

Comparative Analysis of Risks Behind the Beta Value Difference of New Energy Vehicles in China

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Abstract. Three electronic vehicle China companies have developed rapidly in recent years. But they have totally different beta according to the average data of past five years. The beta of Li auto, NIO and XPeng is 0.63,1.85,2.85. Therefore, we analyze from the perspectives of policy, market, research and development and sustainable development to discover the reason behind the beta difference and industry characteristics. Since three companies are all listed, therefore, we make full use of the annual report and publicly disclosed information. After comparison, we find that Li has the lowest beta due to its small category but with a single explosive product, high sales growth and market share, electricity-oil mixed long endurance capability and low percentage of R&D cost. While NIO list medium due to its product variety but quite low endurance, medium sales growth and market share, huge power swap station but fixed cost involved and medium R&D expenditure. Finally, XPeng has the highest beta due to its wide price range, comparatively slow growth rate and market share, first one to conduct oversea market trials and large R&D cost.

Keywords: Electronic Vehicle; NIO; XPeng; Li auto; beta.

1. Introduction

1.1 Research Background

At this stage, China's economy maintains a steady development trend, both economic strength and scientific and technological strength have made great progress, and the automobile industry has entered a stage of comprehensive and high-quality development [1]. In the first half of 2020, due to the global epidemic and other factors, automobile production and sales decreased, but as the domestic active response to the epidemic made the domestic economic situation better, the new energy automobile market began to warm up gradually [2]. In 2020, China's automobile sales were 1367,000, up 10.9% year-on-year. Among them, sales of new energy passenger cars were 1246,000, up 14.6% year-on-year.

With the maturity of new energy automotive market in China, a large number of new energy automotive enterprises, such as Weilai, Ideal, Xiaopeng and so on, have emerged with the innovative concept of Internet automotive manufacturing. Unlike traditional hybrid car manufacturers, these new car companies focus on pure electric vehicle production and manufacturing, and use Internet user thinking to dominate all aspects of car design to attract young people who like to taste fresh. Weilai Automobile is the first new energy automobile enterprise in China with the idea of Internet automobile making [3]. According to the experience study of China's new energy automobile, Weilai Automobile has exceeded Tesla in both the satisfaction degree of new car quality and the recommendation rate of passenger cars in the pure electric vehicle market, and has become the new energy automobile enterprise with the highest satisfaction in people's mind. These new energy automotive enterprises have short establishment time, few fixed assets and low operating profit, but with the unique technical advantages and innovative ideas of the enterprise, the valuation of the enterprise is higher [4].

1.2 Existing research

Statistics from the China Automotive Industry Association show that in 2021, new energy automobile production and sales completed 3.545 million and 3.521 million vehicles, respectively,

with an average increase of 1.6 times year-on-year, market penetration of 13.4%, and an increase of 8 percentage points year-on-year. In terms of the distribution model, the production and sales of pure electric vehicles completed 2942,000 and 2916,000 respectively, increasing by 1.7 and 1.6 times year-on-year respectively. Plug-in hybrid vehicle production and sales completed 601,000 and 603,000 vehicles respectively, increasing by 1.3 and 1.4 times year-on-year respectively; Fuel cell automobiles produced and sold 22,000 vehicles, up 48.7% and 35.0% year-on-year, respectively. The above data show that the new energy automobile industry in China is still in a high-speed development stage, the market demand is large, and there is tremendous room for development.

In terms of factors influencing the value of new energy automobile enterprises, He Benhu believes that the new energy automobile enterprise industry has the characteristics of capital-intensive. Most of the enterprises are controlled by state-owned enterprises, which are more affected by the economic cycle and macroeconomic environment [5]. The most of the emerging industries will face the stage of technological innovation and technological breakthrough. When new energy emerging car companies encounter technological problems in research and development (R&D) and make breakthrough progress, they will show a rapid development trend in the future. The new energy automotive industry will be affected by industrial policy, and uses Porter five power model to analyze BYD's enterprise strategy and future development positioning. The value of listed new energy vehicle enterprises is affected by the institutional environment and human resources. The better the system environment, the more human resources input, the greater the value of new energy automotive enterprises in the locality. The influencing factors of the value of emerging new energy automobile enterprises, which are: fast growth, high policy subsidies, technology dominance, and large fluctuations in future development.

1.3 Research gaps

China's new energy automobile enterprises start late, thus, scholars have less research on the valuation methods of new energy automobile enterprises, mostly based on traditional models, so the literature available for reference in this paper is limited. In the process of predicting and estimating the free cash flow, the selection of data has some subjectivity, which will lead to some errors in the result of estimating. Due to the current international turmoil, some enterprises going to the United States for listing are regulated, and their profitability is limited. Some scholars did not consider the influence of political factors when studying, so the results of enterprise value evaluation will be affected to some extent.

1.4 Research Significance

1.4.1. Theoretical Significance

Scholars at home and abroad have made a lot of research on the traditional automotive industry, but for the rapid development of new energy automotive field in recent years, some scholars have started to evaluate and analyze the value, but it is not mature enough [6]. Therefore, on the basis of learning from previous academic achievements, this study further explores the value of new energy automotive enterprises and combines the free cash flow model to evaluate the value, attempting to further improve the traditional free cash flow model.

1.4.2. Practical significance

First, this paper selects representative popular automobiles in new energy automotive enterprises to evaluate their value, uses free cash flow model to estimate the intrinsic value of the enterprise, and compares the actual value reflected by the stock market to provide reference for investors' investment decisions. Secondly, this paper makes further analysis on the factors that affect the value of enterprises through sensitivity analysis, in order to analyze and judge the key factors that affect the valuation of automobiles in the future, and puts forward suggestions to help automobiles in the future or similar enterprises improve their management strategies.

2. Policy Changes: Combing Changes in Domestic Policies

2.1 General situation of policies

China has a clear development direction and planning policy system for new energy automobiles. China's automobile industry needs transformation urgently, and new energy automobiles have become the main direction of transformation. Our government constantly formulates relevant development plans to form a supporting policy system for science and technology, finance, taxation and industry to protect the development of new energy automobiles [7]. The Ministry of Finance, the State Administration of Taxation and the Ministry of Industry and Information jointly issued a public announcement to extend the new energy automobiles tax exemption policy expiring at the end of 2022 to the end of 2023 [8]. The government organizes a series of activities for "going to the countryside" and "brand-up" of new energy automobiles to support the development of new energy automobile industry and promote automobile consumption. Local tax departments actively implement tax exemption policies, accelerate the development of new energy automotive industry, and further activate the automotive consumption market. Taking Guangdong Province as an example, the local policy of Guangdong Province in 2022 stipulates: The allowance for scrapping used cars and purchasing new energy cars is RMB 10,000 per vehicle; Transfer out of old cars and purchase subsidies of 8,000 yuan per vehicle for new energy vehicles; From May 1 to June 30, an allowance of 8,000 yuan per vehicle will be granted to individual consumers who purchase new energy vehicles within the range of old-to-new promotion models in Guangdong Province. The range of promotion basically covers the mainstream new energy vehicles on the market. This has reduced the cost of purchasing a car for consumers and stimulated the consumption power of new energy automobiles. China's preferential policies for new energy automobiles are both nationwide and local. The support policy for new energy automobiles in China has been adjusted flexibly according to different regions and market conditions, which has effectively activated the consumer market and stimulated economic growth.

2.2 Policy changes

2.2.1. New Energy State Supplementary Deadline

The state subsidy policy for new energy automobiles implemented at this stage will expire on December 31, 2022, that is, starting on New Year's Day, the purchase of new energy automobiles will no longer receive state subsidies [9].

2.2.2. Higher standards for green card issuance

Before 2022, the green policy played a strong role in promoting the development of new energy automobiles in China. Under the policies of "buying new energy to send licenses", "no limit, parking preferences" and so on, the green license is really too "fragrant", which also opens the wallets of many consumers. However, in October 2022, the Implementing Measures for Shanghai to Encourage the Purchase and Use of New Energy Vehicles showed that no special license limit will be issued to consumers who purchase or transfer plug-in hybrid vehicles (including add-ons) from January 1, 2023.

2.2.3. Gasoline upgrade

There is also a major policy change for plugged-in hybrid vehicles (including the add-on program). The gas stations will be replaced on January 1, 2023, and the national VIB (National Sixth B) gasoline quality standard will be popularized and implemented throughout the country [10]. According to the data, the limit of olefin content in national VIB gasoline has been reduced from 24% to 18%. After reducing the olefin content, the engine will be more sufficiently contaminated, the colloid, carbon deposit and so on will be reduced, which will play a protective role on the engine. Overall, after January 1, 2023, the cost of purchasing new energy cars will increase, and subsidies for purchasing new energy cars will be passed on to consumers.

3. Market

3.1 Chinese market

About the Chinese market, firstly, from 2021 to 2022, three companies have reached more than 20% increase. Li auto has the fastest growth rate and market share. 133,246 ensure its market quantity as top 10 new energy vehicle enterprises in sales volume and decrease its risk (in Table 1). Meanwhile, XPeng has the least market as 2.1% and the lowest car quantity. More market shares and sales volume demonstrate less market risk. Thus, the market risk should be ranked from highest to lowest as Li auto, NIO and XPeng, which is consistent with their beta.

Table 1. Market information of three companies.

| | NIO | XPeng | Li auto |
|--------------|---------|---------|---------|
| 2021 Sales | 91,429 | 98,155 | 90,491 |
| 2022 Sales | 122,486 | 120,757 | 133,246 |
| Year-on-year | 34% | 23% | 47.2% |
| Market share | 2.2% | 2.1% | 2.3% |

Data source: China Passenger Car Association

About the car series which sold to public, NIO has the most styles, namely 7 different types [11]. XPeng lists second and Li auto the least [12, 13]. The variety of the products provide company with more capability to cover customer's differences, which demonstrate low-risk current market and future sustainability. NIO is consistent with this characteristic. The second type is XPeng's. It relies on an explosive single product to maintain the lowest risk in the past five years. LEADING IDEAL as Li auto's best product enter the market in October, 2018. And till August 1st it uses only 986 days to achieve the production of 200,000 cars off the production line. After it creating the record of the fastest single model of the new force of domestic car production exceeding 100,000 cars, once again it set the record of the fastest breaking 200,000 cars off the production line. However, XPeng announced in September 1st, 2022 that it would stop manufacturing the LEADING IDEAL. Therefore, the market risk of XPeng may rise as the explosive products exit [14].

What's more, car endurance and price are also decisive factors in the market. Referring to car endurance, Li auto has the highest, XPeng second and NIO the least. As a rule, customer prefer the longer endurance since frequent energy replenishment bring inconvenience. Therefore, in endurance part Li auto demonstrate less risk. And in regard to price, the price ranges from high to low rank as NIO, Li auto and XPeng. XPeng has the highest price range. Different prices correspond to consumer's totally different expectations and characteristics. Therefore, how to equip the corresponding service in different price levels, namely differentiated service is the biggest risk behind XPeng's pricing strategy. The results are shown in Table 2.

Table 2. Car styles.

| | | Car style | | | |
|---------|--------|-----------|-----------------|------------------|-----------------|
| Brand | Series | | Endurance(km) | Price range(RMB) | |
| NIO | ES | ES6 | 465 | 386,000-496,000+ | |
| | | ES7 | 575 | 468,000-548,000+ | |
| | | ES8 | 450 | 502,000-598,000+ | |
| | ET | ET5 | 560 | 328,000+ | |
| | | ET7 | 675 | 458,000-536,000+ | |
| | EC | EC6 | 475 | 396,000-496,000+ | |
| | | EC7 | 590 | 488,000-578,000 | |
| | XPeng | P5 | | 460 | 156,900-174,900 |
| | | | | 550 | 170,900-202,900 |
| | | P | | 480 | 209,900-229,000 |
| P7 | | | 586 | 229,900 | |
| G3i | | | 625 | 249,900 | |
| | | | 460 | 148,900-163,900 | |
| | | | 520 | 176,900 | |
| G | | 570 | 309,900-349,900 | | |
| | G9 | 702 | 349,900-369,000 | | |
| Li Auto | L | | 650 | 399,000-419,000 | |
| | | L7 | 1100 | 319,800-379,800 | |
| | | L8 | 1100 | 339,800-399,800 | |
| | L9 | 1100 | 459,800 | | |
| | One | 1080 | 349,800 | | |

Data source: Enterprise official website

3.2 Oversea market

About the oversea market, XPeng took the lead in sending the first batches of cars to Norway in September 2020. Then in May 2021, NIO also announced its oversea strategy [15]. In August 2021, Li auto decided to establish production base in Europe. Faced with the totally new market, the risk of expanding overseas markets decreases with the order of entry due to the unfamiliarity with the local regulation and market demand. Therefore, Xpeng has the highest risk of oversea market.

3.3 Power

NIO is famous for its Power Swap Station. In 21st, February, 2023, NIO's CEO William announced the plan to build 1,000 power stations in 2023 and have more than 2,300 stations by the end of 2023 [16]. However, NIO power swap station costs near 1.5 million to 3 million yuan each [17]. Hence, huge investment in the early stage will increase its cash flow risk. And the speed of three stations construction may bring huge quality risk because NIO tend to build more self-service stations [18]. Drivers may not be competent enough to solve the station malfunction immediately. Therefore, NIO may need more people involved to cover problem solving and the labor cost will rise greatly.

At the same time, XPeng is popular for its EV charger. Till January 2023, Xiaopeng's has more than 1000 self-operated charging stations and it provide its driver with free access to more than 1,900 charging stations. Each charging station cost from 1.21 million to 1.38 million [19]. Compared to NIO, XPeng's fixed input is less and therefore demonstrate lower risk. And Li auto is extremely special for its replenishment methods. It can be refueled by both electricity and oil. Therefore, it doesn't need to spend a lot of money to construct electricity charging scene. By 2020, China has more than 119,000 gas stations [20]. Therefore, Li auto's driver can enjoy the convenience of oil and electricity stations at the same time without too much self-input. Thus, it showcased the lowest risk in power part.

4. R&D

R&D is a typical risky part with huge investment and probabilistic outcomes. According to the annual report, three companies all has increasing input in R&D. Chart X shows that NIO top the list in 2020 and 2021, while XPeng the second and Li auto the least. The results are shown in Figure 1.

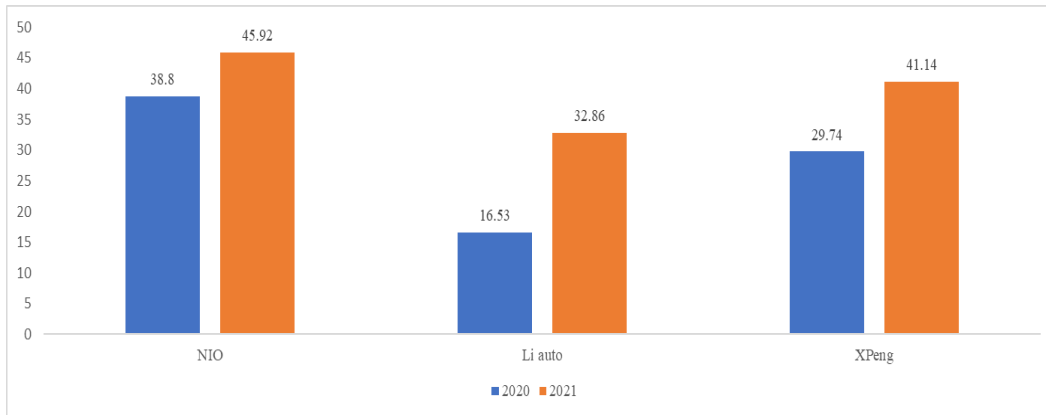


Fig 1. R&D expenditure and year-on-year growth rate of automobile enterprises in 2021. (Unit: RMB 100 million).

Data source: Corporate annual report, WIND, Yilin think tank.

From the situation between expenditure and revenue, XPeng has the highest ratio of R&D to revenue of automobile enterprises, while NIO the second and Li auto the third. Thus, has the lowest return on R&D investment, so it is also the most risky one. This is as same rank as three companies' beta (in Table 3).

Table 3. R&D expenditure and ratio of R&D to revenue of automobile enterprises. (Unit: RMB 100 million).

| Company Name | NIO | Li auto | XPeng |
|------------------------------------|--------|---------|--------|
| R&D Expenditure | 45.92 | 32.86 | 41.14 |
| Operation Revenue | 361.36 | 270.1 | 209.88 |
| R&D Expenditure/ Operation Revenue | 12.70% | 12.17% | 19.60% |

Data source: Corporate annual report, WIND, Yilin think tank.

About the proportion of R&D personnel, XPeng ranks first, NIO second and Li auto the third. The huge percentage of R&D personnel is accompanied with higher risk since this part of people regularly consume more company resources than the other.

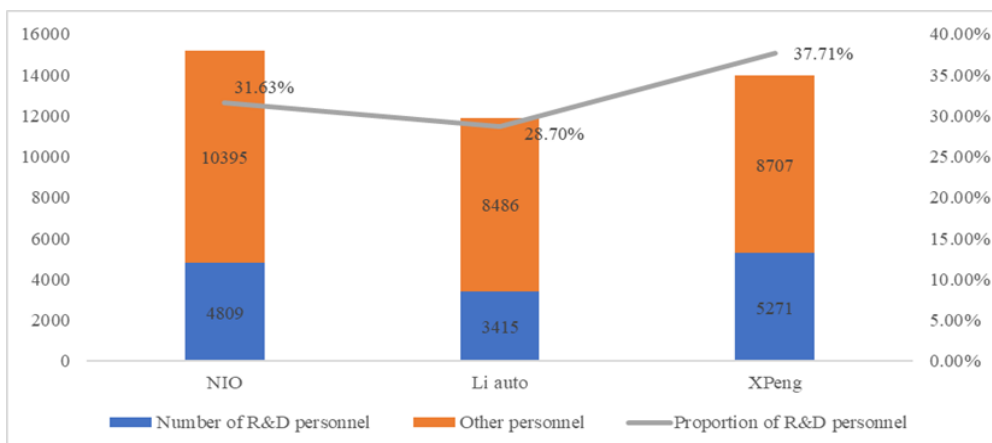


Fig 2. Proportion of R&D personnel.

Data source: Corporate annual report, WIND, Yilin think tank.

5. Sustainable Development: SDGs

5.1 Long-term solvency analysis

The ideal asset-liability ratio of 18% in 2020 is lower than XPeng in popularity mainly because Ideal pays great attention to cost control, has achieved positive profits since the beginning of the market, and is very stable in financial condition. Compared with previous years, the ratio of assets to liabilities of Weilai and Xiaopeng has decreased dramatically, mainly due to the improvement of gross interest rate and tight capital chain in 2020. The three enterprises have good long-term debt ability and low risk.

5.2 Profitability

All three companies achieved positive gross interest rates in the fourth quarter of 2022. Among them, Xiao Peng's gross profit rate is low mainly because Xiao Peng dominates the middle and low ends, but its obvious price advantage is not promoted by the restriction of competitors. The ideal gross margin has been positive since delivery and increased in 2020, mainly due to the decrease in purchasing prices for some parts and the reduction in bicycle manufacturing costs as a result of the increase in ONE production. And its outstanding performance in cost control has also made its gross sales rate reach 17% in the fourth quarter of 2020, much higher than -9% in the same period last year. All three companies have been leading the way in revenue growth by 2020.

6. Sustainable Development

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6.3 The pursuit and realization of new energy vehicle enterprises in SDGs

6.3.1. Implementation of SDGs objectives

NIO, XPeng, Li auto and other new energy vehicle enterprises have always actively explored practical innovation in the four fields of electrification, networking, sharing and intelligence, and vigorously promoted new energy, online car rental, digital marketing and other businesses. NIO,

XPeng, Li auto and other new energy vehicle enterprises are committed to accelerating the research and development of automation. Exploring the research, development and introduction of new energy vehicles is not only committed to providing products that are more in line with the use habits of Chinese consumers, but also pays great attention to the charging service, safety protection, privacy protection, etc. of electric vehicles [9,10].

At the same time, the three new energy vehicle companies also pay great attention to the development of networking, continue to increase the number of vehicles with the Internet of Vehicles, and provide more comfortable and convenient experience for the owners through the Internet of Vehicles system [21]. The goal of new energy vehicle enterprises is not only to increase market share, but also more importantly to explore the sharing mode with “sales store as the center”, flexibly launch the shared travel business in combination with customer use scenarios, and provide customers with customized and scenario-based high-quality car experience through continuous mature application of intelligent technology, so as to achieve the application and popularization of intelligent vehicles.

6.3.2. Ecological practice and development of enterprises

From beginning to end, NIO, XPeng, Li auto and other new energy vehicle enterprises have always coordinated production and operation with environmental development, and deeply implemented the United Nations Sustainable Development Goals (SDGs) is highly valued, actively focused on biodiversity conservation activities, awakened the public's attention to the natural ecological environment, and committed to jointly protect the green home. It is understood that the XPeng brand has invested 11.83 million yuan in social welfare, indirectly covering 133 million people, making great contributions to social welfare undertakings and highlighting its social value [22]. The success of these new energy vehicle enterprises is an indelible contribution to the TNGA architecture. After the systematic completion of the TNGA architecture transformation, the product strength of its models has undergone a revolutionary comprehensive evolution, and it still has the same safe and reliable vehicle quality assurance as before [23].

6.3.3. Sustainable development practice of enterprises

The three brands of new energy vehicle enterprises actively respond to the trend of the development of the times, lay out new product strategies, provide considerate service experience for the majority of consumers, and have achieved excellent results. The new round of scientific and technological revolution is driving the automobile industry to undergo major and disruptive changes [24]. The rules of the game of the traditional automobile industry are being rewritten in the digital era. New energy automobile enterprises, while achieving good results, are also actively responding to opportunities and challenges, deepening the technological upgrading of automobile manufacturing hard power, strengthening the ability of employees, consolidating the soft power of talents, and creating and sharing with partners, and have also achieved a continuous rise [25,26].

7. Conclusion

This article mainly discuss why the beta varies greatly in the same industry: electronic vehicles. This paper choose the three EV companies of China, the three which are regarded as the most potential ones, namely NIO, XPeng and Li auto. We use comparison methods to explain why the gap exist in their beta and we analyze from the perspective of policy, market, R&D and sustainable development. Our mainly discoveries are as followed. Firstly, the Chinese government's subsidies for new energy vehicles have shown an obvious downward trend, which has the same effect on the risks of the three enterprises, that is, the reduction of subsidies leads to the increase of costs, and ultimately leads to the increased of risks. There are no specific policy difference between three companies. Secondly, market risk demonstrate same trend as the beta rank, namely Li auto, NIO and XPeng from low risk to high. It is mainly correlate with car variety, pricing range, oversea market and Chinese market sales. Thirdly, XPeng has the highest proportion of personnel and R&D Expenditure/ Operation Revenue ratio, which reveals that XPeng generates lowest output from R&D. Finally, the Li auto

receivable turnover rate is 152.71, which is much higher than the other two enterprises, indicating that the Li auto has a higher product status and strong ability to control accounts receivable, which is consistent to the beta of Li auto. China is one of the countries with the most rapid development of new energy vehicle market. Understanding the risk related analysis of its new power leader enterprises has great enlightenment and reference value for industry research and investment risk assessment. At present, the shortcomings of our research are as follows: the sample size of selected enterprises is small, and there are many new energy automobile enterprises in China worth using this research model to expand the universality of the conclusions; Also, the analysis aspects are quite limit, risk related perspective can be extended to technology itself, user experience, the speed of financing and so on.

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