

The Effectiveness of the Fiscal Policies Issued by the Chinese Government on the New Energy Vehicle Industry

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Abstract. The development of alternative energy vehicles is a successful way to encourage energy saving and emission reduction. The renewable energy transportation sector is a vital growing industry in China. As energy and environmental issues become more serious today, vigorously developing alternative energy vehicles is an efficient strategy to address these issues. This paper focuses on the impact of China's fiscal policy on the development of alternative energy vehicles. In this study, we inquire about the fiscal policies enacted by the Chinese government for new energy vehicles. The effectiveness of the fiscal policy is reflected by studying and comparing the revenue growth as well as the sales of new energy vehicles under each brand of two different car brands: BYD and NIO. Another aspect of this study is to examine whether the introduction of new energy vehicles by the Chinese government has a negative impact on traditional vehicles by comparing the sales of the two models of GM Wuling.

Keywords: Fiscal policies; New energy vehicle industry; Traditional vehicle industry.

1. Introduction

Using unconventional vehicle fuels as a power source (such as using personal transportation fuels and implementing new on-board power devices) and incorporating innovative tech in power control and drive of vehicles, alternative energy vehicles are defined as those with excellent technological principles, new technologies, and new structures. Fully electric cars, extended program electric vehicles, hybrid electric vehicles, fuel cell electric vehicles, vehicles powered by hydrogen, other new energy vehicles, etc., are the main categories.

First off, as nations throughout the world have more awareness of environmental preservation, technical advancement, and energy security, internal combustion engines—which burn fossil fuels—are gradually being utilized through other energy power sources in the sector of road transportation. With automation as the technical foundation, this gives a solid potential for the growth of the new energy vehicle industry. For instance, Japan adopted a plan for the development of clean energy cars in 1997 and set a goal to reduce CO₂ emissions in accordance with the Kyoto Protocol. The subsequent Paris Agreement additionally demonstrated the willingness of governments to regulate greenhouse gas emissions. By 2018, several nations, primarily those that are part of the European Union, had committed to restricting or ending the registration of internal combustion engine sales, and some had even introduced legislation to that effect. For instance, the UK and France have announced bans on the sale of cars with internal combustion engines starting in 2040. Other countries may have stricter deadlines; Norway, for example, will set this target for 2025. According to China's Ministry of Industry and Information Technology (MIIT), a double points management scheme has been implemented to compel and incentivize businesses to improve the energy efficiency of conventional vehicles. A timeline for the phase-out of fuel-fired vehicles has also been studied [1].

Secondly, the development of the new energy vehicle industry has been aided by a consistent and robust multi-faceted governmental incentive mechanism. Due to their innate environmental protection and technological upgrading qualities, alternative energy vehicles have become a crucial tenet of China's environmentally conscious and innovative high-quality growth. To do this, the nation has created a top-down, four-dimensional incentive policy structure that encompasses four aspects:

national strategy, tax relief, financial assistance, and industrial policy. In terms of national strategy, it manifests itself in the policy focus on cultivation and the expansion of public services in many cities to actively carry out demonstration and promotion of new energy vehicles. In terms of tax relief, two documents were published in 2014 and 2015, respectively, to exclude new energy vehicles from purchase tax and grant them favorable vehicle tax treatment. A pilot program for private new energy vehicle purchases was started and made available to the entire nation. New energy vehicle projects also received a set amount of annual financial support. Several documents about industrial policy were released to encourage the development of charging infrastructure, increase the marketing of new energy vehicles, provide subsidies to new energy activities, etc.

A growing number of consumers are choosing new energy vehicles when they purchase cars because of their advantages in terms of environmental preservation and low power costs. A new energy vehicle research project was included in the national "863" key science and technology projects during the "Tenth Five-Year Plan" in 2001, despite the new energy vehicle industry in China having only developed for a brief ten years. "The annual sales growth of new energy vehicles was just 899 units in 2008, the very first year of new energy vehicles in China; in 2018, the figure reached 1.27 million vehicles: in just a decade, the sales growth has been more than one thousand times. The government's array of fiscal policies are necessary for the development of China's new energy vehicles [2].

2. Policies Issued on New Energy Vehicles Industry

Since 2009, the Ministry of Finance has worked with the necessary agencies to encourage the growth of the new energy vehicle sector. China's new energy vehicle technology level is continuing to advance thanks to the combined efforts of all parties; product performance has substantially improved, and production and sales scale have ranked first in the world for six years. The Notice on Improving the Financial Subsidy Policy for the Promotion and Application of New Energy Vehicles (Caijian [2020] No. 86), jointly issued by four ministries and commissions, was published in April 2020. It stated that "in principle, the subsidy standards for 2020 -2022 will be 10 percent, 20 percent, and 30 percent respectively on the basis of the previous year, and for vehicles that fulfill the standards in the general populace transportation industry, the subsidy benchmark will not be" In spite of the global pandemic and chip scarcity, the new energy vehicle industry saw considerable growth and positive industrial development in 2021.

The new energy vehicle purchase subsidy standard is reduced by 30% in 2022 compared to 2021; this reduction affects city buses, roads for passenger transportation, taxis (including net cars), sanitary conditions, urban transportation and logistics, postal and express shipment, civil aviation, and airports, as well as party and government organs in the field of official new energy vehicle compliance [3, 4].

3. Case Study of New Energy Vehicle Companies

3.1 Case Study of BYD

Founded in February 1995, BYD Company Limited ("BYD") is a Chinese company with its headquarters in Shenzhen, Guangdong Province. The firm spans four industries: vehicle, rail transportation, new energy, and electronics, and it employs more than 220,000 people. BYD is dedicated to advancing technical innovation and assisting in the achievement of the objectives of "carbon peaking and carbon neutrality" in order to foster the sustainable growth of human society. BYD earned the UN Special Energy Prize in 2015, marking the organization's first recognition of the new energy sector in its 70-year existence. BYD received the Zayed Future Energy Award for major businesses in 2016. BYD was voted the most admired Chinese firm in 2017 by Fortune magazine, coming in first place for the automotive sector. BYD appeared in the 2020 BrandZ 100 best Most Valuable Chinese Brands list as an automobile manufacturer and held the title of most valuable Chinese brand in the car industry for six years running [5].

BYD published its annual statement for 2020 on March 30, 2021. BYD's revenue in 2020 increased by 22.59 percent year over year to 156.598 billion yuan, and its net income attributable to equity holders of listed businesses increased by 162.27 percent to 4.234 billion yuan.

BYD sold 97,990 units of all of its passenger vehicles in December 2021, a 77.9% increase over the same month the previous year. Among them, sales of new energy passenger vehicles increased by 236.4% year over year to 92,823, smashing the 90,000-unit barrier twice in a row.

In 2022, BYD, which had already won the title for seven straight months in new energy automobile sales, repeated as champion, and the revenue growth was noticeably greater than the industry standard. BYD sold 95,180 units overall in January 2022, a 126.1 percent year-over-year increase against the norm. Among them, sales of new energy passenger cars increased by 367.6 percent year over year to 92,926 units. According to data released by the Passenger Association on April 11, 2022, BYD pure electric and plug-in hybrid dual drive stifled the renewable power current leader of independent brands, manufacturers of total revenue surpassed 10,000 units of 13 companies (2 more for the same period the year before), which include BYD 104,338 units, and the new energy passenger automotive market diversification force in March. In June 2022, BYD reported that new energy vehicle sales for May were 114,943 units, compared to 32,800 units during the same month last year; cumulative sales for the year was 507,314 units, up 348.11 percent.

Table 1 shows the year-on-year increase rate of the total sales and new energy cars sales of BYD company. In December 2021, new energy vehicles accounted for 94.7% of total vehicle sales, and in January 2022, this percentage increased to 97.6%. Therefore, new energy vehicles account for the majority of BYD's sales, and after a series of subsidies and tax breaks have increased their share even more.

Table 1. Monthly revenue, total sales and new energy car sales of BYD [5].

Months	Total sales	YoY+%	New energy cars sales	YoY+%
Dec. 2021	97990 units	77.9%	92823 units	236.4%
Jan. 2022	95180 units	126.1%	92926 units	367.6%
May. 2022	/	/	114943 units	250.4%

3.2 Case Study of NIO

NIO, the company established on November 25, 2014, a company fully produced alternative fuel vehicle. With the beginning of the few years, the sales were little because of the business environment during that period. The tradition vehicles are more popular, and the technology of alternative fuel vehicle is not well-developed, thus people have less confidence of buying alternative fuel vehicle.

In 2018, NIO sold 11348 alternative fuel vehicles [6]. In December, NIO sold 2692 alternative fuel vehicles [7]. NIO's total revenue was 4.65 billion yuan. The net profit is -9.6 million yuan and net margin was -195.12% [8].

In 2019, NIO sold 20565 alternative fuel vehicles, increase 81% year to year, in December 2019, NIO sold 3170 alternative fuel vehicles [9]. NIO's total revenue was RMB 7.825 billion, having its net profit margin of -145.86% which net profit of RMB is -11.413 billion [8].

In July 2020, NIO received a 7-billion-yuan injection from the Hefei government which helped NIO overcome the dangerous period. NIO sold 43728 alternative fuel vehicles in total in 2020. In December 2020, sold 7007 alternative fuel vehicles [10]. The NIO's total revenue was 16.25 billion RMB and net profit is -5.6 billion with a net profit margin of -145.86% [8]. In 2021, NIO sold 91429 alternative fuel vehicles. In December 2021, sold 10474 alternative fuel vehicles. NIO's total revenue will be RMB 36.136 billion and net profit will be RMB -10.572 billion, with a net margin of -29.26%. In December 2021, sold 10474 alternative fuel vehicles. Vehicle sales revenue for the fourth quarter was 9.2 billion RMB, up 49.3% year-over-year [11].

In 2022, for the first and second quarter, NIO sold 82434 electron vehicles, an increase 24.2% year to year [12]. Vehicle sales revenue was RMB 33.17 billion, an increase of 118.5% year-over-year. Vehicle sales revenue for the fourth quarter was 9.2 billion RMB, up 49.3% year-over-year [8].

Compare the data of total revenue from 2018 to 2021 in Figure 1. The total revenue increased each year, especially started from 2019. From Figure 2, the total revenue between 2019 and 2020 increase 110.8% and from 2021 to 2021, total revenue increases 119% which was dramatic increase.

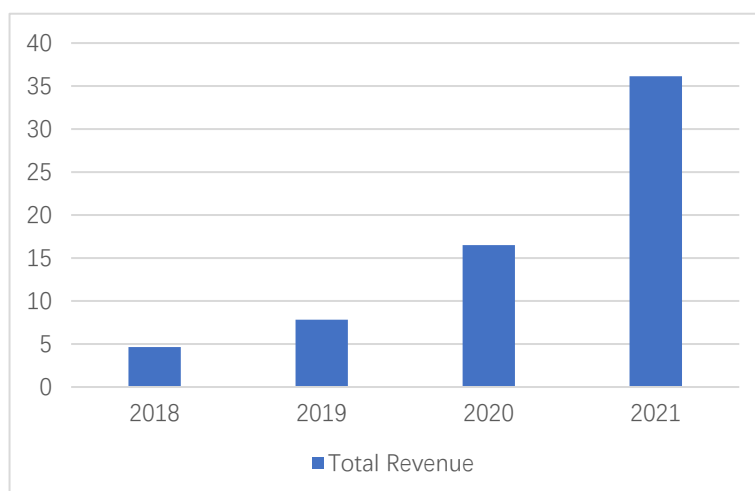


Fig. 1 NIO's total revenue [8].

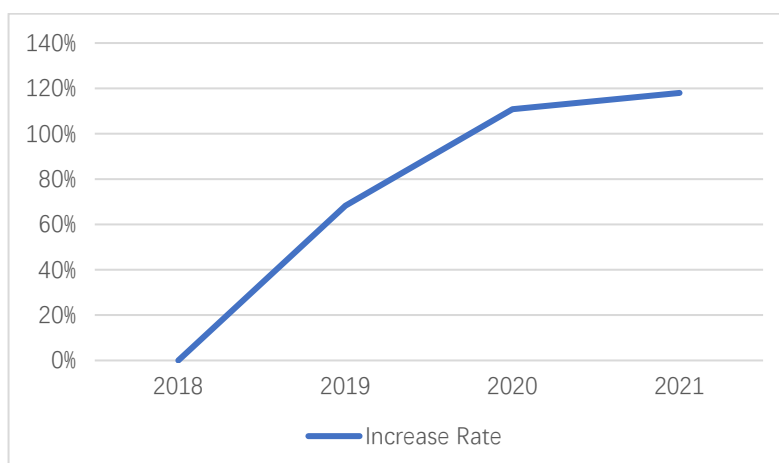


Fig. 2 Total revenue increase rate [8].

By comparing the data from December 2018 to 2021, the December sales are increasing every year, especially from 2020, a remarkable growth of 54% compared to 2019.

In 2022, the new energy vehicles sold in the first two quarters have accounted for 90.1% of the annual sales in 2021, which shows that the sales volume in 2022 is increasing rapidly.

Table 2 shows each year's total revenue of NIO with the net profit and net margin. There is an increase trend in the total revenue and an increase rate in net margin although the net profit still unstable.

Table 2. Total revenue, net profit and net margin of NIO [8].

	Total Revenue	Net Profit	Net Margin
2018	4.64 billion	-9.662 billion	-195.12%
2019	7.825 billion	-11.413 billion	-145.86%
2020	16.5 billion	-5.611 billion	-34.51%
2021	36.136 billion yuan	-10.572 billion	-29.26%

4. The Effect of Incentive Policies on Car Industry

The dramatic increase started from 2020 is because one government policy that called “double carbon”, Carbon dioxide emissions will strive to reach the peak in 2030 and strive to achieve carbon neutrality in 2060, and to achieve this goal, carbon neutrality is called that help country attain relative "zero emissions" by offsetting all of the carbon dioxide or greenhouse gas emission through planting trees, conserving energy and cutting emissions [13]. This "2 carbon" goal aids China in promoting the growth of the alternative fuel vehicle sector.

With the target, China government enact the policies of exemption of car purchase tax from January 1, 2018, to December 31, 2022 [14].

Tax function for traditional vehicles:

$$\text{Car prices} \times (1+13\%) \times 10\% + \text{consumption tax} + \text{vehicle tax.} \quad (1)$$

Tax function for new energy vehicles:

$$\text{Car prices} \times (1+13\%) \quad (2)$$

(13% is the value-add tax of automobile)

The regular car purchase tax is 10%. In 2016, the policy is that the car purchase tax is 5%, government decrease the tax rate about 50% for regulars one. For a car of 2 hundred thousand, it takes 11700 RMB for purchase the taxes.

In 2017, the policy is that the car purchase tax increase to 7.5%. For a car of 2 hundred thousand it takes 17550, increase 50% compared with 2016.

The policy that eliminates the car purchase tax can help consumer save 23400 RMB for a car purchase at two hundred thousand.

The policy stimulates more consumers to purchase a new energy vehicles, and appeals more potential consumers that are consider between tradition vehicle and new energy vehicles.

With the “two-carbon” goal and the policy of exemption of car purchase tax, it effectively stimulates the total sales of car company. Especially started from 2020. Also, the increasing also influenced by the advertising. As more and more people know how to use the Internet in China, many car brands will put advertisements on the Internet, find bloggers to review and promote the advantages of their own brand products to attract potential customers and expand their popularity. When people have a preliminary understanding of the brand and have a need to buy a car, they will start to consider new energy vehicles, plus the purchase tax exemption policy, people will be willing to buy a new energy vehicle.

Although sales grew from 2018 to 2019, the loss for NIO is still serious. The losses will only start to decrease in 2020 and 2021. With the advertising and tax exemption policy, In the first two quarters of 2022, sales grew very quickly, with 90.1% of the annual sales in 2021.

Except with the advertising on internet, government policy still positively influenced the sales, looking at the data from 2018 and 2019 where China’s internet was not popular enough the sales still increase 81%.

BYD's pre-existing popularity has reduced BYD's investment in publicity, with the exemption of Internet publicity, BYD's sales in December 2021 increased by 236.4% compared to last year. The effectiveness of the purchase tax exemption can be seen.

5. Comparison between Traditional and New Energy Cars

Shanghai General Motors Wuling is a sizable Sino-foreign joint venture vehicle manufacturer jointly founded by Shanghai Automotive Group Company, General Motors Corporation of the United States, and Guangxi Automobile Group Company. It was formally established on November 18, 2002.

The main idea of the company is “making the possible lowest cost and make it unique”.

Wuling followed this idea, most of the cars are less than 100,000 yuan. For Wuling Hongguang, a car launched from 2010 and is the most representative model. The price is only 40,000 yuan to 70,000 yuan. For electric vehicles, Wuling launched Wuling Hongguang MINIEV, priced at 30,000 yuan to 100,000 yuan in June 2020.

Wuling's Global Small Pure Electric Vehicle Architecture products will sell a total of 452238 new vehicles in 2021. An increase of 160% year-on-year, accounting for about 26% of the total annual sales. Among them, the most contributed is the Hongguang MINIEV, which has a cumulative sale of up to 426452 in 2021, the most popular product in China's new energy vehicles market. From the aspect of global market, Hongguang MINIEV also performed well. In July and August 2021, Hongguang MINIEV won the global new energy vehicle sales crown for two consecutive months [15].

Figure 3 shows that the monthly sales of two different cars. From the first 5 months after MINIEV published, the sale of Wuling Hongguang was still higher than MINIEV series. But from December 2021, MINIEV series monthly sales started to increase and exceed Wuling Hongguang's sales.

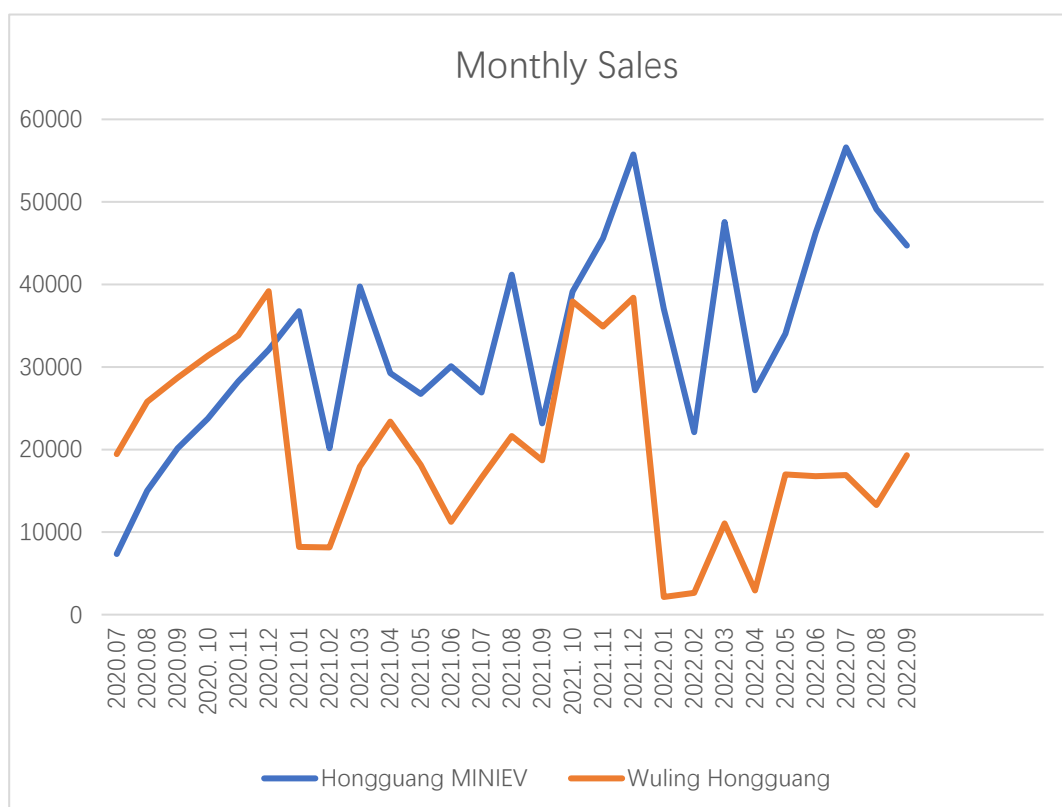


Fig. 3 Monthly Sales of Hongguang MINIEV and Wuling Hongguang [16]

Figure 4 and Figure 5 show the percentage of how tradition car and new energy vehicles account for brand monthly sales. The graph indicates a sharp decline in the proportion of Wuling Hongguang and an upward trend for MINIEV's sales participation, both of them indicate that the traditional auto market will be impacted by the enhancement of alternative fuel vehicle technology and the existence of alternative fuel vehicles.

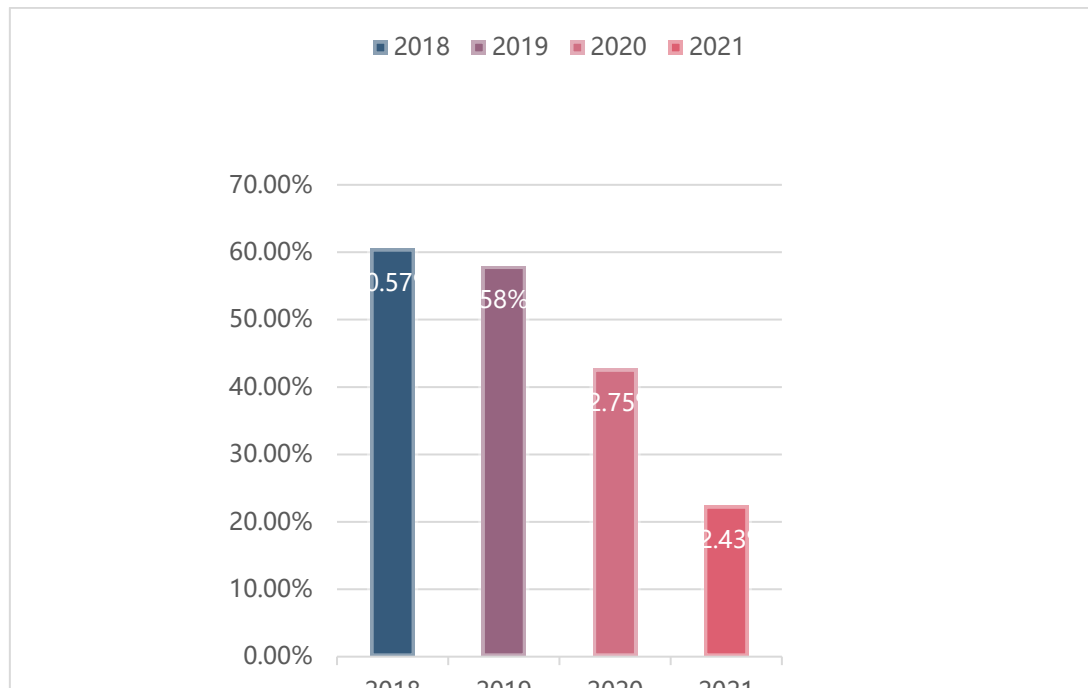


Fig. 4 Wuling Hongguang accounts for brand monthly sales [16]

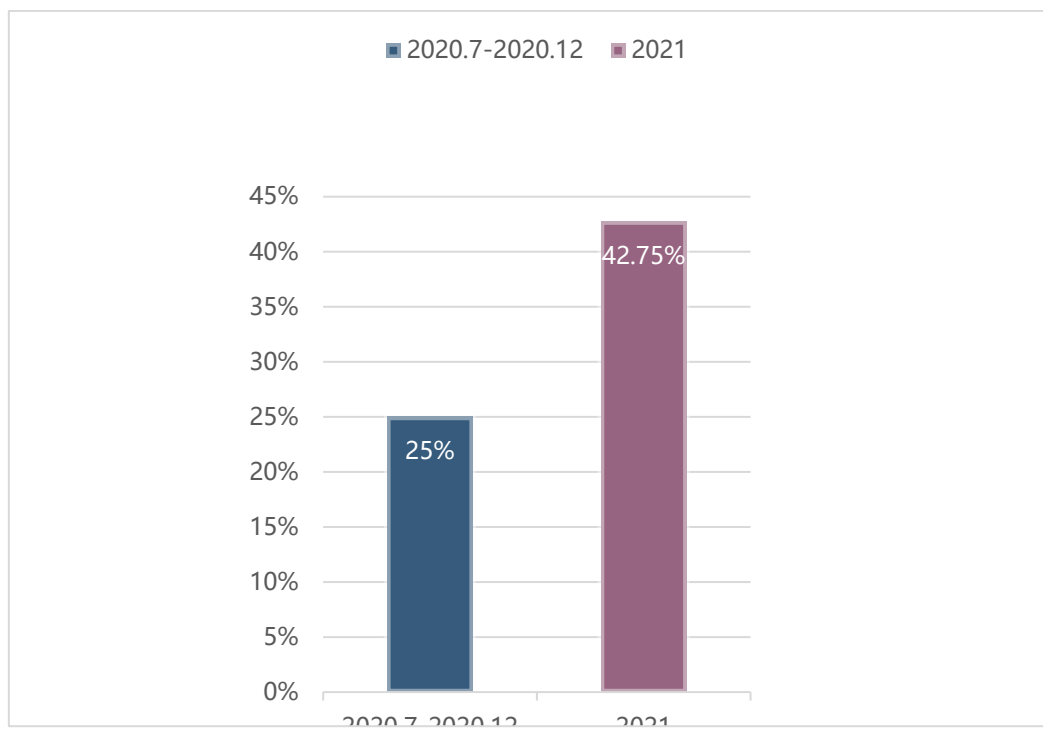


Fig. 5 Wuling Hongguang MINIEV accounts for brand monthly sales [16]

Moreover, Wuling Motors released its financial report for the first half of 2022 for the first half of June 30, with revenue of 6.27 billion yuan, drop 12.4% from last year, and net profit of 372million yuan, decrease of -24.53% year-on-year. Even with this decline profits and revenue, the electronic vehicles products sales are still increased. For first half year of 2021, Mini-series sold 14.6 thousand cars. For first half year of 2022, Mini-series sold about 19.5 thousand cars which increased 33% [17].

6. Conclusion

The “two-carbon” goal helps the development of alternative fuel vehicles. With the goal, government establishes policies to encourage consumers to purchase new energy vehicles which can increase the speed to achieve the “two-carbon” goal. The policies that the government enact is giving purchase subsidy and eliminate the car purchase tax rates, through the case study of BYD and NIO, both brands have dramatic increase in sales and total revenue which reflects the efficiency of policies. The data of two brands shows the policies have strong positive influence on the alternative fuel vehicles industry.

New energy vehicles attract more potential customers than before, the promotion of new energy vehicle purchases and the growth of the new energy vehicle market have a negative influence on the sales of conventional cars. Through the data of Wuling Hongguang which is the representative of traditional car and Wuling Hongguang MINIEV, the representative of alternative fuel vehicles industry. The decreasing rate of Wuling Hongguang is obvious after the MINIEV was published. The decrease trend of traditional car shows that the policies bring some negative effects and more fierce competition in traditional vehicles market.

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