

Research of Power Battery Risk Investment: Taking CATL as an Example

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Abstract: Traditional fuel vehicles seriously pollute the environment, damage the health of the people, and hinder the sustainable development of the national economy. The wave of global electrification is sweeping, and the rapid development of new energy vehicles with the strong support of the country. As the core key to new energy vehicles, power batteries have entered a new stage of accelerated development. Based on the theory of risk value investment, this article studies the investment value of Contemporary Amperex Technology Co. Ltd. (The following is referred to as CATL), which is a power battery provider. Through background analysis, the development prospects and research significance of new energy and lithium batteries are used to use literature research laws and case analysis methods to analyze theoretical analysis of CATL. Analyze the company's current situation and competitive advantage, and analyze it. Finally, on the basis of valuation analysis, summarize the investment value of the CATL. It is hoped that the research in this article can give investors a certain reference value and provide constructive opinions on the development of CATL.

1. Introduction

In July 2020, my country's new energy vehicles achieved positive growth year-on-year, the product power of new energy vehicles improved and the improvement of the infrastructure of charging and replacing power and replacing power, and promoted the rapid growth of consumer demand. As the core part of new energy vehicles, power batteries are the top priority of each car company that truly show their market position. As a supporting product, power batteries also ushered in new development opportunities [1]. With the rapid development of the economy, the improvement of people's living standards has steadily improved, which has prompted the demand for automobiles to become more obvious. Nowadays, cars have gradually become a transportation that cannot be replaced in life. The growth of automobile demand has made competition in the automotive industry more and more intense. Traditional cars provide power through burning oil and natural gas. With the increase of the number of cars, the problem of environmental pollution is particularly serious. With the increasingly serious environmental damage and energy loss, the

production and use of new energy vehicles have gradually become an irreversible trend. At present, the state supports the development of new energy vehicles and hopes to achieve an overtaking in this field. It is imminent to solve these problems. The "fuel vehicle" has become a new trend in the future. In the CATL, it had the world's leading new energy battery technology, which ushered in a long period of bonus. Factors such as the continued promotion of various welfare policies, technological progress and cost reduction have brought about the rapid growth of the demand for the lithium battery industry. As a leading industry in the lithium battery industry, CATL has been listed for 4 years, and its market value has exceeded trillion yuan. Studying its investment value has important practical significance.

Although there are currently many results and the results of the analysis of the value analysis of the academic community, the data and results of the research on this article can accumulate the original materials for the analysis of the investment value analysis of the enterprise, which has enriched the theoretical research on the investment value of the enterprise to a certain extent. Promote the development of related industries. It is conducive to the discovery of the current risks and problems in CATL, thereby further improving the company's operations, solving related problems, and developing and expanding the company. At the same time, this article can have a targeted research on CATL, making investors pay more attention to the development of CATL. He has a deeper understanding of its business model, production field and business. It also helps investors with reference opinions and reasonable investment advice.

2. The Theory of Investment Value Valuation Research

Investment refers to an act of ensuring the safety of capital after the situation of the company that understands the bid in depth, and obtain investment returns on the basis of this basis. "Wall Street Godfather" Benjamin Graham first proposed the theory of investment value valuation analysis at the end of 1934. In his article "Securities Analysis", he proposed that as a successful investor, he should prohibit losses. It mainly analyzes internal financial data such as the company's assets, operating conditions, and gross profit margins. It is believed that the value of the stock cannot be determined only through internal data. It is necessary to combine macroex factors such as economic environment, industry characteristics, and national policies to determine the value of investment. The measurement analysis method and value assessment method described in the "Securities Analysis" make investors a lot less blind. This makes investors more rational. This also lays a solid foundation for the research of later scholars. At the same time, Feili Pukie proposed Feiche theory. Feixie's doctrine believes that increasing the company's inherent value includes two factors: "the company's development prospects and the company's management capabilities". Before investing in the company, investors must conduct a detailed investigation of investment targets. Felipe Ferxue found that growth ability can better reflect the long-term development of the enterprise. The company's core competitiveness, employee's qualifications level, R & D expenditure, etc. can analyze the development advantages from the other side and reduce the speculative risks of long-term investment. Based on this, he first proposed the theory of growth value analysis of growth, and advocates buying stocks that have the ability to increase its long-term value and increase the perspective of investment value analysis [2].

Domestic scholar Shuying Yan (2020) comprehensively analyzed the fundamentals of the CATL, empirical research on its market value influencing factors, and returned analysis through the absolute and relative valuation method construction model, and put forward suggestions for long-term investment [3]. Mengjie Li (2020) mainly conducted financial analysis of CATL and analyzing the current law of free cash flow without leverage, and proposed that the company is more suitable for long-term holding of investment [4]. Qingle Kong (2020) combined with the asset evaluation

science, conducted corporate value evaluation and analysis of the CATL through the fuzzy period of power, and provided a reference for the power battery industry. Sorting out the point of view of senior scholars found that the concept of stock investment value analysis is mainly due to foreign countries [5]. At the stage of rapid development, it has gradually formed a comprehensive theoretical system for stock investment analysis. With the arrival of the opportunity of the new energy industry era, it has attracted a large number of scholars to study the value analysis of the industry in depth, and most of them are optimistic about it.

3. The Current Situation of the Operation of CATL

In CATL, it has an independent R & D, procurement, production and sales system, and is mainly profitable through sales of power battery systems, energy storage systems and lithium battery materials. In terms of research and development, it is mainly based on independent research and development. In the CATL, there were four major R & D centers and five major production bases, and a comprehensive R & D system was established. In terms of procurement, CATL established a diversified supply system. Through strict review procedures, many high -quality and qualified suppliers were selected, which not only reduced the risk of dependence on single procurement, also balanced the procurement price, and grasped the dominance of bargaining. It pulls the supplier into its camp through joint ventures and cooperation and acquisition. At the same time, it deploys overseas mineral resources, built its own material factories to further ensure the stability of raw material supply and reduce procurement costs, and improve product hair profits and competitiveness. In terms of production and sales, CATL opened up and progress, comprehensively considering customer needs arrangement production, expanding scale, releasing production capacity, and continuing to maintain a state of full production and full sales, increasing profit. In terms of after -sales service, according to customer procurement contracts and specific orders, CATL provides customers with complete products and after -sales service through the after -sales service stations set up in various places.

3.1. The Growth Ability of CATL

Table 1: Growth ability indicator

Growth ability indicator	2020	2019	2018
Total income (yuan)	50.32 billion	45.79 billion	29.61 billion
Based on net profit (yuan)	5.58 billion	4.56 billion	3.389 billion
Deducting non -net profit (yuan)	4.2.7 billion	3.92 billion	3.13 billion
Total operating income increased year -on -year (%)	9.90	54.63	48.08
Bettering net profit increased year -on -year (%)	22.43	34.64	-12.66
Deducting non -net profit increase year -on -year (%)	8.93	25.15	31.68
Total income rolling increased from the previous month (%)	13.19	5.67	9.02
The increase in net profit rolling ring increased (%)	25.39	1.96	-10.39
Deducting non -net profit rolling ring increases (%)	21.22	-4.69	--

Source: official website of CATL

By installing its financial statements, I listed the company's growth capacity index in recent years.

It can be seen from Table 1 that the total operating income and net profit of CATL have increased year by year, reflecting the high operating quality of the CATL, the increase in market demand for products, and strong business expansion capabilities and market competitiveness. However, the year-on-year growth rate of total operating income decreased significantly compared with 2019, and it is necessary to pay attention. It shows that the ability to obtain funds in CATL has expanded its ability to operate well. In the future, the development trend of production and operation activities has a good development trend, great development potential, and strong growth ability.

3.2. CATL's Risk Research

3.2.1. Macroeconomic and Market Volatility Risks

Since the outbreak of the new coronary pneumonia's epidemic in 2020, under the huge economic negative impact, many enterprise industries have successively closed down, the real economy has fallen into unprecedented difficulties, the unemployment rate has increased, the national consumption enthusiasm has decreased, and the market demand has declined. Although compared with the tertiary industries such as the tourism industry, the transportation industry and the catering industry, the power battery industry is not so obvious that the epidemic is not so obvious, but in terms of the production and sales of the new energy industry chain, the same impact The macro environment worsen, the import and export trade is difficult, and the output of production capacity has declined [6].

At present, my country has gradually restricted the spread of new coronary pneumonia to a certain extent, and the economy has gradually recovered. However, in the context of globalization, China is still at a critical moment of "external prevention input and internal prevention." The epidemic still deeply affects the economy and our lives, such as Shanghai, Guangdong and other places. If the environment continues to deteriorate in the future, it will restrict the development of the new energy industry chain and adversely affect the operation of the CATL. And CATL is enjoying the bonus of the opportunity of the times, and gets a lot of government subsidies every year, which is greatly affected by policies. Therefore, in the CATL, we must take the new crown prevention and control measures, make good protection of market fluctuation risks in advance, make full use of national policy subsidies, increase product development and market promotion, promote innovation in all aspects, make bigger and stronger, do everything possible, do everything possible It may reduce the impact of market fluctuations and policy changes.

3.2.2. Market Competition Intensify Risk

In recent years, the new energy industry has continued to develop rapidly, and power batteries have also gained huge opportunistic dividends as the supporting product industry, entering a new stage of development. But the market "cake" is limited and competition is becoming increasingly fierce. The power battery industry has high barriers and high concentration in the industry. The top 5 power battery companies account for about 80% of the market share. The main competitors in CATL have LG new energy and Panasonic abroad. BYD in China has intensified competitive risks. As a rising industry, power batteries have considerable prospects, and long-term supply tensions have stimulated many companies to announce large-scale power battery expansion and expansion plans, and industry capacity is continuously improved. At the same time, in order to not be subject to people in the future, new energy vehicle companies improve their gross profit, get rid of the restrictions of power batteries, and also increase their research on it, and join in the dividing power battery market [7].

The CATL is currently the leader of the global industry. It should give full play to the brand scale effect, stabilize customer resources, improve consumer satisfaction and loyalty, and expand the development of new customers, and expand market share. At the same time, we should continue to pay attention to the research and development of technology, improve product quality, and maintain the company's core competitiveness.

3.2.3. New Products and New Technology Development Risks

As a high-tech industry, power batteries have faster technology, investment funds are huge, and risks are high. And once technology is behind, it will be very likely to be eliminated by the times and competitors. In the CATL, the reasons for the decline of similar enterprise industries should be absorbed. For example, the original mobile phone industry leader Nokia continued to improve the update and expansion. Real-time attention pays attention to the research and development of competitors and industries, controls the research direction of the development of power batteries, continuously improves in dynamic competition, improves its own ability, and develops more and better new products [8].

In the CATL, talent resources were rich, and a high-level R&D team was cultivated, the road of independent research and development innovation was taken, providing plenty of patent results, and transformed it into a production capacity economy. In the future, the CATL should maintain the leading position of the industry's technical level and continue to improve. At the same time, do a good job of development risk control of new products and new technologies, position the development strategy of power battery development, make a forward-looking layout plan, and ensure that the risk is within the company's tolerance.

3.2.4. The Risk of Decline in Gross Profit Margin

According to the CATL Annual Report, the gross profit margin of CATL has declined for three consecutive years, from 32.79% in 2018 to 27.76% in 2020, a significant decrease, which has a greater impact on profitability. In recent years, most of the raw materials of lithium batteries have increased. For example, lithium carbonate rose to more than 600,000 yuan per ton in June 2022, and the production cost increased. The price fluctuations are large, coupled with the impact of the epidemic, the logistics is not good, and the insufficient raw material inventory directly causes some production to suspend and affect the company's normal operation. In the future, competition and policy changes may increase the risk of decline in gross profit margin.

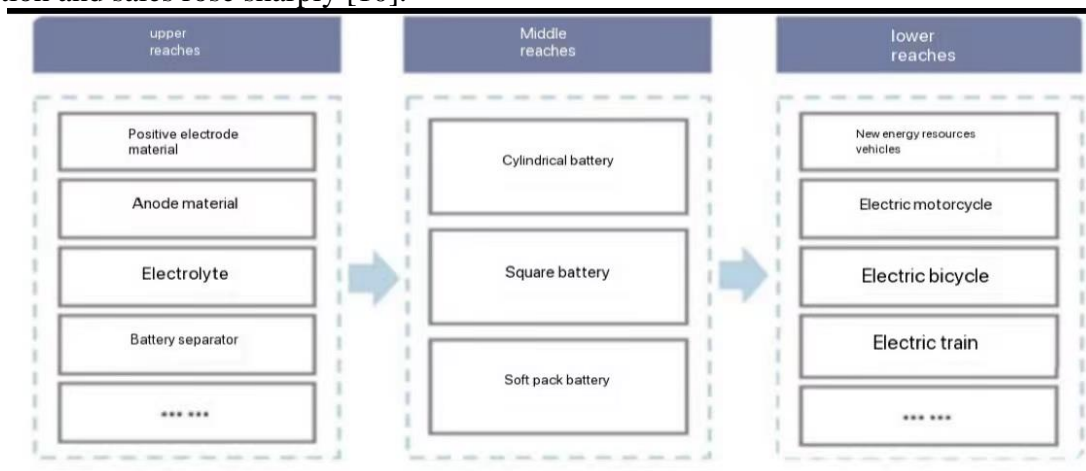
In order to cope with the risk of the decline in gross profit margin, the CATL planned a plan and carried out the in-depth layout of the entire industry chain. In recent years, it has successively acquired investment and construction in the field of mining and processing in raw materials. The influence is to reduce production costs from the source. At the same time, we will continuously optimize product design, increase product labor productivity, achieve lower costs, and increase gross profit margin.

4. Analysis of the Investment Value Valuation of CATL Company

4.1. The Fundamentals of the Power Battery Industry

The industrial chain of the power battery industry is shown in Figure 1. The upstream is raw materials, the midstream is the power battery, and the downstream is the specific application field [9]. Among them, in 2021, in the upstream, the output of the positive pole materials in my country was about 11.117 million tons, the output doubled, and the future production capacity was still tight. In the middle reaches, my country's power battery output was 219.7GWh, a year-on-year increase

of 247.1%, and sales of 186GWh, an increase of 182.2% year -on -year. In the lower reaches, my country's new energy vehicle output was 3.545 million, with a growth rate of 159.52%, and production and sales rose sharply [10].



Source: official website of CATL

Figure 1: Power battery industry industry chain

In the future, high-nickelization will be an inevitable trend of the development of power batteries, thereby increasing the reversible capacity of the ternary positive pole material. Products will be more diverse, richer in variety, and more segmented on the market.

4.2. Relative Valuation Analysis

4.2.1. Price-earnings Analysis

Table 2: CATL's P/E ratio

Abbreviation	PEG	P / E ratio			
		2020	2021	2022	2023TTM
CATL	1.51	212.91	95.38	53.71	37.24
An average of the industry	1.23	115.62	69.21	41.34	29.15
Median industry	0.94	93.79	54.71	31.43	23.06

Source: official website of CATL

The price-earnings ratio is usually used as an indicator of whether the stocks of different prices are overvalued or underestimated. It can be seen from Table 2 that the CATL in 2020 was 212.91, which is much higher than the industry average, indicating that the investment period of investment in CATL has a long period of investment recycling, the investment risk is large, and the investment value of the stock is low. The P / E effects growth rate (PEG) of CATL was 1.51, which was greater than 1 and higher than the industry average of 1.23, indicating that the value of the stock may be overestimated, or the market's performance growth would be higher than the market expectations.

4.2.2. Analysis of Price-to-sales

The Price-to-sales means how much money it needs to invest if the company's sales revenue needs to be invested, reflecting the operating income created by each ordinary stock. It can be seen from Table 3 that the market sales rate of CATL in 2020 was 16.25, which is much higher than the

industry average of 7.36, indicating that the sales of stocks per share in CATL are relatively low and the investment costs are high. The investment value is relatively small.

Table 3: CATL’s Price-to-sales

Abbreviation	Price-to-sales			
	2020	2021	2022	2023TTM
CATL	16.25	10.3	5.72	4.01
An average of the industry	7.36	6.87	4.41	3.24
Median industry	10.46	5.65	3.32	2.43

Source: official website of CATL

4.2.3. The Analysis of the Price-to-Book Ratio

Table 4: CATL’s Price-to-Book Ratio

Abbreviation	Price-to-Book Ratio	
	2020	most recent quarter
CATL	12.74	16.35
An average of the industry	8.28	9.3
Median industry	5.49	5.74

Source: official website of CATL

Price-to-Book Ratio is the ratio of each share price to net assets per share. Net assets per share are the value of the stock. It is measured by cost, and the market price per share is the current price of these assets and the result of transactions in the securities market. It can be seen from Table 4 that the market sales rate of CATL in 2020 was 12.74, which was higher than the industry average of 8.28, indicating that the risk of CATL was high and the investment value was relatively small. However, the market price is higher than value, indicating that the quality of CATL has better quality, has development potential, and has good prospects.

4.2.4. Price/Cash Flow Ratio Analysis

Table 5: CATL Price/Cash Flow Ratio

Abbreviation	Price/Cash Flow Ratio 1		Price/Cash Flow Ratio 2	
	2020	TTM	2020	TTM
CATL	20.33	-295166.65	44.38	29.55
An average of the industry	27.64	3718.99	50.61	40.04
Median industry	36.17	-56.56	47.31	31.69

Source: official website of CATL

The Price/Cash Flow Ratio is the ratio of stock prices to cash flow per share. Among them, the cash flow per share of the city's current rate of 1 is calculated at the net cash flow of cash and cash equivalent amounts. Calculation of net cash flow generated by operating activities. It can be seen from Table 5 that the current Price/Cash Flow Ratio of CATL in 2020 was 20.33, and the Price/Cash Flow Ratio of 2 was 44.38, which was lower than the industry average. However, its absolute value is high, which shows that the CATL was trading at a higher price, and it did not produce enough cash flow to support its high stock price. The absolute value of the Price/Cash Flow Ratio is large, indicating that when the cash increase per share in CATL increased, operating pressure was greater. At the same time, inquiring the situation of CATL in 2022, although the price reduction was reduced due to the price reduction of raw materials. In general, the Price/Cash Flow Ratio of CATL was less than the median industry, indicating that its Price/Cash Flow Ratio was within a reasonable range and the valuation was relatively moderate.

5. Conclusions

This article believes that since the listing of CATL, its profits have continued to rise, the scale has continued to expand, the competitive advantage is obvious, and the technology is advanced, and it has formed a unique development model. Influenced by the new crown virus, when the macroeconomic downturn, it still maintained an upward trend, showing strong pressure resistance and profitability, and the new energy industry has broad prospects. Technology is constantly improving, continuously launching new products to expand its market share, has strong development potential and high investment value. At the same time, due to my limited ability, I may be lacking in data and research depth. However, through the analysis of the relative valuation law, it can be seen that the CATL's Price-earnings, Price-to-sale, Price-to-Book Ratio and Price/Cash Flow Ratio were higher than the industry average. The value of its stock is overvalued, the investment value is relatively small, and the investment risk is large.

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References

- [1] Linfang Huang, Yuyi Song. *Research on the development of the lithium battery industry in my country-Take CATL as an example*. *Journal of Beijing School of Printing*, 2020, 8 (02): 108-111.Doi: 10.19461.
- [2] Bernard V L. *The Feltham-Ohlson Framework: Implications for Empiricists*. *Contemporary Accounting Research*, 1995, 11 (2): 733-747.
- [3] Shuying Yan. *Analysis of the value valuation of stock investment in CATL*. *Lanzhou University*, 2020.Doi: 10. 27204.
- [4] Mengjie Li. *CATL New Energy Technology Co. Ltd. Investment value case analysis*. *Qinghai University*, 2020.Doi: 10. 27740.
- [5] Qingle Kong. *New energy power battery enterprise value assessment based on the fuzzy actual power law*. *Yunnan University of Finance and Economics*, 2020.Doi: 10.27455.
- [6] Yuchun Zhu, Yifei Qi. *New energy power lithium battery industrialization development faces the dilemma and countermeasures*. *Journal of Xinyang Agricultural Forestry Institute*, 2022, 32 (02): 46-48+56.Doi: 10.16593.
- [7] Ruihuan Pan, Zihan Gao, Jing Qiao. *The development status of my country's power lithium battery industry. Scientific and technological innovation and application*, 2013 (12): 66-67.
- [8] Jialiang Liang. *Study on Enterprise Value Evaluation in Ningde Era Considering Real Options*. *Qingdao University of Technology*, 2018.
- [9] Xuemei Ma, Yi Cui. *Research on the development trend of power lithium battery technology and investment strategy*. *Journal of South China University of Technology (Social Science Edition)*, 2011, 13 (01): 5-8.doi: 10.19366.
- [10] Gu Zhong. *Electric vehicle core power lithium battery in-depth research*. *Electric bicycle*, 2009 (06): 8-10.