and value creation ability. Ma Jing (2017) argued that the analysis of EVA value can be targeted to to suggest improvements, such as it can be proposed to increase the company's economic profit and improve the value of the company by improving the efficiency of the use of assets the company [1]. Yao Jinyuan (2018) studied how to improve the economic value added of the enterprise by decomposing the EVA driving indicators to construct a system of its driving indicators, which helps the enterprise can quickly shift from the core of the net profit evaluation to the economic value added, so as to realise the value added of the enterprise [2].

In this paper, the introduction of EVA performance evaluation method can evaluate the actual value created by the enterprise, and can find its deficiencies in the operation process, can effectively solve the defects due to the statement whitewash and

can not accurately analyse the profit and loss situation of the enterprise, as well as for enterprise stakeholders to provide a more reasonable basis for business decision-making, for the relevant enterprises to further enhance the competitiveness of the occupation of a larger market share to provide a guarantee, and at the same time for the other automotive manufacturing enterprises in China to provide a new evaluation idea. At other in China the same time, it provides a new for the performance evaluation of enterprises evaluation idea automobile manufacturing

1.Case study

1.1 BYD Auto Company Background

BYD Auto, as a global leader in new energy vehicles, has taken technological innovation as its core driving force since its establishment in 1995, and has achieved leapfrog development in recent years: it won the global championship with 1.86 million new energy vehicles sold in 2022, and was ranked No. 1 in the world with sales exceeding 3.02 million in 2023, and historically won the crown of the whole-brand sales in China's automobile market, breaking the monopoly pattern of joint venture brands; it has continued to make breakthroughs in the field of technology, with self-developed technologies such as blade batteries and DM-i super hybrid systems setting industry benchmarks. The brand's monopoly pattern; continuous breakthroughs in the field of technology, blade batteries, DM-i super hybrid system and other self-developed technologies to set the industry benchmark. 2024, the first half of the cumulative sales of new energy vehicles exceeded 1.6 million units, an increase of 28%, and accelerated the globalisation of the layout of the product coverage of Europe, East South Asia, South America and other 78 countries, a surge in overseas sales of 174% year-on-year, Thailand and Brazil, such as the imminent commissioning of the overseas bases. In addition, the company has demonstrated its strong progress from "Chinese Champion" to "Global Leader", and continues to promote the sustainable development of global transport with green technology.

2.Analysis of Traditional Financial Indicators BYD Auto'

2.1 Evaluation of 's Current Financial Performance BYD Auto

The financial performance evaluation of is based on BYD Auto net profit as the main assessment and evaluation index, and by analysing the financial data of for the years can be BYD Auto 2018-2023 (see Table 1), the company's profitability, operating ability, development ability and solvency evaluated comprehensively , and problems can be found.

Table 1: BYD Auto Financials 2014-2023

sports event	Indicator/year	2018	2019	2020	2021	2022	2023
profitability	Net sales margin (%)	2.73	1.66	3.84	1.84	4.18	5.2
	Return on net assets (average) (%)	5.05	2.88	7.45	4.01	16.13	24.05
operating ability	Inventory turnover	4.14	3.28	3.64	4.24	4.87	5.25
	Total asset turnover	0.7	0.65	0.79	0.87	1.07	1.03
solvency	Gearing ratio (%)	68.81	68.00	67.94	64.76	75.42	77.86
	current ratio	0.99	0.99	1.05	0.97	0.72	0.67
Development capacity	Earnings per share year-on-year growth rate (%)	-33.57	-46.24	194.00	-27.89	438.68	80.74
	Year-on-year growth rate of operating income (%)	22.79	-1.78	22.59	38.02	96.20	42.04
earnings per share	Earnings per share EPS (yuan)	0.93	0.50	1.47	1.06	5.71	1.03

Data source: Oriental Wealth Choice data

2.1.1 Profitability

The company's profitability is showing a volatile upward trend. Net sales margin increased from 2.73% in 2018 to 5.2% in 2023, and ROE even jumped from 5.05% to 24.05%. This improvement is mainly attributed to the scale effect and

technological dividend brought about by the outbreak of the new energy vehicle market after 2020. For example, ROE in 2022 is as high as 16.13%, while net sales margin for the same period is 4.18% and total asset turnover reaches 1.07, showing synergistic improvement in profitability and operational efficiency. However, it should be noted that the net sales interest rate in 2023 does not match the ROE growth rate, and the ROE increase is significantly higher than the net sales interest rate, which may stem from the further amplification of financial leverage.

2.1.2 Operational capacity

Among the operating capacity indicators, the total asset turnover ratio improved from 0.7 in 2018 to 1.07 in 2022, and slightly decreased to 1.03 in 2023; the inventory turnover ratio increased from 4.14 to 5.25. This indicates that the company's asset use efficiency continues to be optimised and the supply chain management capability has been enhanced, especially against the backdrop of the surge in demand for new-energy vehicles after 2021, with the acceleration of inventory turnover and the capacity utilisation rate Improvement. However, the slight decline in total asset turnover ratio in 2023 may reflect intensified market competition or digestion pressure after capacity expansion.

2.1.3 Solvency

BYD Auto's solvency indicators show that the gearing ratio continues to climb from 68.81% to 77.86% from 2018-2023, while the current ratio falls from 0.99 to 0.67. This indicates the company's long-term reliance on debt financing and a significant increase in short-term debt-servicing pressure. In particular, the gearing ratio exceeds 75% after 2022 and the current ratio is below 1, reflecting the lack of asset liquidity and possible short-term debt service risk. Although high leverage can amplify shareholders' returns, such as ROE of 24.05% in 2023, it also increases financial vulnerability and requires vigilance against debt servicing crisis triggered by interest rate fluctuations or economic downturn.

2.1.4 Developing capacity

In terms of development capability, the year-on-year growth rate of operating income peaks at 96.2% in 2022 and falls back to 42.04% in 2023, but remains high. The year-on-year growth rate of earnings per share fluctuates sharply, reaching a high of 438.68% in 2022 and falling to 80.74% in 2023. This high growth rate is mainly benefited from the new energy vehicle penetration rate and policy support, but the decline in growth rate also indicates that the industry is gradually entering a mature period, the future need to rely on technological innovation or international expansion to maintain growth momentum .

2.2 Shortcomings of traditional financial performance evaluation

Ignoring cash flow and non-financial factors. DuPont analyses rely on the income statement and balance sheet, and do not address factors that affect long-term competitiveness, such as cash flow, R&D investment or brand value.

Strong dependence on historical data. Based on past data, it is difficult to predict future trends, such as the effect of 's new energy transformation needs to be combined with industry forward-looking analysis BYD Auto.

Accounting profits are susceptible to manipulation. automobile The business scope of an enterprise includes complete automobiles manufacturing the manufacture of , the production and manufacture of automobile parts and components and automobile trading. Year-end inventory of internal assets of the enterprise requires asset impairment provision and depreciation of used parts and equipment, and the enterprise may exist by reducing the amount of current provision or reversal of previous accounting period's provision, which provides an opportunity for managers to whitewash the financial statements. Such behaviour may make managers more focused on enhancing their personal earnings rather than on the development of the business and the interests of shareholders. The falsification of financial data can lead to short-term false growth in , and shareholders financial performance and investors will not be able to accurately understand the true state of the enterprise's earnings and revenues, which affects decision-making and is detrimental to the long-term development of the enterprise.

3.Evaluation under EVA of Financial Performance BYD Auto's

EVA (Economic Value Added, Economic Value Added) is a method of measuring the economic performance of an enterprise, proposed by Stern Stewart & Co. in 1982.The formula for calculating EVA is: EVA = Net Operating Profit (NOPAT) - Cost of Capital (Capital × Expected Return on Capital). The core idea of EVA is to measure the actual profit generated by a company after deducting all the costs of capital, which reflects the value created by the company for its shareholders.

The main advantage of EVA over traditional financial performance evaluation methods is that it provides a more comprehensive and in-depth reflection of an enterprise's actual profitability; EVA takes into account not only the cost of debt, but also the cost of equity, fully reflecting the cost of capital used by the enterprise; at the same time, EVA focuses on the creation of shareholder value and avoids the distortions that may be associated with traditional metrics. In addition, EVA can incentivise management to focus on capital efficiency and long-term value creation rather than short-term profits, and it is applicable to companies of different sizes and industries, providing a more uniform performance assessment standard.

3.1 Calculate the EVA of BYD Auto

3.1.1 Calculation of net operating profit after tax

The formula for calculating operating profit after tax is as follows:

Net operating profit after tax (NOPAT) = net profit + (interest expense + R&D expenses - non-recurring gains and losses x 50%) x (1 - income tax rate).

The net operating profit after tax (NOPAT) of BYD Auto for 2018-2023 calculated based on the above formula is shown in Table 2.

Table 2: Calculation of BYD Auto's net operating profit after tax, 2018-2023 (in millions)

Project/year	2018	2019	2020	2021	2022	2023
net profit	355619.30	211885.70	601396.30	396726.60	1771310.40	3134407.00
Add: Interest expense *(1-25 per cent)	224782.58	226052.40	282195.75	134019.53	-121346.78	-110617.05
R&D costs* (1-25 per cent)	374202.00	422202.90	559864.58	599323.05	1399083.98	2968120.88
Less: Non-recurring gains and losses *50 per cent *(1-25 per cent)	5395.50	4456.61	-7619.48	-4274.59	-17328.38	-31292.18
Net operating profit after tax	949208.38	855684.39	1451076.10	1134343.76	3066375.98	6023203.00

Data source: BYD Auto 2018-2023 financial report

3.1.2 Calculation of total capital

In order to ensure the accuracy of the results, a series of corresponding adjustments are also made to the total capital of the company when calculating the total capital. The formula for calculating the adjusted total capital is as follows:

Total capital = owners' equity + short-term borrowings + long-term borrowings + bonds payable + non-current liabilities due within one year - construction in progress

Table 3: BYD Auto's Total Capital Calculation 2018-2023 (in millions)

Project/Year	2018	2019	2020	2021	2022	2023
owners' equity	6069397.90	6260142.00	6445391.20	10424420.90	12138983.70	15046211.30
Add: short-term loans	3778897.70	4033236.50	1640069.00	1020435.80	515309.80	1832321.60
long term loan	684760.30	1194793.20	1474549.50	874351.90	759359.60	1197513.90
Non-current liabilities due within one year	748263.40	874744.80	1141246.00	1298341.60	646482.80	774049.10
Less: Construction in progress	968377.30	1067484.70	611176.70	2027730.90	4462193.50	3472619.60
Total capital	10312942.00	11295431.80	10090079.00	11589819.30	9597942.40	15377476.30

Data source: BYD Auto 2018-2023 financial report

The total capital of BYD Auto for the years 2018-2023 calculated based on the above formula is shown in Table 3.

3.1.3 Calculation of the weighted average cost of capital ratio

The formula for calculating WACC is: WACC = debt capital ratio × debt capital cost rate × (1-25%) + equity capital ratio × equity capital cost rate. In this paper, published by the People's Bank of China (PBOC) for the last 6 selected the lending

rate (4.75%) as years was the debt cost of capital ratio of Auto. The cost of equity capital ratio is derived from the capital asset pricing model (cost of equity capital ratio = risk-free interest rate + beta coefficient × market risk premium), the risk-free interest rate is based on until 2024BYD calculated the one-year time deposit rate of 1.5% published by , the market risk premium is by the the People's Bank of China expressed GDP growth rate , and published by the National Bureau of Statistics the beta coefficient of Auto is found from the Rexis database BYD. In summary, the weighted average cost of capital ratio for BYD Auto is derived as shown in the table below.

Table 4: Calculation of Weighted Average Cost of Capital Ratio for BYD Auto 2018-2023

Indicator/year	2018	2019	2020	2021	2022	2023
Debt capital ratio/per cent	0.69	0.68	0.68	0.65	0.75	0.78
Equity capital ratio/per cent	0.31	0.32	0.32	0.35	0.25	0.22
Risk-free rate/per cent	1.50	1.50	1.50	1.50	1.50	1.50
Beta coefficient	0.89	0.72	0.72	0.43	0.90	1.18
Market risk premium/per cent	6.75	5.95	2.24	8.45	3.00	5.20
Debt cost of capital ratio/per cent	4.75	4.75	4.75	4.75	4.75	4.75
Cost of equity capital ratio/per cent	7.51	5.78	3.11	5.13	4.20	7.64
Weighted average cost of capital ratio/per cent	4.79	4.27	3.42	4.12	3.72	4.46

Data source: BYD Auto 2018-2023 financial report

3.1.4 Calculation of EVA

The EVA value is calculated as EVA = Net Operating Profit After Tax (NOPAT) -Total Capital (TC) at the beginning of the period x Weighted Average Cost of Capital (WACC). The results of BYD Auto's EVA value calculation are shown in 5 Table. BYD Auto's overall EVA value for 2018-2023 shows a significant growth trend, reflecting the company's continuous optimisation in value creation and capital efficiency. From the data, EVA from 4,in 2018 jumped .9 million yuan to 53,367 million yuan in 2023, a six-year growth of more than 10 times, especially in 2022 and 2023, the growth rate is the most rapid, reaching 27,094 million yuan and 53,367 million yuan, respectively, which reflects the company's strong profitability in the period of new energy automobile market outbreak.540

Specifically, EVA briefly declined to $3.730 billion in 2019, likely related to the decline in net operating profit after tax (from $9.492 billion to $8.557 billion) and the rising cost of capital in that year. However, after 2020, EVA began to rebound sharply, exceeding $11.062 billion in 2020, mainly thanks to the nearly 70% growth in net operating profit after tax to $14.511 billion and the WACC effective control of to 3.42%. 2021, although EVA fell back to $6.573 billion due to the impact of the increase in total capital and the rise in the cost of capital, the following two years by virtue of the net operating profit after tax. In 2021, EVA dropped back to $6.573 billion due to the increase in capital stock and rising cost of capital. It is worth noting that despite the increase in total capital to RMB153.775bn in 2023 and a rise in WACC to 4.46%, high profits still drove EVA to break through historical peaks, reflecting BYD in technological innovations (e.g., blade batteries, 's success hybrid system) and large-scale production. going forward DM-i The impact of capital cost volatility on long-term value creation will need to be watched, but overall, BYD has demonstrated industry-leading profitability and strategic execution.

Table 5: EVA Value of BYD Auto, 2018-2023 (in million yuan)

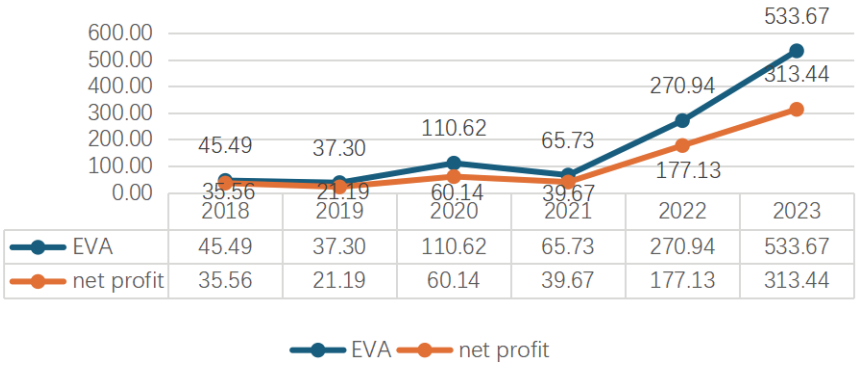
Indicator/year	2018	2019	2020	2021	2022	2023
Net operating profit after tax	949208.38	855684.39	1451076.10	1134343.76	3066375.98	6023203.00
Total capital	10312942.00	11295431.80	10090079.00	11589819.30	9597942.40	15377476.30
Weighted average cost of capital	0.05	0.04	0.03	0.04	0.04	0.04
EVA	454899.51	372992.66	1106166.04	657285.90	2709409.68	5336685.66

Source: BYD Auto Annual Report

3.1.5 Comparison of EVA and Net Profit

Comparison of EVA and net profit As shown in Figure 1, BYD Auto's from 2018-2023 BYD Auto's EVA is higher than net profit in all cases, which implies that BYD Auto's actual operation is better than the net profit in the statement, and the company can really create value for shareholders. Since 2021, EVA has rebounded strongly, and its growth rate exceeds the growth rate of net profit in the same period, a phenomenon which suggests that BYD has made a capital allocation efficiency, cost control or high value-added business expansion to make breakthroughs, which effectively enhance the economic value added. In addition, the difference of EVA consistently higher than net profit may stem from the effective management of capital cost, which has enabled the company to create a continuous expansion of excess profit. Overall, despite short-term fluctuations, BYD's EVA performance highlights its enhanced long-term value creation ability and optimised financial health.

Figure 1: Comparison of BYD Auto's EVA Value and Net Profit, 2018-2023 (in billions of yuan)



	2018	2019	2020	2021	2022	2023
EVA	45.49	37.30	110.62	65.73	270.94	533.67
net profit	35.56	21.19	60.14	39.67	177.13	313.44

4.Suggestions for Improving the Financial Performance Evaluation Methodology of BYD Auto

4.1 Integration of the cost of capital into the evaluation system and comprehensive measurement of value creation capacity

Traditional financial indicators (e.g., net profit, ROE) do not take into account the cost of equity capital, which may overestimate the real profitability of the enterprise, while EVA reflects more accurately the actual economic profit created by the enterprise for shareholders by deducting the full cost of capital (including debt and equity). It is recommended that BYD in its performance evaluation continue to deepen EVA the application of , and incorporate cost of capital management into its assessment objectives, for example, by setting a threshold for return on capital (ROIC), to incentivise the management to optimise the allocation of capital, to reduce the occupation of inefficient assets, and to avoid wastage of capital due to blind expansion, so as to enhance the overall efficiency of value creation.

4.2 Strengthen long-term orientation and promote synergy between strategy and performance evaluation

Traditional methods are susceptible to short-term profit manipulation, while EVA emphasises long-term value accumulation and can guide companies to balance short-term earnings and long-term investment. It is recommended that BYD link EVA to strategic objectives such as technological innovation and globalisation, for example, by incorporating non-financial indicators such as R&D investment and overseas market penetration into the analysis of EVA drivers, and evaluating the effect of releasing technological dividends by extending the assessment cycle. At the same time, long-term incentive mechanisms based on EVA, such as equity incentive plans, can be designed to prompt management to focus on technology research and development, brand building and other long-term value drivers, to avoid the pursuit of short-term profits at the expense of core competitiveness.

4.3 Improving data transparency and adjustment mechanisms to enhance evaluation objectivity

Traditional accounting profits are easily affected by standard adjustments or management's subjective judgement, while EVA reduces the room for financial whitewash by adjusting accounting items such as non-recurring gains and losses and

capitalised R&D costs. It is recommended that BYD further refine its EVA calculation rules, such as clarifying the criteria for capitalising R&D costs, standardising the process of adjusting non-recurring gains and losses, and regularly disclosing the details of EVA calculation and the basis for adjustment. At the same time, an independent third party can be introduced to audit the EVA data to enhance external stakeholders the trust of (e.g., investors and regulators) in the evaluation results, so as to build a more transparent and credible performance evaluation system to support the sustainable development of the enterprise.

5.concluding remarks

This study evaluates BYD Auto's financial performance through the EVA model and finds a significant increase in its EVA value, reflecting the company's strong value creation capability driven by new energy technologies. Compared with traditional indicators, EVA measures the cost of capital more comprehensively, revealing the effectiveness of BYD's capital efficiency optimisation and long-term strategy execution. However, high leverage and short-term debt servicing pressure still need to be guarded against. It is recommended that BYD continue to optimise its capital structure, deepen its technological innovation, and strengthen its globalisation to consolidate its competitive advantage. This study provides a practical reference for EVA performance evaluation in the automotive industry, helping companies balance profitability and sustainable development, and promoting the industry's transition to a value-driven model.

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no

Conflict of Interests

The author(s)declare(s) that there is no conflict of interest regarding the publication of this paper.

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