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A Financial Analysis and Valuation of BYD

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Abstract: In the contemporary era, the depletion of traditional energy sources has become an increasingly pressing concern. In response, the development of new energy technologies has emerged as a pivotal strategy to alleviate energy shortages while aligning with ambitious carbon neutrality objectives. Understanding and properly assessing the financial landscape and risks faced by new energy enterprises are paramount for effective management and sustainable growth. This paper delves into this imperative by focusing on BYD, a prominent player in the new energy sector. Employing a comprehensive approach, this study begins with a SWOT qualitative analysis, dissecting BYD's strengths, weaknesses, opportunities, and threats. This analysis illuminates the nuanced landscape within which BYD operates, shedding light on both its potential and the challenges it must navigate. Subsequently, the study employs the Price/Earnings (P/E) model to assess BYD's valuation, providing quantitative insights into its financial standing and market positioning. Key findings from this research reveal a promising trajectory for BYD. Over the past two years, the company has demonstrated rapid growth in operating income, coupled with an enhanced debt repayment capacity, indicative of its robust developmental potential. However, the evaluation using the P/E model suggests that BYD's true value may be underestimated, hinting at further upside potential and market opportunities. This holistic examination underscores the importance of integrating qualitative and quantitative methodologies to comprehensively evaluate new energy enterprises, offering valuable insights for strategic decision-making and sustainable growth in the evolving energy landscape.

Keywords: New Energy Industries, SWOT Analysis, Corporate Valuation

1. Introduction

In 2021, the global pandemic continued to recur, and the international environment became even more complex and severe. The global economy struggled to recover amidst risks and challenges. Among them, China's normalized epidemic prevention and control took the lead globally, and its economic development demonstrated stronger resilience and vitality. Foreign investment and trade remained robust, the conversion of old and new drivers accelerated, and the high-tech industry continued to improve, marking a solid start for the 14th Five-Year Plan. However, due to various factors such as repeated pandemics and rising prices of bulk commodities, the downward pressure on China's macro economy began to increase from the second quarter, resulting in weak consumption and investment and a slowdown in the process of economic recovery. Against the backdrop of repeated pandemics, insufficient domestic demand, and supply chain tensions, China's automobile

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industry achieved positive growth against the trend. BYD Company, with its stock code (002594), has a significant market share in China's new energy vehicle industry. Its stock price has been surging, breaking through 300 yuan, and has nearly doubled in recent years. As a leader in the new energy vehicle industry, studying its corporate value and risk value holds practical significance [1].

Public attention to the new energy vehicle industry has been constantly increasing, and it is generally believed that this is an industry with great potential, but also with fierce competition. However, is the actual situation of the industry as the public imagines? The significance of this article is to explore the specific situation of BYD, a leading company in China's new energy vehicle industry. Through horizontal and vertical comparisons at home and abroad, the article aims to highlight the advantages and disadvantages of BYD, as well as the opportunities and challenges it faces in the current era. At the same time, it also carries out corporate valuation and provides relevant investment suggestions for investors.

The research method of this article is as follows. Firstly, this paper conducts a comprehensive qualitative analysis of BYD using SWOT analysis, which incorporates comparisons between BYD and other domestic and foreign companies with similar businesses. This will help us gain a deeper understanding of the enterprise. Secondly, this paper estimates the corporate value of BYD through the P/E model to understand the relevant investment risks and provide investment suggestions accordingly.

2. Performance Evaluation Based on SWOT Analysis

Before starting the formal analysis, Table 1 provides a preliminary comparison of the three new energy vehicle companies: NIO, BYD, and Tesla, for reference and understanding.

Table 1: Financial ratios of BYD and its competitors.

	Tesla	NIO	BYD
Market Value of Equity	565.84Billion USD	9.95Billion USD	87.71Billion USD
Market Value of Debt	43.01Billion USD	12.18Billion USD	73.48Billion USD
Debt to Equity Ratio	0.68	2.92	3.52
Marginal corporate Tax rate(based on regulations in the headquarters country)	21%	25%	25%
Equity beta	1.96	2.92	1.57
Expected cost of Equity Capital	9.35%	8.4%	11.25%
Expected cost of Debt Capital	4.3%	5.5%	4.35%
Weighted average cost of Capital(WACC)	7.6%	7.8%	6.6%
Business risk(β_A) and all-equity expected return on assets(r_A) implied by delivering Equity Beta	1.93	2.13	1.16

2.1. Strengths

2.1.1. Technique

BYD has a global research and development center in Shenzhen, as well as other research and development centers in Los Angeles, São Paulo, Rotterdam, and other locations, realizing a globalized layout of R&D. In the BYD Research and Development Center in Shenzhen, BYD's R&D

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work is not categorized according to traditional business classifications. Instead, there are specialized research institutes conducting a series of R&D activities, and each research and development institution is involved in automotive business. BYD places a high value on R&D work, which is first reflected in its comprehensiveness. The BYD Shenzhen Research and Development Center has six research and development institutions, covering multiple subdivisions such as automobiles, trucks, and buses. The design, research and development, prototyping, and testing work of the entire vehicle are all included, demonstrating the comprehensive coverage of its R&D work. Secondly, BYD's automotive technology research and development has the characteristic of independence. Most of BYD's automotive technology research and development work is undertaken by its own research and development institutions, especially in the three core technologies of batteries, motors, and electronic controls for new energy vehicles. BYD holds independent intellectual property rights. Thirdly, BYD's automotive technology research and development also has a certain degree of long-term perspective. BYD's automotive research and development not only involves the engineering research and development work of existing vehicle models, but also looks towards the future of automotive development to carry out research and development related to intelligent automotive ecosystems, such as open intelligent vehicle platforms, intelligent customer relationships, and intelligent vehicle applications. It can be seen that the research and development direction has a certain degree of long-term vision and strategic perspective. In addition,

BYD's "Blade Battery" revolutionizes the automotive industry through structural innovation, bypassing the need for "modules" in assembly to significantly increase volume utilization, allowing for the incorporation of more cells within the same space. This advancement leads to a more than 50% enhancement in volume utilization compared to traditional battery packs, matching the range of high-energy ternary lithium batteries.

The elimination of the intermediate "module" structure not only optimizes system mass and volume energy density but also simplifies the battery system, resulting in higher product stability and reduced fault rates. This translates into the provision of new energy vehicles that offer both superior safety and quality, catering to the demands of consumers.

Furthermore, the Blade Battery undergoes the industry-acknowledged "needle puncture test" as a rigorous safety assessment. This test involves puncturing the battery cell with a steel needle, simulating a severe short-circuit scenario. In a comparative video released by BYD, the Blade Battery stood out among its peers. While the ternary lithium battery exhibited extreme thermal runaway with surface temperatures surpassing 500°C and violent combustion, and the traditional prismatic lithium iron phosphate battery showed smoke and temperatures ranging from 200°C to 400°C, the Blade Battery remained intact, without fire, smoke, or significant temperature rise. The egg placed on its surface remained undisturbed, a testament to its remarkable safety.

This outcome underscores the Blade Battery's ability to overcome the potential risks of thermal runaway associated with traditional batteries, establishing it as a safety pioneer in the field. BYD's innovation not only enhances the performance of new energy vehicles but also ensures their safety, setting a new benchmark in the automotive industry.

This is the reason why BYD has a high cost performance ratio in terms of selling price. And the target market and market classification of NIO and Tesla are more focused on luxury cars, but BYD's target market is more comprehensive and can range from low to high luxury, which is one of its unique competitiveness [2].

2.1.2. Politics

The enduring support from policies favoring new energy vehicles has bestowed cost advantages upon consumers. In September 2022, the Ministry of Finance, State Administration of Taxation, and Ministry of Industry and Information Technology jointly declared an extension of the exemption from

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purchase taxes for new energy vehicles, valid until the conclusion of 2023. This policy, initially instituted in 2014 and subsequently renewed multiple times, attests to the state's unwavering commitment to fostering the growth of new energy vehicles. The enactment of numerous tax relief measures signifies that consumers purchasing new energy vehicles will persist in enjoying financial incentives.

The ratio of new energy vehicles to charging stations in China has progressively decreased, concurrent with the steady enhancement of charging infrastructure. With a distinct development roadmap, China has pinpointed new energy vehicles as the focal point of the automotive industry's transformation and advancement. Within this framework, a comprehensive system of supportive policies encompassing technology, industry, and taxation has been progressively refined, and the ancillary service system, encompassing charging infrastructure, has been increasingly strengthened. These advancements have established a robust industrial foundation, conducive to the subsequent development of new energy vehicles. From a vehicle-to-station ratio of 2.9 in December 2020 to 2.6 in September 2022, the consistent decline in this ratio underscores the progress made in bolstering the charging infrastructure [3].

2.1.3. Finance (Cost)

Firstly, regarding NIO, a glance at its capital structure reveals a significant imbalance. With total debt standing at 91,837 million CNY and total equity at 29,596 million CNY, it's evident that the company's liabilities outweigh its equity. This heavy debt burden poses potential financial risks and repayment pressures, leading to increased cost risks and operational instability. Furthermore, NIO's net profit margin of -37% indicates that the company is operating at a loss. Coupled with consecutive years of exceeding 10 billion CNY in technology R&D investments, these factors further exacerbate NIO's cost risks.

Moving on to Tesla, in the domestic market, the company has entered into a gamble-like agreement. While the first two clauses, pertaining to annual tax payments and capital investments, pose manageable challenges, the third clause – achieving a 100% domestic supply chain – significantly elevates cost risks. This requires Tesla to rely solely on domestic suppliers for all components and raw materials, exposing it to potential risks in production capacity, quality control, and delivery timelines. Moreover, managing and coordinating this extensive domestic supply chain will involve additional costs that may exceed initial projections. Additionally, technological hurdles and policy shifts could further compound these cost risks. Tesla's decision to increase prices, contrary to the current price war in the Chinese market, has led to a slowdown in sales, exacerbated by the high taxes and investment expenses, further amplifying its cost risks.

Finally, BYD enjoys a distinct advantage in terms of cost. Its scale has enabled it to reduce production costs, making it more resilient in the face of a price war. This scaled-up advantage significantly lowers BYD's cost risks, positioning it favorably compared to NIO and Tesla.

2.2. Weaknesses

Currently, BYD faces a bottleneck in the battery life of its power batteries. Battery technology is a crucial factor in the competition of new energy vehicles. Although BYD's production and sales of new energy vehicles rank among the top in China, it lags far behind international brands such as Tesla in core technologies such as batteries, electronic control, and motors. Additionally, BYD has been deeply influenced by the "vertical integration" model, resulting in a relatively closed state in the development of new energy vehicle-related technologies. This has, to a certain extent, constrained the extensive exchange and cooperation in technology for new energy vehicles.

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Moreover, in terms of brand building, BYD initially formulated a brand strategy through a team of experts, aiming to provide users with services across the entire value chain, including new energy vehicle products, technology, supporting facilities, portability, and after-sales service. Furthermore, the company has participated in international and domestic auto shows to enhance its brand influence. However, despite these efforts, they have not fundamentally altered BYD's reputation among consumers. In terms of brand building and market segmentation, BYD still has a long way to go [4].

2.3. Opportunities

The company's latest "green aspiration" is the development of streamlined energy storage systems for grid operations and renewable balancing. Central to this endeavor is the pursuit of intelligent grid systems, capable of discharging energy during peak power demand and charging during periods of lower demand. A key innovation lies in the shortened response time of these systems, achieving a remarkable 4 milliseconds, which not only enhances the efficiency of transmission lines but also extends the lifespan of associated equipment.

Illustrative of the company's dedication to this emerging technology are projects such as China State Grid's 6 MW/36 MWH energy storage station and Chevron's 4 MWH mobile energy storage station in San Francisco. These projects represent significant strides in building the foundation for this new platform, while also showcasing the potential for home energy storage systems as a complementary component.

BYD, as a leading player in the new energy vehicle industry, stands poised to capitalize on several favorable trends. Firstly, with the government's increasing support for the new energy vehicle sector, BYD can leverage these policy advantages to further expand its market share. This support, ranging from subsidies to infrastructure development, provides a robust foundation for the company's growth [5].

Secondly, the growing awareness and acceptance of new energy vehicles among consumers present a significant opportunity for BYD. As environmental concerns rise and the benefits of electric vehicles become more apparent, BYD can enhance its brand recognition and influence by offering innovative and reliable products.

Furthermore, the continuous advancement of new energy vehicle technology offers BYD the chance to strengthen its research and development capabilities. By investing in technological innovation, the company can improve the competitiveness and added value of its products, ensuring a sustainable competitive edge.

Lastly, BYD's increasingly comprehensive overseas market layout is expected to further expand its global presence. This strategic move not only diversifies the company's revenue streams but also positions it to capture a larger share of the growing global new energy vehicle market [6].

In conclusion, BYD's focus on energy storage solutions, coupled with its ability to capitalize on favorable market trends and technological advancements, positions the company well for future growth and success in the new energy vehicle industry.

2.4. Threats

Against the backdrop of the Sino-US trade war, China's stock market has been sluggish, the value of the Renminbi has depreciated, economic growth has slowed, and people's purchasing power has declined. As a high-end durable good, the sales of new energy vehicles have also been affected to a certain extent [7].

Despite the increasing popularity of domestic automobile production and sales, people's recognition of the new energy vehicle market remains low. Many users who lack a deep understanding of new energy vehicles still believe that traditional fuel-powered vehicles have sufficient power, good

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safety, and mature craftsmanship. In comparison, the disadvantages of new energy vehicles, such as low speed, short driving range, inconvenient charging, and high prices, have always been significant factors limiting their sales [7].

The power battery is one of the key factors influencing the development of new energy vehicles, as its performance directly determines the performance of new energy vehicles. However, at the current stage, China's domestic power battery research and development capabilities in areas such as energy density, cycle life, reliability of battery packs, and thermal management are insufficient, and this situation is difficult to change in the short term, which is not conducive to the development of the new energy vehicle industry [7].

BYD's asset-liability ratio remains within a justifiable range of 40%-70%, demonstrating a stable trend and reasonable level. In the latest reporting period, the company's interest-bearing debt ratio stands at 16.07%, indicating that its interest-bearing liabilities do not constitute a significant proportion of its overall financial structure. Consequently, the long-term debt service risk remains manageable.

Despite a gradual increase in the operating cash flow ratio, the overall figure remains relatively low. This suggests that BYD's operational cash flows are limited, and a majority of its funds are allocated towards research and development. While investment in innovation is essential for long-term growth, it also poses a challenge in maintaining healthy financial operations.

The relatively high level of liabilities, however, poses a significant financial operational risk for BYD. A high debt burden can limit the company's flexibility in financial decision-making and expose it to potential liquidity issues. It is crucial for BYD to carefully manage its debt obligations and ensure that it maintains a balanced capital structure to mitigate these risks.

In conclusion, while BYD's asset-liability ratio and interest-bearing debt ratio are within reasonable ranges, the company faces challenges in maintaining healthy operational cash flows and managing its debt obligations. To ensure sustainable financial operations, BYD must continue to monitor and manage these risks effectively [8].

3. Valuation

Tesla Inc. (Tesla), founded on July 1, 2003, specializes in the design, development, production, and sales of electric vehicles and advanced powertrain components for electric vehicles. Tesla boasts its own sales and service network. Currently, Tesla is engaged in the commercial production of electric vehicles that meet federal standards, including the Tesla Roadster and the Model S. In addition to developing future vehicle manufacturing capabilities, the company also designs, develops, and produces lithium-ion battery packs, electric motors, transmissions, and other components for itself and original equipment manufacturers (OEMs). Tesla also provides services for electric vehicle powertrain components and sells these components to other automobile manufacturers. The company has provided related services and components for Daimler's Smart Fortwo and Class A electric vehicles. Recently, the company also received an initial purchase order from Daimler for the development of power systems for Mercedes-Benz vehicles.

In 2023, Tesla's global sales increased by 39% year-on-year, delivering 1.7397 million units, while BYD's cumulative sales exceeded 3 million units, with a year-on-year growth of 61.86%. As shown in the table, both companies maintained growth in revenue, with BYD becoming the global leader in new energy vehicle sales last year, However, there is still a nearly 100 billion revenue gap compared to Tesla Inc.

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Table 2: Comparison Between Tesla and BYD.

Financial Index	Tesla	YOY	BYD	YOY
Operating Revenue(in billions)	7006.171	19%	6023.15	42.04%
Operating Costs(in billions)	5727.622	2.6%	4805.58	41.87%
R&D expenses(in billions)	287.347	29.07%	395.75	58.69%
Selling and Administrative expense	347.5104	21.64%	386.73	40.59%
Gross profit margin of automotive business	18.2%	-7.35%	23.02%	2.63%
Net profit attributable to shareholders	1085.752	19%	310	86.5%
Net cash flow	952	49.17%	1697.25	20.51%

From Table 2, it can be seen that there is still a certain gap between BYD and Tesla. However, BYD's financial indicators are gradually increasing, especially the rapid growth of operating income, which can reflect its great potential. In contrast, Tesla's revenue and sales growth have gradually slowed down in recent years, indicating that the gap between BYD and Tesla can be gradually narrowed in the future to a large extent. At the same time, BYD's higher net cash flow reflects its relatively high flexibility in capital operation and investment. Although the investment in scientific research is relatively large and the return on investment takes a long time, it can promote the improvement of BYD's own technological strength, help BYD seize more market shares, increase operating income and competitiveness [9]. At the same time, BYD's higher gross profit margin of automobile business reflects the enhancement of its profitability, which benefits from the company's large-scale effect and technological investment. In summary, although BYD and Tesla have similarities in their businesses, there is still a certain gap between them. However, with the substantial improvement of BYD's financial indicators, BYD has become comparable to Tesla.

The main businesses of Tesla and BYD are automobiles, and they have similar development potential, serving as the leaders among American and Chinese automotive companies, respectively. It is theoretically reasonable to select Tesla as an analog company for valuing BYD's stock price.

Using the analog company (Tesla) P/E ratio to estimate BYD's value, where P represents the stock price and E represents earnings per share. In 2023, Tesla's stock price was 122.12 with earnings per share of 4.72, while BYD's earnings per share was 10.32 yuan.

Using the formula P/E ratio, where P represents the stock price and E represents earnings per share, BYD's stock price is calculated to approximately 267.008 yuan, given Tesla's P/E ratio and BYD's earnings per share.

The P/E valuation method results in a stock price of 267.008 yuan for BYD. Although there are certain similarities between Tesla Inc. and BYD in terms of scale, including market size, and the average of the stock prices in 2023 obtained by the P/E ratio is higher than the real stock prices, the enterprise value of BYD obtained through indirect valuation is likely to be underestimated [10].

4. Conclusion

This paper focuses on BYD, a leading domestic new energy vehicle company, to explore its development strategy. Through an extensive examination of the current state of the domestic and international new energy vehicle industries, as well as the theoretical frameworks of corporate development strategic management, a comparative analysis is conducted on BYD's corporate profile, external environment, and internal environment. This analysis reveals the strengths, weaknesses, opportunities, and threats facing BYD in its growth trajectory. Based on these findings, short-term, medium-term, and long-term strategic objectives are formulated, along with various strategic

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measures and tasks, as well as strategic safeguard measures to be implemented in the company's operations to achieve these objectives.

This research has arrived at the following conclusions: The new energy vehicle market, despite fierce competition, holds immense potential. The global trend towards green industrial development has made the new energy vehicle industry a vital emerging sector that receives strong support from China. Fueled by both market demand and policy incentives, the industry is experiencing rapid growth. Concurrently, the global automotive industry is steadily advancing towards electrification, with both established foreign automakers and China's new energy vehicle startups actively competing in this domain.

BYD enjoys favorable conditions for its development. As the leading company in China's new energy vehicle production and sales, BYD is ripe for further growth and expansion within the current political, economic, social, and technological landscape. The company's marketing prowess, research and development capabilities, human resources, and financial standing all exhibit strong development potential. Notably, BYD's technological prowess and cost-effectiveness stand out as its primary advantages. While the company's relatively high debt ratio and significant investment in scientific research indicate a prolonged investment horizon and associated risks, the improvement in profitability in recent years has to some extent strengthened its solvency and mitigated business risks. However, as BYD's stock price continues to surge, the company faces increasing market risks, thereby posing certain investment risks. Nevertheless, according to the P/E model valuation, it appears that BYD's target enterprise value may currently be underestimated. In summary, BYD retains significant investment value.

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