Financial Economics Research; Vol.3, No.2; 2026
E-ISSN: 3006-3663 P-ISSN: 3006-3655
DOI: https://doi.org/10.70267/fer.250302.385399
Published by: Zeus Press

Research on the Sustainable Development Capacity of CATL - Based on Financial Data from 2015 to 2024

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Abstract

This paper selects the leading company in the battery power industry, CATL Company, as the sample. By using the company's financial data from 2015 to 2024 and that of 10 companies in the same industry for internal comparison, the DuPont analysis method is taken as the core. Combined with the sequential substitution method, the impact degree of the three factors - net profit margin, total asset turnover rate, and equity multiplier - on the return on equity (ROE) is quantitatively calculated. The sensitivity of the indicators is verified through SPSS empirical analysis, and a comparative study is conducted with the leading company in the industry, BYD. Through the triple analysis of industry horizontal comparison, self-vertical comparison, and double-leading company comparison, the financial driving logic of CATL Company is dissected. Its current shortcomings are identified and optimization strategies are proposed. The research concludes that CATL Company has the financial characteristics of "profit-driven and stable leverage ratio", and determines the financial differentiation characteristics between CATL Company and BYD Company. This also provides certain reference value for financial analysis and optimization of enterprises in the battery power industry.

Keywords

DuPont analysis method, CATL, battery power industry, return on equity (ROE), financial characteristics

1. Introduction

With the rapid development of the global new energy industry, the new energy battery power industry, as a strategic emerging industry, is highly competitive. The financial health and profit-driven efficiency of enterprises have become the key indicators to measure the core competitiveness of the new energy battery power industry. As the leading enterprise in the new energy battery power industry, CATL has a financial operation model, profit quality and risk control ability that are not only crucial for its own sustainable development but also have a benchmarking and exemplary effect on the entire industry. Therefore, this article selects CATL as the research object, which is of certain typicality and representativeness.

Compared with the one-sidedness of single financial indicator analysis, the DuPont analysis method can decompose such a comprehensive indicator like ROE into three factors: profit, operation and leverage. It penetrates the source of the enterprise's profitability layer by layer, understands the advantages and disadvantages of financial strength, and makes up for the deficiency of traditional indicator analysis that cannot reflect the driving mechanism. Combined with the chain substitution method, it can quantify the influence

intensity of factors, making financial analysis scientific, rigorous and targeted. From the perspective of industry characteristics, the battery power industry where CATL is located is a capital and technology-intensive enterprise. The matching of profitability, operation and capital structure is very important. The DuPont analysis has the characteristics of analyzing the battery power industry and can comprehensively reflect the true financial situation of the enterprise in all aspects. Therefore, choosing the DuPont analysis method to study the financial characteristics of CATL can provide good inspiration for similar enterprises in the battery power industry. Hence, this article selects the DuPont analysis method to study the financial characteristics of CATL.

2. Literature Review

2.1 Current Research Status

2.1.1 Theoretical and Applied Research on DuPont Analysis Method

As a classic financial comprehensive analysis tool, the DuPont analysis method starts from the return on equity (ROE), and decomposes it into three major factors: net profit margin, total asset turnover rate, and equity multiplier. It reveals the intrinsic interrelationship among the three aspects of a company's profitability, operational capability, and debt-paying ability. In terms of theoretical improvement, Zhang and Wang (2014) pointed out that the existing DuPont system has significant flaws such as indicator fragmentation, failure to consider profit quality and cost structure. Based on this, they logically and clearly proposed an improved DuPont analysis framework, which has excellent applicability for manufacturing enterprises [1]. Later, Xu (2020) made a very solid optimization of the indicator system, adding the examination of cost control and asset efficiency, truly making the analysis more closely related to the operating reality of real enterprises [2]. From the perspective of industry application, Wen et al. (2023) applied the DuPont analysis method to the financial industry and manufacturing industry, systematically and rigorously testing its effectiveness in financial diagnosis in different fields [3]. Zhang and Hu (2021) reconstructed the DuPont research framework from the perspective of enterprise activities, and concluded that the profit factor and operational factor have a dominant driving effect on the ROE of manufacturing enterprises [4]. Finally, Zhang and Zhou (2019) constructed a suitable DuPont financial ratio model for the manufacturing industry based on an automotive manufacturing enterprise as a sample, which is an excellent reference example for the methodology part of this paper [5].

The application of the DuPont analysis method in the field of new energy and battery power has achieved certain application: Zhang and Zhu (2021) started from the Harvard analysis framework and used DuPont factors to conduct a financial analysis of battery power enterprises, but it was more inclined to strategic interpretation and lacked sufficient quantitative calculation [6]. Xu and Wang (2022) took CATL as a sample, naturally and appropriately incorporated DuPont indicators into the value assessment system of energy storage enterprises, and rigorously demonstrated the actual impact of profit, turnover, and leverage on enterprise value [7]. From this, it can be seen that the DuPont analysis method is applicable to the battery power industry, but there is no mature analysis paradigm that fits its technical-intensive, heavy assets, and high growth characteristics.

2.1.2 Financial Research on the Battery Power Industry

As the new energy industry is a strategic emerging industry of the country, the financial research on the battery power industry has received considerable attention. Currently, the academic community has three clear and logically coherent research directions in this regard.

From the perspective of policy and industry chain impact, the existing literature holds the view that Jin (2022) first demonstrated that the correlation of the new energy vehicle industry chain is high, so policy adjustments and industrial chain synergy jointly affect the financial performance of enterprises [8]. Subsequently, Zhang et al. (2023) made certain supplements to this, namely that the subsidy reduction policy forces enterprises to improve financing efficiency and optimize capital allocation, and that midstream battery enterprises are the most directly and obviously affected by the policy [9]. This is connected with Rao et al. (2022)'s analysis of the impact of the dual credit points policy on the heterogeneity of financial performance of the upstream and downstream of the industry chain, where the midstream battery link benefits the most [10].

Regarding the relationship between R&D investment and sustainable development, Wu et al. (2022) conducted a very clear and rigorous investigation based on panel data, thereby obtaining the U-shaped

relationship between R&D investment of the new energy industry chain enterprises and enterprise value, and the gradual regulatory effect of government subsidies [11]. Song and Zhang (2023) made excellent supplements from the perspective of technological innovation [12].

Chen (2021) made a very clear and logically coherent analysis of optimizing profit quality from the perspective of light asset model regarding enterprise value and operation management, thus providing excellent reference for battery power enterprises to reduce costs and increase efficiency [13]. A very good complement to this is that Tang et al. (2024) demonstrated that digital transformation is conducive to improving the financial performance of manufacturing enterprises through methods of efficiency improvement and value reconstruction [14].

2.1.3 A Comparative Study of Financial Performance of Leading Enterprises in the Industry

Leading enterprises serve as the benchmarks for industry development and have significant exemplary significance. However, at present, the existing literature still has some deficiencies in the research on leading enterprises: Ye and Zhuang (2022) demonstrated how leading enterprises in the industrial chain can drive the growth of small and medium-sized enterprises through cost reduction and efficiency improvement, and also pointed out that industrial agglomeration and a favorable business environment will strengthen the driving effect [15]. Zhang and Yu (2022) used CATL as a case to systematically and rigorously analyze its growth logic from embedding to building an innovative ecosystem, but they have not yet examined it from a financial perspective [16]. Zhang and Wang (2024) provided a theoretical explanation from the perspective of strategic rhythm on the mechanism of high-growth enterprises, providing support for the financial strategy of leading enterprises [17]. Currently, there are two quite excellent studies comparing the dual leading enterprises: Wang and Zhang (2024) used BYD as a case, clarifying the path for improving turnover efficiency and stabilizing profits through the entire industrial chain model [18]. While Zhang et al. (2022) conducted a text analysis of BYD's financial characteristics, they did not make a direct and solid comparison with CATL [19]. Therefore, existing studies recognize the dual leading positions of CATL and BYD, but have not yet conducted long-term and standardized quantitative decomposition of the differences in financial drivers using the DuPont analysis method and the chain substitution method.

2.1.4 Literature Review

From the existing literature, it can be seen that there have been fruitful results in the fields of DuPont analysis application, financial performance of new energy enterprises, industrial chain and policy impact. However, there are indeed three obvious deficiencies in these areas: First, the DuPont analysis in the battery power industry is mostly qualitative research and lacks long-term, large-sample empirical verification. Second, the current research on leading enterprises mainly focuses on a single case, thus lacking the DuPont decomposition and driving factor comparison of two leading enterprises over several consecutive years. Third, the existing research has not fully combined industry patterns and case characteristics, so the analysis of the advantages, weaknesses and optimization directions of the financial model of CATL is not complete.

2.2 Research Innovation

1. Innovation in research methods: Break through the limitations of the traditional DuPont analysis method's qualitative description, combine it with the sequential substitution method of DuPont analysis, and more accurately calculate the impact of net profit margin, total asset turnover, and equity multiplier on ROE. At the same time, use SPSS to conduct empirical analysis of index sensitivity to test and enhance the accuracy of the research results, and make up for the deficiency of the quantitative lack in the traditional DuPont decomposition system.

2. Innovation in comparison dimensions. Conducted a systematic and hierarchical horizontal benchmarking of two industry leaders, CATL and BYD, using DuPont factor decomposition and sequential substitution measurement methods to clarify the differences between the two companies' “profit-driven” and “efficiency-driven” financial models. Thus, naturally and appropriately filled the gaps in the existing literature regarding the financial benchmarking analysis of leading enterprises.

3. Innovation in industry adaptability: In response to the characteristics of the “capital-intensive, technology-intensive, and long supply chain” industry of battery power, adjusted and optimized the interpretation logic of DuPont analysis indicators, combined them with current industry policy declines, raw

material price situations, etc., and focused on the industry adaptability of financial analysis to avoid the lack of industry adaptability in existing research.

3. Research Design

3.1 Research Approach and Sample Selection

1. This study adopts the DuPont analysis method as the core research framework. The return on equity (ROE) is decomposed into profit factors such as the net profit margin from sales, total asset turnover rate, and equity multiplier to study the profit factors. Using SPSS, empirical checks are conducted on correlations, regression analysis of industry panel data, and sensitivity of financial indicators to provide empirical data for the DuPont analysis, thereby compensating for the subjective nature of a single DuPont analysis.

2. Regarding sample selection, to ensure the comprehensiveness of the research, 11 representative listed companies in the battery power and energy storage industries were selected, including CATL, BYD, Guoxuan Gaoke, Xinhuaanda, Funeng Technology, Yihua Tong, Penghui Energy, Wei Lan Lithium, Nandu Power, Shengyang Shares, and Paien Technology. The research period is from 2015 to 2024.

3. All data are from the annual financial reports of enterprises on the East Finance website. After removing missing values, a total of 108 valid observations were obtained, resulting in industry sample panel data. At the same time, for the time series data of CATL and BYD from 2023 to 2024, the DuPont chain substitution quantitative analysis was used.

3.2 Core Variables and DuPont Indicators Definition

1. Core Dependent Variable (ROE): Return on Equity (%), a core indicator in DuPont analysis, reflecting the comprehensive profitability of the enterprise

2. DuPont Core Decomposition Indicators:

NP (Net Sales Profit Margin, %): DuPont Profit Factor, measures the efficiency of main business profit, reflecting the enterprise's cost control and product premium ability

TAT (Total Asset Turnover Rate, times): DuPont Operating Factor, characterizes the efficiency of asset operation, reflecting the enterprise's asset utilization and turnover level

EM (Equity Multiplier): DuPont Leverage Factor, reflects the level of financial leverage, measures the enterprise's capital structure and risk control ability

3. Auxiliary Analysis Indicators: GP (Gross Profit Margin, %), FER (Operating Expense Ratio, %), used to analyze the quality of profit and details of cost control

3.3 Construction of Regression Model

SPSS was used to conduct a multivariate linear regression analysis to verify the sensitivity and significance of the DuPont three factors in driving ROE, in order to quantify the degree of influence of each factor. The model is as follows:

$$ROE_{it} = \beta_0 + \beta_1 NP_{it} + \beta_2 TAT_{it} + \beta_3 EM_{it} + \beta_4 GP_{it} + \beta_5 FER_{it} + \varepsilon_{it} \quad (1)$$

In this formula, i represents an individual enterprise, t represents the year, β_0 is the intercept term, β_1 - β_5 are the regression coefficients, and ε_it is the random disturbance term. Separate regressions are conducted on the industry samples and CATL, and the driving differences of the DuPont three factors are compared to provide empirical evidence for the DuPont decomposition analysis.

3.4 DuPont Core Formula and Chain Substitution Method

This article adopts the traditional DuPont analysis core formula and introduces the sequential substitution method for quantitative calculation, accurately quantifying the influence degree of each factor on ROE.

1. DuPont Core Formula

$$ROE = \text{Net sales profit margin}(NP) \times \text{Total Asset Turnover Rate}(TAT) \times \text{Equity multiplier}(EM)$$

2. The method of sequential substitution calculation

The chain substitution method is used to calculate the impact of a single DuPont factor change on ROE. It is carried out in the order of "profit factor → operating factor → leverage factor", and the steps are as follows:

1 Set the base period indicators:$ROE_0 = NP_0 \times TAT_0 \times EM_0$

2 Set the indicators for the reporting period:$ROE_1 = NP_1 \times TAT_1 \times EM_1$

3 Alternative net sales margin (NP), maintaining TAT and EM unchanged:$ROE_{NP} = NP_1 \times TAT_0 \times EM_0$, The impact of NP = ROE_{NP} - ROE_0

4 Alternative to Total Asset Turnover Ratio (TAT), keeping NP and EM unchanged: $ROE_{TAT} = NP_1 \times TAT_1 \times EM_0$, TAT impact on the amount = ROE_{TAT} - ROE_{NP}

5 Alternative Equity Multiplier (EM), maintaining NP and TAT unchanged:$ROE_{EM} = NP_1 \times TAT_1 \times EM_1$, EM impact on the balance sheet = ROE_{EM} - ROE_{TAT}

6 Overall Verification: Total ROE change = NP impact amount + TAT impact amount + EM impact amount

4. Empirical Analysis

4.1 Industry Descriptive Statistics

Table 1: Descriptive Statistics for the Industry Sample

Variable	Observation count	Mean value	Standard deviation	Minimum value	Maximum value
ROE	108	11.2322	19.00475	-32.76	130.37
NP	108	3.5903	20.19498	-147.34	93.63
GP	108	21.5796	10.17190	-3.35	50.32
TAT	106	0.66937	0.274807	0.075	1.313
EM	108	2.38406	0.922845	1.176	5.788
FER	99	18.2225	18.79880	3.05	159.80

From the descriptive statistical results of the overall sample of the listed industries, it is clearly observable that the Chinese battery power industry has the distinct characteristics of significant fluctuations in indicators and highly differentiated financial performances from enterprises from 2015 to 2024: the average return on equity (ROE) is 11.23%, but its minimum value is as low as -32.76%, and the maximum value is as high as 130.37%. Therefore, the profit levels within the industry are extremely polarized, with a huge profit gap between leading enterprises and those at the tail. It is worth noting that the average sales net profit margin (NP) is only 3.59%, and the difference between the extreme values is nearly 240 percentage points, indicating that the profitability of enterprises within the industry is extremely uneven.

From the available data, the average gross profit margin (GP) is 21.58%, which is at a medium level, but there are indeed significant differences among enterprises. The fundamental reason lies in the differences in product pricing, cost control, and bargaining power in the industry chain among various enterprises. The average total asset turnover rate (TAT) is 0.67 times, which is generally low, which is highly consistent with the basic characteristics of the battery power industry, such as heavy assets, rapid expansion, and long turnover cycle. The average equity multiplier (EM) is 2.38, currently the leverage level is moderate, but some enterprises exceed 5.0. The capital structure of enterprises within the industry varies greatly, and some enterprises expand through high debt financing. The average period expense ratio (FER) is 18.22%, and the maximum value is nearly 160%, which can be used to determine that the ability to control expenses is the most direct and crucial factor determining the quality of a company's profits, and uncontrolled expenses lead to profit loss.

4.2 Correlation Analysis

To verify the intrinsic relationships among the core indicators of DuPont and to determine the direction and strength of the correlation between each factor and ROE, a Pearson correlation analysis was conducted. The results are as follows:

Table 2: Pearson Correlation Matrix of Industry Variables

Variable	ROE	NP	GP	TAT	EM	FER
ROE	1.00	0.564**	0.450**	0.328**	0.248**	-0.181
NP	0.564**	1.00	0.313**	0.299**	0.048	-0.762**
GP	0.450**	0.313**	1.00	-0.214*	-0.300**	0.220*
TAT	0.328**	0.299**	-0.214*	1.00	0.357**	-0.459**
EM	0.248**	0.048	-0.300**	0.357**	1.00	-0.223*
FER	-0.181	-0.762**	0.220*	-0.459**	-0.223*	1.00

*Note: *p<0.1, **p<0.05.*

1. The profitability factor is the core driving force of the industry's ROE. From the overall correlation results of the industry, it can be seen that the profitability factor has the most prominent and stable driving effect on the net asset return rate. The correlation coefficient between the net profit margin (NP) and ROE is 0.564, which is significantly positive at the 1% level. Therefore, profitability is the first core element determining the revenue level of battery power enterprises. This conclusion is highly consistent with the characteristics of the battery power industry, which is technology-intensive, has huge R&D investment, and has obvious differences in product value-added: enterprises with core technologies, patent barriers, and scale advantages obviously have greater pricing power and cost control ability, thus being able to maintain higher profit levels in competition and keeping ROE at a high level for a long time.

At the same time, since the correlation coefficient between gross profit margin (GP) and ROE is 0.450, and it is highly significant at the 1% level, and there is a 0.313 obvious positive correlation with the net profit margin, it can be concluded that the product profit margin is the basis for the final net profit realization. To obtain an acceptable net profit, enterprises must first ensure sufficient profit margin space to cover costs, expenses, and various losses, thus profitability quality is the most fundamental support for the financial performance of battery power enterprises.

2. Operating efficiency has a positive pull on ROE, but the effect is relatively limited.

There is a significant positive correlation of 0.328 between total asset turnover rate (TAT) and ROE, but its impact is weaker than the profitability factor. Therefore, it can be inferred that the overall industry operating efficiency has a very limited actual pull on profitability. The specific reasons can be systematically and clearly summarized into three aspects: First, the battery power industry is a typical heavy-asset industry, with huge fixed asset investment and extremely high specificity, so the asset turnover speed is low and the improvement space is limited. Second, the industry demand fluctuates violently and the order cycle is extremely unstable. Enterprises must maintain a high level of raw material and finished product inventory to ensure stable supply, which occupies funds and reduces turnover efficiency. Third, from the correlation structure, it can be clearly seen that although the total asset turnover rate is positively correlated with the net profit margin, the synergy is not strong. Many enterprises in the industry are in an imbalance state of “fast turnover but weak profitability”, failing to simultaneously improve scale expansion and profitability quality, so the actual positive contribution of operating efficiency to ROE is very limited.

3. The leverage factor has a positive effect on ROE, but the overall driving effect is weak.

Since the correlation coefficient between equity multiplier (EM) and ROE is 0.248, which is statistically significantly positive at the 1% level, it can be explained that moderate leverage expansion is conducive to improving ROE, but its effect is still weaker than the profitability and operating factors. This leads to the conclusion that the leverage utilization efficiency of the battery power industry is not high.

The main reasons are reflected in two aspects: The use of debt funds by some enterprises in the industry: First, their debt funds are not invested in efficient production capacity and R&D projects, so the leverage cannot form effective returns. Second, factors such as macro interest rate fluctuations and financing cost differences lead some enterprises to have debt costs higher than the asset return rate, thus generating a “leverage negative effect”, which neither improves ROE nor reduces financial burden. The significant positive

correlation between equity multiplier and total asset turnover rate, that is, moderate leverage expansion is conducive to asset expansion, but excessive leverage expansion will cause the asset growth rate to decelerate and turnover to be blocked, and the actual benefit of leverage will also be weakened.

4. Cost control ability has a decisive impact on profitability quality.

From the current analysis, the period expense ratio (FER) is negatively correlated with ROE, and it has a -0.762 highly negative correlation with the net profit margin at the 1% level. Therefore, it can be clearly concluded that the cost control level directly determines the efficiency of profit conversion, and is also one of the most important variables affecting financial performance. Period expenses erode profits throughout the entire process from gross profit to net profit: Uncontrolled research and development expenses will temporarily lower profits, uncontrolled sales expenses will inevitably reduce the profit margin of products, and redundant management expenses will inevitably lower the overall operational efficiency.

The period expense ratio has a very significant negative correlation with the total asset turnover rate. Therefore, cost control and operational efficiency complement each other and promote each other. That is, the more refined, digitized, and intensive the cost control in operation management is, the more fully the resources are utilized, the stronger the cost control ability will be, and the more conducive it will be to profitability. Implementing detailed, digital, and intensive cost control in each of the research, sales, and management stages is the direct way for battery power enterprises to improve profit quality and improve financial performance.

4.3 Multivariate Linear Regression Analysis

4.3.1 Regression Results for the Entire Industry Sample

Table 3: Regression Results (Industry Full Sample)

Variable	Coefficient B	t-value	P-value	Significance	Standardized coefficient Beta
Constant items	-38.558	-6.226	0.000	***	—
Net sales profit ratio (NP)	0.815	6.265	0.000	***	0.894
Gross profit margin (GP)	0.316	1.738	0.086	*	0.168
Total asset turnover rate (TAT)	17.389	3.223	0.002	**	0.250
Equity multiplier (EM)	6.858	4.702	0.000	***	0.333
Operating expense ratio (FER)	0.651	4.628	0.000	***	0.655

Model fit: $R^2 = 0.614$, Adjusted $R^2 = 0.593$, $F = 29.237$, $P = 0.00$.

4.3.2 Regression Results of CATL Sample

Table 4: Regression Results (CATL Sample)

Variable	Coefficient B	t-value	P-value	Significance	Standardized coefficient Beta
Constant items	-58.838	-2.948	0.042	**	—
Net sales profit ratio (NP)	1.902	2.325	0.081	*	0.186
Gross profit margin (GP)	-0.253	-0.369	0.731	—	-0.054
Total asset turnover rate (TAT)	49.448	2.596	0.060	*	0.238
Equity multiplier (EM)	4.410	1.137	0.319	—	0.138
Operating expense ratio (FER)	2.521	3.756	0.020	**	0.644

Model fit: $R^2 = 0.991$, Adjusted $R^2 = 0.981$, $F = 93.021$, $P = 0.00$.

4.3.3 Result Analysis

1. Model Fitting and Overall Synergy

The industry regression model, with an adjusted R^2 of 0.593, can explain nearly 60% of the variation in ROE. Additionally, the overall F value of the model is 29.237, which is highly significant at the 1% level. Therefore, it can be demonstrated that the explanatory variables centered around the DuPont three factors have a very strong explanatory power for the industry's ROE. This naturally verifies the applicability and reliability of the DuPont analysis system in financial research within the battery power industry. In contrast, the adjusted R^2 of the individual regression model of CATL is as high as 0.981, far exceeding the industry level, and it also passes the significance test at the 1% level, indicating that the internal factors of CATL, such as profitability, operation, leverage, and cost, have a very strong synergy. The financial driving mechanism is more clear and stable, and the maturity and standardization of the financial system are superior to the industry average.

2. Profit Factor: CATL has both excellent strength and quality in profit driving

From an industry perspective, the regression coefficient of the net profit margin (NP) on ROE is 0.815, which is highly significant at the 1% level, and the standardized coefficient is 0.894. It is the most core and stable driving factor affecting the industry's ROE, meaning that the profit level is the first essential factor determining the comprehensive income ability of battery power enterprises. The coefficient of the gross profit margin (GP) is 0.316, which is significant at the 10% level, and it has a clear positive supporting effect on ROE. Together, they constitute the two main pillars of industry profit.

From the perspective of CATL, the coefficient of the net profit margin on ROE is 1.902, which is highly significant at the 10% level. Therefore, its profit has a much greater actual driving effect on earnings than the industry average, and the driving strength is outstanding. However, the coefficient of the gross profit margin did not pass the significance test. The reason is quite clear: CATL has a very high gross profit base and excellent cost control, so it can directly and reliably convert high gross profit into net profit. The profit conversion efficiency is extremely high, thus forming a dual advantage of “high gross profit base + strong net profit conversion”. Correspondingly, the profit purity and sustainability are at the top of the industry.

3. Operating Factor: CATL has a more prominent effect of asset turnover on ROE

From an industry perspective, it is clearly seen that the coefficient of total asset turnover (TAT) on ROE is 17.389, which is highly significant at the 5% level. Improving operational efficiency is conducive to improving enterprise earnings, but it should be noted that it is limited by factors such as heavy assets in the industry and long expansion cycles.

Due to the coefficient of CATL' total asset turnover on ROE being 49.448, which is highly significant at the 10% level, and its effect is almost three times that of the industry average, the main reason is that CATL has a global production capacity layout, achieves large-scale production, and has an extremely lean supply chain management. Therefore, CATL' production utilization rate is always at a high level, with an extremely low asset idle rate, and the capital turnover speed is very fast. Thus, it can amplify the profit advantage through operational efficiency, and operational efficiency has become the most powerful factor supporting CATL' ROE.

4. Leverage Factor: CATL achieves a stable positive effect of leverage, while the overall leverage efficiency of the industry is low

From an industry perspective, the coefficient of the equity multiplier (EM) is 6.858, which is highly significant at the 1% level. However, the leverage levels of various enterprises in the industry are highly inconsistent. Most enterprises have inefficient debt capital allocation efficiency. Therefore, leverage cannot be reliably and fully converted into profit gains, which also leads to some enterprises experiencing negative leverage effects.

CATL' equity multiplier did not pass the significance test. CATL does not drive growth with high leverage but actively maintains a stable capital structure, with long-term debt as the main form of financing, lower financing costs, and all leverage funds are invested in high-return projects. Therefore, the asset return rate is always higher than the debt cost, achieving a safe and efficient “positive leverage effect”. Unlike the common practice in the industry of adopting a high-debt expansion model, CATL uses its leverage more rationally and prudently, resulting in lower financial risks.

5. Cost factor: CATL excels in cost control, and its impact on profit erosion is significantly less than that of the industry.

From an industry perspective, the coefficient of the period expense ratio (FER) for ROE is 0.651, which is highly significant at the 1% level. Therefore, the level of cost control directly relates to the quality of an enterprise's profitability. Excessive costs will erode the enterprise's profits.

From CATL's perspective, the coefficient of the period expense ratio for ROE is 2.521, which is highly statistically significant at the 5% level. Moreover, its erosion of profits is significantly lower than that of the industry. The reason is clear: CATL fully utilizes various means such as scale effects, centralized R&D, and digital management to systematically control the period expense ratio at a low level over the long term. Thus, more gross profits can be converted into net profits.

Comprehensive comparative analysis

Compared with the industry as a whole, CATL has a very mature and effective differentiated high-quality financial model of "high profit-driven, efficient operation amplification, stable leverage support, and meticulous cost guarantee". Therefore, it can break through various predicaments such as profit differentiation, insufficient turnover, inefficient leverage, and excessive costs that are common in the industry. Moreover, in the context of overall industry fluctuations and uneven financial quality, CATL has more stable profits, more coordinated finances, and better risk control. Thus, it is the most typical and successful demonstration of high-quality financial development in the battery power industry.

5. Comparative Analysis

Based on the DuPont three-factor model and combined with the sequential substitution method for quantitative calculation, from three dimensions: horizontal industry benchmarking of CATL, vertical temporal evolution of the company itself, and in-depth comparison between the two leading companies, a multi-level analysis of the driving logic of CATL's ROE is conducted. This enables precise identification of its financial strengths and weaknesses, and realizes the combination and comparison of qualitative analysis and quantitative calculation.

5.1 Comparison of CATL's Indicators with Industry Averages (DuPont)

To demonstrate CATL's financial position in the battery power industry, we compare the average DuPont core indicators of CATL from 2015 to 2024 with those of the industry, and analyze its relative competitive advantages:

Table 5: Comparison between CATL and Industry Average

Indicator Type	CATL	Industry average	Difference range	Advantages/Weaknesses
ROE (%)	25.15	11.23	+13.92	Significant advantages Core advantage
Net Sales Profit Margin (%)	14.24	3.58	+10.66	Minor shortcomings
Total Asset Turnover (times) Equity multiplier	0.61	0.67	-0.06	Steady and controllable
Period expense ratio (%)	2.87	2.38	+0.49	Significant advantages
Indicator Type	8.58	18.19	-9.61	Advantages/Weaknesses

1. The advantage of CATL Technology's ROE is the result of multi-dimensional synergy. Its average ROE is 25.15%, which is 13.92 percentage points higher than the industry average. The comprehensive profitability of this company far exceeds the industry average. This advantage is not the result of a single factor but is the result of the mutual cooperation and complementarity of various factors such as net profit margin from sales, asset turnover rate, leverage efficiency, and cost control. Compared with the leading A-share manufacturing enterprises, its ROE still remains at the leading position, being a model of high-quality development in the industry and a benchmark for driving the improvement of financial performance in the battery power industry.

2. The fundamental source of the profit advantage lies in technical barriers and scale effects. Therefore, the net profit margin of CATL Technology is 14.24%, much higher than the industry average of 3.58%. It has two supporting points: technology and scale. Technologically, CATL Technology has systematically and prospectively optimized battery materials, structures, and systems, thus forming an extremely difficult-to-replicate technical barrier, and the products thereby obtain stable premiums. In terms of scale, the global production capacity layout and high market share bring cost advantages in all aspects of procurement, production, and logistics, and due to the high-quality customer structure and extremely high collection efficiency, the two factors combine to form a truly impregnable profit moat.

3. Weak turnover is an objective and predictable characteristic of the strategic expansion stage, that is, the total asset turnover rate is slightly lower than the industry average. In essence, it is the inevitable result of the company's long-term capacity expansion and global layout. Since the company aims to seize the future market, it actively and systematically increases fixed assets and production capacity investment, which temporarily dilutes turnover efficiency, but the strategy it adopts of "first layout, then harvest" precisely lays a solid foundation for long-term market share increase and profit stability. CATL Technology's "high profit, stable

turnover" model has strong sustainability and is superior to enterprises within the industry that solely rely on high turnover and low profit for survival.

4. Due to the stable and efficient use of leverage, the risk is controllable, and the return is clear, the equity multiplier is higher than the industry but within a reasonable range. It can be seen that CATL Technology has a stable capital structure. Compared with a large number of high-leverage and low-efficiency enterprises within the industry, it forms an excellent contrast: CATL Technology uses leveraged funds in a planned and focused manner for high-return capacity construction and technological research and development, thereby forming a virtuous cycle from leverage to assets and from assets to profit, and diversified and low-cost financing channels have enhanced financial flexibility.

5. Cost control is itself a manifestation of refined operation. The cost expense ratio of CATL Technology is far lower than the industry, which is a direct reflection of the company's extremely strong management ability: the company reduces R&D expenses through centralized R&D, controls sales expenses through brand and channel advantages, improves management efficiency through digital means, and actively and systematically reduces ineffective expenditures. Therefore, the cost control ability has become the most effective aspect for buffering industry price fluctuations, maintaining high profit levels, and breaking industry cycles.

5.2 CATL DuPont Index Longitudinal Comparative Analysis

As this article starts from the enterprise's development stage, it divides the enterprise's 2015-2024 period into three stages: expansion period, optimization period, and leading period. Thus, it systematically observes the dynamic changes of the DuPont three factors.

The expansion period (2015-2018) is a stage where the enterprise actively and systematically expands its scale and market. The total asset turnover rate dropped from 0.72 times to 0.59 times. Due to various factors such as previous R&D investment, capacity construction, and market expansion at this time, the net profit margin dropped from 12.31% to 9.87%. The equity multiplier rose to 3.15, and the ROE remained at a relatively high level of 18% - 20%. Therefore, this stage can be summarized as "emphasizing scale expansion, with a light focus on operational efficiency".

The optimization period (2019-2021) saw the full release of production capacity, continuous optimization of product structure, and steady expansion of market share. Thus, the operational efficiency improved significantly. The total asset turnover rate rebounded to 0.68 times. Technological upgrading, cost meticulous control, and scale effect combined led to a rebound in the net profit margin to 13.45%. The equity multiplier dropped to 2.92, and the ROE rose to 22% - 24%. The coordination of the DuPont three factors was excellent, with all factors such as profit, turnover, and leverage developing in harmony.

The leading period (2022-2024) is under the circumstances of intensified industry competition, rising raw material prices, and phased overcapacity of production capacity. The enterprise consolidated its high-profit level by leveraging technological barriers and industrial chain advantages. Therefore, the net profit margin increased to 14.92%. It also coincided with the period of macro environment changes and capacity digestion, so the total asset turnover rate dropped to 0.48 times, the equity multiplier remained at 2.87, and the ROE stabilized at above 20%, forming a mature financial model of "profit dominance, stable leverage, and efficiency as the guarantee". The development resilience has significantly enhanced.

5.3 CATL and BYD's DuPont Analysis Comparison

5.3.1 DuPont Core Indicator Benchmarking

Select the core financial data of the two leading companies from 2020 to 2024, compare the differences in the three DuPont factors, and reveal the differentiated financial models of the two:

Table 6: Comparison between CATL and BYD

DuPont Dimension	Enterprise	2020	2021	2022	2023	2024	Five-year average	Mode positioning
ROE (%)	CATL	11.27	21.52	24.67	24.04	24.13	21.13	Profit-driven type
Net sales profit margin (%)	BYD	7.43	3.73	16.14	24.40	26.05	15.55	Efficiency-driven type

DuPont Dimension	Enterprise	2020	2021	2022	2023	2024	Five-year average	Mode positioning
Total Asset Turnover (times)	CATL	12.13	13.70	10.18	11.66	14.92	12.52	Significantly leading
Equity Multiplier	BYD	3.84	1.84	4.18	5.20	5.35	4.08	Low
Period expense ratio (%)	CATL	0.390	0.562	0.723	0.608	0.481	0.553	Significantly low
DuPont Dimension	BYD	0.790	0.870	1.074	1.027	1.062	0.965	Significantly leading
ROE (%)	CATL	2.263	3.322	3.397	3.262	2.877	3.024	Steady
Net sales profit margin (%)	BYD	3.119	2.837	4.068	4.516	3.943	3.697	High
Total Asset Turnover (times)	CATL	11.26	7.39	9.55	6.99	7.69	8.58	Significantly leading
	BYD	11.87	14.22	10.95	10.12	9.88	11.41	High

1. From the ROE trend, we can observe the differentiation between the two and the different driving logic behind it: The ROE of CATL has remained at a high level and has been steadily increasing. It rose from 20.52% in 2020 to 21.52% in 2021, and then fluctuated slightly and gradually declined in the following years. In sharp contrast, the ROE of BYD has continued to rise. Later on, BYD surpassed CATL. The driving logic of the two is quite clear. CATL maintains a high ROE by generating high profits, while BYD boosts its ROE rapidly through high asset turnover. Thus, it naturally exhibits the distinct financial model differences of "profit-driven" and "efficiency-driven".

2. The gap in profit levels is essentially caused by the different business structures: The average net profit margin of CATL over the past five years is significantly higher than that of BYD. The fundamental reason is that CATL mainly focuses on battery and energy storage businesses, with high technical barriers and high product value-added, resulting in purer profit quality. In contrast, BYD's business is mainly centered around vehicle manufacturing, with a high proportion of vehicle business and a relatively low net profit rate in the vehicle industry, so its overall profit level has been pulled down. Additionally, CATL has stronger vertical integration capabilities in the supply chain and more prominent cost control advantages.

3. Due to the different industrial chain models, the gap in operational efficiency is very clear: The total asset turnover rate of BYD is significantly ahead of that of CATL. The fundamental reason is that BYD adopts an integrated operation model of vehicle manufacturing and battery, thus having prominent internal synergy effects, and the turnover efficiency of inventory and funds is higher. While CATL mainly focuses on supply business, raw materials and finished product inventories occupy more funds, and the customer payment cycle is also longer.

4. Due to the continuous optimization of leverage levels, each enterprise adopts different prudent strategies, so the equity multipliers of both enterprises are showing a downward trend and are in the stage of actively reducing financial risks. CATL's leverage level is more stable, optimizing the capital structure through its own profits and equity financing, while BYD's leverage scale has declined in recent years, but it is still higher than CATL at present. Therefore, its debt repayment pressure and financial risks are also greater.

5.3.2 Comparison of results from dual-headline sequential substitution method

Using the sequential substitution method, quantitative calculations were conducted for the core indicators of CATL and BYD from 2020 to 2024. The impact amounts and changes of each factor on ROE are summarized as follows:

Table 7: Chain Substitution Analysis for CATL and BYD

Year	Company	Annual ROE Change	Net Profit Margin (NP) Impact	Total Asset Turnover (TAT) Impact	Equity Multiplier (EM) Impact	Equity Multiplier (EM) Impact
2020-2021	CATL	+10.25	+1.84	+3.42	+4.99	Profit, turnover, and leverage drive together, with leverage contributing the most.

Year	Company	Annual ROE Change	Net Profit Margin (NP) Impact	Total Asset Turnover (TAT) Impact	Equity Multiplier (EM) Impact	Equity Multiplier (EM) Impact
	BYD	-3.70	-0.72	+0.21	-3.19	The decline in net profit and the contraction of leverage are the core drag factors.
2021-2022	CATL	+3.15	-3.52	+3.23	+3.44	Turnover and leverage offset the decline in net profit, and the overall performance improves slightly.
	BYD	+12.41	+0.52	+4.31	+7.58	The significant expansion of leverage is the core driver, while turnover and profit assist.
2022-2023	CATL	-0.63	+1.70	-2.32	+0.00	The increase in net profit offsets the decline in turnover, and ROE remains basically stable.
	BYD	+8.26	+0.22	-0.22	+8.26	The significant expansion of leverage is the only core driver.
2023-2024	CATL	+0.09	+6.46	-6.18	-2.76	The increase in net profit offsets the declines in turnover and leverage, and ROE increases slightly.
	BYD	+1.65	+0.70	+0.91	+0.04	Profit and leverage drive together, while turnover slightly hinders.
Five-year average	CATL	+3.22	+1.62	-0.46	+2.06	Leverage dominates, turnover assists, and profit contributes minimally.
	BYD	+4.66	+0.18	+1.30	+3.18	Profit, turnover, and leverage drive together, with leverage contributing the most.

Comparison and analysis conclusion:

CATL is a typical profit-driven benchmark enterprise. Its three characteristics of high profitability, stable leverage, and strong control are very clear. The product premium brought by technical barriers, the cost advantage brought by supply chain integration, and the expense control ability brought by refined management all constitute a complete and powerful core competitiveness. Currently, the large-scale capacity expansion and the cultivation period of the energy storage business occupy a large amount of assets, so the total asset turnover rate is relatively low. This is also the main factor restricting the improvement of ROE at present.

BYD is an efficiency-driven benchmark enterprise. Therefore, its high turnover, strong synergy, and wide layout characteristics are very obvious: The integrated operation of vehicles and batteries brings excellent synergy effects in the industrial chain, and the diversified business layout is conducive to risk dispersion. Therefore, the asset turnover efficiency keeps improving. The excessive proportion of vehicle business has led to the current overall profit level being not high and the leverage level being relatively high. Therefore, financial risk control remains an important issue.

Due to the different strategic positioning and business structure of the two. CATL relies on the battery main business and builds profit barriers through technology and scale, while BYD lays out the entire industrial chain and builds efficiency advantages through integration and collaboration. Therefore, both models are typical representatives of the industry and provide feasible references for enterprises in the same industry. CATL's high-profit model has stronger anti-risk ability, and BYD's high-turnover model has greater growth space.

6. Comparison and Analysis Conclusion

China's battery power enterprises are still in a stage of rapid development and fierce competition. Moreover, the financial conditions of enterprises within the battery power industry vary greatly, with significant differences in performance, overall low operational efficiency, varying levels of benefit control, and low utilization of liabilities. These are common phenomena. At the industry level, profitability and cost control determine the comprehensive financial performance of China's battery power enterprises, and the level of enterprise asset operation and asset-liability structure are key; the direction for enterprises to enhance their core competitiveness.

From the perspective of financial characteristics, CATL has formed a typical financial model characterized by high profit driving, stable leverage support, strong cost control, and relatively weak operational efficiency. CATL demonstrates strong profitability, a relatively stable financial structure, strict risk control, and relatively strong profitability through its leading technology, scale, and industry integration advantages. Its comprehensive strength is more prominent compared to other types of enterprises, but it also has obvious disadvantages such as slow overall asset turnover, operating pressure accompanying large-scale growth, and low asset utilization efficiency. The low operational efficiency has become the main factor restricting the further improvement of its financial performance.

Optimization suggestions for CATL:

1. Capture the current profit characteristics and advantages, strengthen current advantages to continue investment in cutting-edge technology development, maintain a high-profit product structure, rely on its own technological advantages to maintain the advantage of monopolized prices; at the same time, grasp the accumulation of upstream resources, stabilize material costs, and be less affected by price wars and cyclical changes in the industry to maintain the current net profit margin advantage.

2. To comprehensively improve operational efficiency, actively release existing assets, reasonably optimize production capacity layout and asset utilization methods, accelerate the release of new industry capabilities, and strengthen the management of inventory and accounts receivable, shorten the holding period of futures, and accelerate the turnover speed. Use digital and lean operation methods to improve production capacity utilization efficiency and turnover efficiency, and reverse the situation of low turnover rate.

3. Since it is necessary to maintain a stable leverage and capital structure, it is necessary to balance “expansion” and “risk”. On the basis of maintaining an appropriate debt level, actively control the proportion of short-term liabilities, lower financing costs, and make full use of abundant operating cash flow to strengthen the company's financial safety cushion. Therefore, an optimal balance point can be found between company expansion and financial balance, forming a high-quality and sustainable capital structure.

4. Based on enhancing supply chain resilience and establishing long-term stable supply chain cooperation and price hedging mechanisms, systematically and plannedly establish a long-term stable supply chain cooperation and price hedging mechanism to reduce the risk of raw material price fluctuations, and actively and precisely control period expenses to truly turn scale advantages into cost advantages, profit advantages.

Reference suggestions for similar industries and other enterprises:

1. Small and medium-sized enterprises: Find a niche market, start by doing well in detail before expanding, first consolidate profitability quality and cost control capabilities, do not blindly expand without considering a decline in turnover and a rising debt ratio; deeply focus on the niche market, take a specialized and professional path, first use technology and efficiency to establish development and survival capabilities, do not engage in head-on competition with leading enterprises in homogenized competition.

2. Mid-sized catch-up enterprises and enterprises in the catch-up period: Learn the development ideas of leading enterprises, fill in the shortcomings in efficiency; draw on the thinking of CATL's industry-acquisition and meticulous management, improve asset turnover and operational efficiency; ensure stable profitability and appropriately utilize leverage to gradually narrow the gap with leading enterprises, scale gap, cost gap, and risk control gap.

3. The entire industry: Take a high-quality and stable development path. Industry enterprises should abandon the low-level competitive mode of low-price competition and embark on a development path

dominated by technological innovation, development, efficiency, and stability; attach importance to product research and development, control the occurrence of risks, and improve cash flow. The industry should shift from rapid development to high-quality development and improve financial health and international competitiveness as a whole.

7. Research Prospects

This paper combines the traditional DuPont analysis with the chain substitution method and empirical testing to improve the financial performance analysis method for battery power enterprises. The conclusions of this article are helpful for enterprise financial diagnosis, strategy formulation, and competitive benchmarking, and are a relatively practical reference. Future work can further expand on this: First, continue to expand the breadth of research on leading overseas enterprises by comparing and analyzing their competitive benchmarking situations; second, add factors such as ESG, R&D investment, and policy impacts to enrich the analysis of financial influencing factors; third, apply more long-term or more frequent data for rolling analysis to observe the changes in enterprise finances; fourth, extend to the research of the entire industrial chain to study the financial transmission and correlation effects between upstream and downstream. Through further research on these issues, more theoretical support and beneficial references can be provided for the healthy development of new energy enterprises, industrial development, and investment decisions.

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Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgment

This paper is an output of the science project.

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