

# Research on the Value of Listed Companies in the Global Automotive Industry

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**Abstract.** The valuation of the current automotive industry has been undergoing some significant changes due to the rapid shift of market trends. The rise of electric vehicles (EVs) through government policies and its technological enhancements on batteries has much to offer on the table to be a substantial opponent of the traditional automobile companies. This research focuses on analyzing the market value of the leading automakers such as Tesla, BYD, and Toyota by examining the financial metrics, which include Profitability, Liquidity, Efficiency, and Growth ratios. While also evaluating the strengths and weaknesses of these industry leaders. The finding suggests that cost efficiency and supply chain control play an important role in one's valuation. Though Tesla is in the lead in the technological invitations, meanwhile, BYD benefits from its well-integrated production chain, which drastically cuts the cost down. Toyota, on the other hand, maintains its stability through hybrid technology. These findings provide insights to investors, policymakers, and industry leaders in better understanding how the shift to electric vehicles impacts the financial landscape of the automotive industry.

## 1 Introduction

The electric vehicle (EV) industry has truly evolved from within a niche market to within a major force in the vehicular sector, propelled by improvements from within battery technology, in supply chain development, as well as from government policies. Battery expenses have fallen nearly 90% since 2010, which has made them easier to get and use more often. Even so, the electric vehicle market share differs among multiple areas; China is first because of government support, infrastructure spending, and pollution rules, but adoption in the U.S. and Europe relies on tax breaks and customer interest. High costs and limited charging infrastructure in developing countries remain barriers still.

The vehicular supply chain has shifted around. Companies such as Tesla and BYD vertically integrate battery production, while legacy automakers change their sourcing strategies. Worldwide, governments are investing more in research and development, certain production incentives, and wide-ranging charging systems, greatly affecting automaker earnings and worth. This study examines how several profitability, liquidity, efficiency, and

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growth metrics reflect the financial effect of the EV transition upon publicly traded vehicular firms.

Jagani et al. examined the transformation within the EV supply chain as well as its effect on vehicular suppliers, stressing that the shift from internal combustion engine (ICE) vehicles to EVs has redefined supplier relationships along with increased competition among new market entrants [1]. According to Jagani et al., the increasing importance of battery manufacturing as well as semiconductor requirements plus vertical integration affects car companies' finances [1]. Alanazi thoroughly explored EV adoption trends and barriers, noting that while EVs substantially reduce emissions and dependency on fossil fuels, quite a few key challenges such as comparatively high costs, restricted charging infrastructure availability and range anxiety still obstruct more common adoption [2]. This study indicates that, in certain government incentives and in specific battery technology improvements, there are critical aspects in accelerating EV market penetration [2]. Li looked into the economic effects of recycling batteries from electric vehicles, finding that economies of scale involving a third party in battery collection can lower costs and improve automakers' financial viability there. The study thoroughly stresses how important circular economy methods are to improving EV producers' lasting profits [3]. Diao compared the EV industry in China and in the U.S. Government policies, consumer demand, and infrastructure investments shape market growth, it was shown. China's EV dominance stems from aggressive subsidies with production mandates, as one study found, while the U.S. depends more on some tax incentives plus private sector innovation to grow its EV market [4].

This research examines the overall effect of EV improvements on the worth of vehicle businesses. By assessing how firms are navigating through the EV transition by analyzing financial performance indicators, such as profitability, liquidity, efficiency, as well as growth. The findings will furnish many investment understandings. These understandings assist stakeholders in evaluating companies according to data-driven financial trends rather than speculation within markets. Grasping these metrics remains quite important for identifying which automakers are, in fact, exceptionally well-positioned for thriving within the ever-evolving vehicular landscape.

## **2 Current Development Status of China's Automotive Industry**

### **2.1 The scale of the industry**

China's automobile market is one of the largest in the world. According to the China Association of Automobile Manufacturers (CAAM), China's automobile production in 2023 was 30.161 million units and sales were 30.094 million units, representing year-on-year growth of 11.6% and 12%, respectively, with both annual production and sales hitting record highs. In addition, data from the National Bureau of Statistics (NBS) showed that China's automobile production in 2023 was 30,098,900 units, of which 11,810,900 were sedans, 450,600 were buses, and 3,573,000 were cargo vehicles. With the rise of the middle class and the upgrading of consumption, automobiles have gradually changed from "luxury goods" to "family necessities". Especially in first- and second-tier cities, the car ownership rate continues to rise. In third-tier and lower-tier cities, car sales are also increasing as consumption levels rise [5-7]. What cannot be ignored is that China's auto industry has a complete supply chain, including vehicle production, parts production and sales network, which provides a solid foundation for the industry's expansion.

## **2.2 Market competition**

On the one hand, traditional car companies such as Geely, Great Wall and SAIC continue to dominate the market and maintain market share with their mature production capacity and distribution network. On the other hand, foreign brands such as Volkswagen, Toyota and Mercedes-Benz have successfully captured the premium market through localized production and model design adapted to the needs of Chinese consumers. Of course, the dark horses are emerging EV brands such as Tesla, Azure, Lixiang Auto, and Xpeng, which have quickly captured the market with innovation and better value for money. Meanwhile, traditional car companies have also accelerated their transition to electrification, with the likes of BYD and SAIC-GM-Wuling enhancing the competitiveness of their brands by launching new electric models. So China's auto industry is very competitive, which of course also promotes the continuous optimization of the auto industry and the continuous development of science and technology.

## **2.3 Technology iteration**

China's automotive industry is undergoing a period of rapid technological iteration, especially in the areas of new energy vehicles, smart internet, and autonomous driving, where technological innovations are changing rapidly. For example, advances in battery technology (e.g. lithium iron phosphate batteries) and electric drive systems have improved EV range, charging speed and overall performance, while the Chinese government's policy support for new energy vehicles, such as subsidies and tax exemptions on vehicle purchases, has given a strong impetus to the electrification process [8-11]. With the advancement of science and technology, the application of in-vehicle operating systems, intelligent voice assistants, and self-driving technology has gradually turned vehicles into high-tech intelligent terminals. In addition, the construction of a 5G network and the development of data analysis technology provide more innovation opportunities for automobile companies.

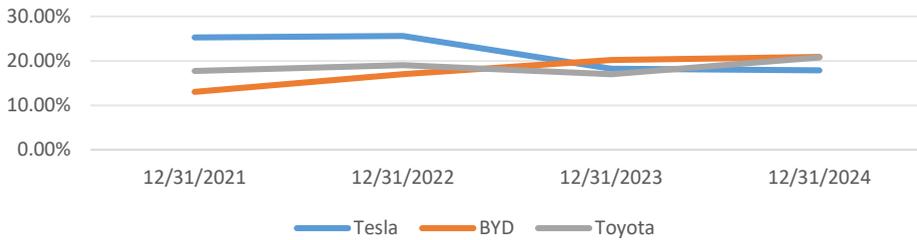
# **3 Financial Analysis**

## **3.1 Profitability analysis**

To evaluate the profitability of these firms, we use gross profit margin and net profit margin as profitability measurements.

### *3.1.1 Gross profit margin*

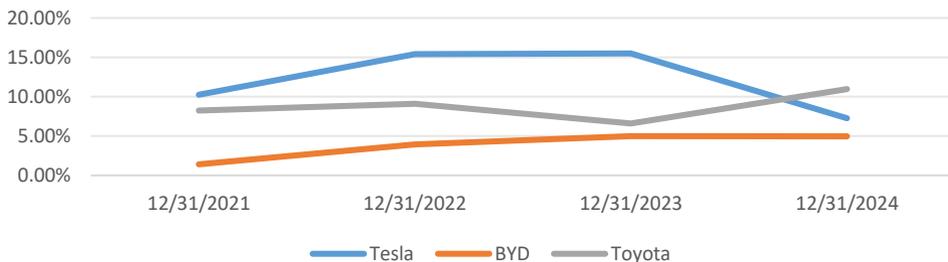
The gross profit margin indicates the ability of a company to sell a product for more than the cost of producing it. As shown in Fig. 1, Tesla's gross profit has continuously declined over the past 4 years, which may be caused by increasing competition in the EV market, the unpopularity of EVs in Europe, and price cuts to increase incentives for consumers. Conversely, the gross profits of BYD and Toyota are steadily increasing and surpass that of Tesla, though Toyota's gross profit fluctuates between 2022 and 2023. The underlying reasons may be that BYD has utilized improved battery technology to cut production costs while increasing the production scale, and being a popular civil car brand, Toyota has been constantly improving its condition of cars and controlling production costs. In short, this trend indicates that BYD and Toyota are performing well in controlling the cost of products.



**Fig. 1.** Gross margin comparison of three firms

### 3.1.2 Net profit margin

Net profit margin measures the total profit of a company after cutting all the costs, including EBIT. As shown in Fig. 2, Tesla had the highest between 2021 and 2023 but faced a sharp decline from 2023 to 2024. In addition to the impact factors in the gross margin, Tesla invested in researching new technology as well, which will be an additional and relatively high cost for Tesla. Toyota has consistently fluctuated during the 4 years, and its net margin began to increase in 2023 and gradually surpassed Tesla's. The reputation of Toyota has almost been pleasing, which connotes its demand is stable and has no drastic, dynamic cost issues. BYD's net margin was steady over the course of 4 years, and it is slowly increasing. BYD only earns thin margins because as competition becomes more intense, without more attractive innovation, its better sales tactic is to lower prices as incentives to encourage consumption of its products. Therefore, its productive efficiency will be lower than Tesla and Toyota.



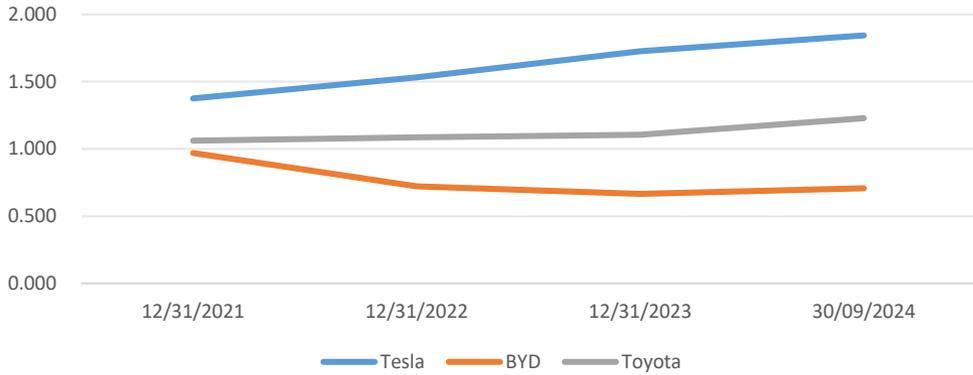
**Fig. 2.** Net margin comparison of three firms

## 3.2 Liquidity analysis

To evaluate the liquidity of these firms, we use the current ratio and cash ratio as liquidity measurements.

### 3.2.1 Current ratio

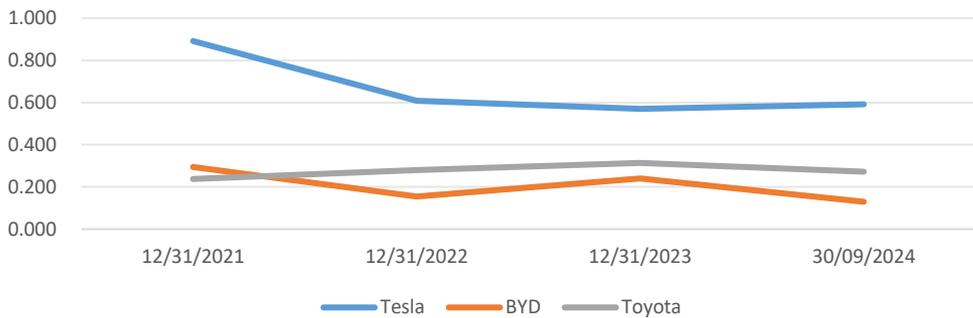
The current ratio measures a company's ability to cover its short-term debt using its short-term assets. As shown in Fig. 3, Tesla and Toyota have a strong ability to meet their short-term obligation due to their current ratio being higher than 1 and still increasing during the 4 years. However, BYD may have an issue with covering short-term debt because its ratio is less than 1 and has no sign of increasing.



**Fig. 3.** Current ratio comparison of three firms

### 3.2.2 Cash ratio

The cash ratio measures a company's ability to cover short-run debt only with cash and cash equivalents, which is the most rigorous liquid metric. As shown in Fig. 4, Tesla's ratio decreased during the 4 years, but its ratio is still the highest one. The ratio of Toyota also fluctuated over the past 4 years. However, the ratio is too low compared to that of Tesla, showing the debt-paying ability only with cash and cash equivalents is less strong than Tesla. The same as BYD.



**Fig. 4.** Cash ratio comparison of three firms

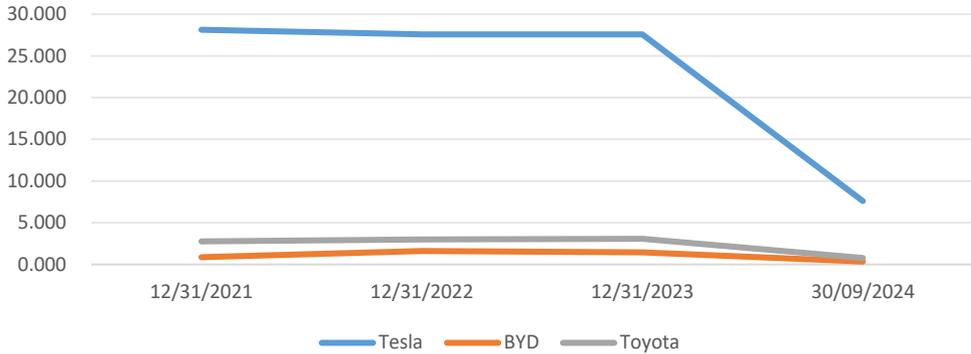
### 3.3 Efficiency analysis

To evaluate the efficiency of these firms, we use receivable turnover rate and inventory turnover rate as efficiency measurements.

#### 3.3.1 Receivable turnover rate

The receivable turnover rate measures the efficiency with which a company is able to collect on its receivables or the credit it extends to customers. As shown in Fig. 5, Tesla's ratio has been comparatively steady for 4 years, but it is much higher than Toyota and BYD's ratio, revealing Tesla is more efficient at collecting payments and credit to clients. Tesla has a Direct-to-Consumer Model, which means it sells its products on its own platform and stores,

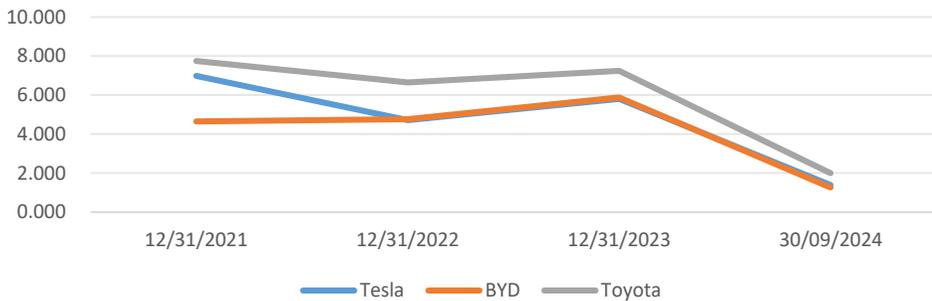
not dealerships. The revenue will be directly received by Tesla. That accounts for why Tesla has a such high receivable turnover rate.



**Fig. 5.** Receivable turnover rate comparison of three firms

### 3.3.2 Inventory turnover rate

The inventory turnover rate measures the efficiency of a company in selling its inventory over a given period. As shown in Fig. 6, the ratio of three firms fluctuated in the first three years. On 9/30 2024, Toyota has the highest ratio, showing its high efficiency in transforming inventory into cash flow. Toyota is famous for its Just-in-Time (JIT) manufacturing, which minimizes inventory and requires frequent payments to suppliers. This manufacturing structure maximizes inventory turnover efficiency and reduces unnecessary inventory costs, which interprets the high ratio of Toyota. Tesla has a similar trend to Toyota, but it is slightly lower than Toyota. The reason behind this may be that Tesla produces products by itself, which means it does not predominantly rely on external suppliers. In the long run, there will be an accumulation of raw materials and products and eventually, slowing down the inventory turnover process. The same for BYD.



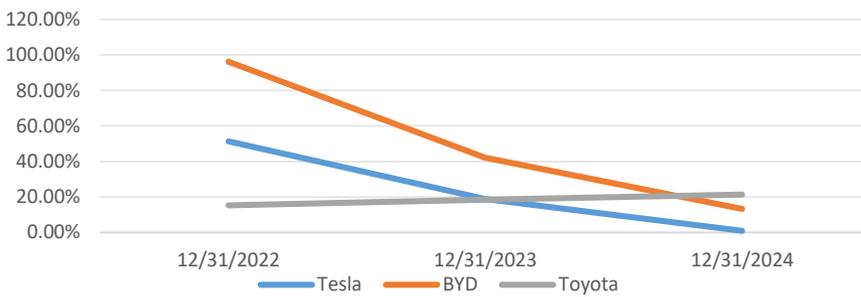
**Fig. 6.** Inventory turnover rate comparison of three firms

### 3.4 Growth analysis

To evaluate the growth condition of these firms, we use revenue growth rate and net income growth rate as growth measurements.

### 3.4.1 Revenue growth rate

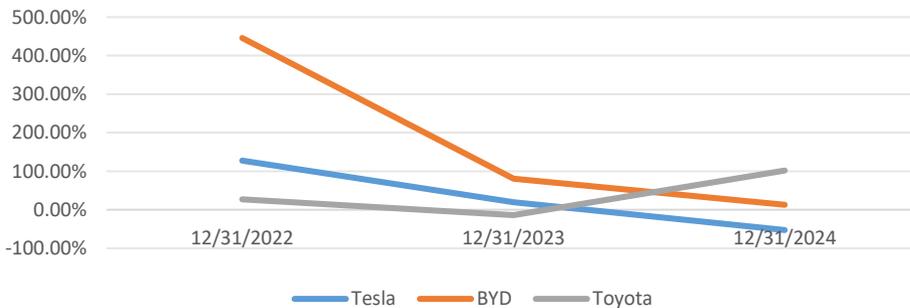
The revenue growth rate measures the percentage increase in a company's revenue in a given period. As shown in Fig. 7, the revenue growth rate of Tesla and BYD decreased drastically over the past 3 years, indicating there will be a loss for investors who have already invested in the 2 firms. For Toyota, in spite of being the lowest initially, its revenue growth rate is constantly, slowly growing, which bodes well for the earnings of firms and investors. Tesla and BYD's revenue growth is slowing due to market saturation, rising competition, price cuts, and economic headwinds. Tesla faces demand challenges, while BYD struggles with subsidy reductions and a price war in China. Meanwhile, Toyota's steady growth is driven by hybrid dominance, strong global sales, and a cautious EV strategy, ensuring stable financial performance.



**Fig. 7.** Revenue growth rate comparison of three firms

### 3.4.2 Net income growth rate

Net income growth rate measures the percentage increase of a company's net income in a given period. As shown in Fig. 8, Tesla and BYD experienced a significant decline in net income growth, which corresponds to the loss in revenue growth above, extrapolating great losses for investors and firms. On the contrary, despite a decline in 2023, Toyota rose up its net income grew enormously then, fully demonstrating its resilience in earnings and will be appealing to investors.



**Fig. 8.** Net income growth rate comparison of three firms

## 4 Prospects

#### **4.1 4.1 Operational part**

Tesla, BYD, and Toyota represent the vanguard forces in the electric vehicle (EV) sector, embodying divergent strategies for Chinese domestic brands and traditional automakers. Financial data indicates that Tesla's gross profit margin decreased from 25.00% in 2021 to 10.00% in 2024 over a four-year period. This decline was primarily attributed to intensified pricing competition and substantial investments in research and development, which led to a sharp reduction in the net profit margin from 15.00% to 5.00%. Despite this, Tesla's direct sales model ensured a stable accounts receivable turnover rate of 25,000–30,000 times annually, significantly surpassing industry averages.

BYD, leveraging its self-developed battery technology, experienced an increase in its gross profit margin from 10.00% to 20.00%. However, its low-price market strategy resulted in a consistently low net profit margin of 5.00%, while also exposing liquidity risks with a current ratio of 0.800. Revenue growth decelerated markedly from 100.00% to 20.00%, reflecting growing pressures due to market saturation.

Toyota, focusing on hybrid power systems and just-in-time (JIT) production, achieved an inventory turnover rate of 8,000 times per year in 2021, outperforming competitors. Its net interest rate exceeded Tesla's, reaching 10.00% in 2023, accompanied by steady revenue growth climbing to 15.00%. A cash ratio ranging from 0.500 to 0.700 highlighted Toyota's financial resilience.

The competitive landscape suggests that Tesla must balance innovation with profitability, BYD needs to address its profit constraints urgently, and Toyota faces challenges in transitioning to fully electric vehicles. The long-term competitiveness of these three companies will depend on their capacity to dynamically align technological advancements, cost management, and strategic adaptability.

#### **4.2 Risks**

Here is a risk-focused evaluation of the potential challenges faced by Tesla, BYD, and Toyota. Tesla confronts risks associated with technological advancements, vulnerabilities within its supply chain, and legal issues stemming from autonomous driving incidents. BYD depends heavily on the Chinese market and government subsidies, while its globalization efforts are hindered by geopolitical factors and high compliance expenses. Toyota struggles with a delayed shift towards electrification, a declining hybrid vehicle market, and uncertainties surrounding the viability of hydrogen energy technologies. All three companies must address differentiation risks related to their technical approaches, supply chain robustness, and adaptability to policy changes.

### **5 Conclusion**

This paper examines the financial performance and strategic paths of three publicly traded companies in the automotive industry, Tesla, BYD and Toyota, in the context of the transition to electric vehicles. By analyzing profitability, liquidity, efficiency and growth ratios, it is found that Tesla maintains a high gross margin due to technological innovation (e.g., 4680 battery and autopilot technology), but its advantages are gradually overtaken by BYD's vertically integrated supply chain and cost control capabilities. BYD relies on the whole industry chain layout (e.g., blade battery technology) to achieve economies of scale, but its internationalization process is limited by geopolitical risks. Toyota, on the other hand, relies on hybrid technology and hydrogen energy layout to maintain financial stability, but the lag in pure electric transition poses a long-term challenge.

In terms of takeaways, investors need to focus on companies' ability to differentiate technology and supply chain management efficiency, while policymakers should optimize new energy subsidies and infrastructure investment to accelerate industry transformation. Going forward, the automotive industry will face fierce competition around electrification, smartness, and globalization, and companies will need to balance technological innovation and risk management to adapt to the rapidly evolving market landscape.

## Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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