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Analysis of Central-Local Policy Deviation in China: Economic Impacts of New Energy Vehicle Industry Policies under Carbon Neutrality—A Case Study of Anhui Province, Hefei City

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Abstract: This paper investigates central-local policy deviation in China's electric vehicle car (EV car) industry through a case study of Hefei, Anhui Province. The study classifies policy deviation into three aspects: objectives, execution, and resource allocation. It reveals significant misalignment between national, provincial, and municipal policies. The study finds that these deviations reflected in over concentration of resources, excessive subsidies, and protectionist practices, have distorted market competition, weakened technological innovation, and created risks of overproduction. Using literature review, policy text analysis, and case comparisons, the paper discovered that the extent of deviation is getting larger and larger as is passed to lower levels with more detailed measures taken. This article also concludes with recommendations for improving coordination, including enhanced central supervision and mechanisms for cross-regional collaboration. By revealing the economic consequences of policy deviation, this research contributes to understanding the governance challenges in China's green transition and offers insights for aligning local development with national strategic objectives.

Keywords: Central-local policy deviation, EV car industry in China, Resource misallocation, Industrial policy implementation, Carbon neutrality

1. Introduction

As a member of the Paris Agreement, China has committed to achieving peak carbon emissions by 2030 and carbon neutrality by 2060. Under the guidance of this target, the central government of China launches a series of policies to encourage the transformation of the automobile industry towards electric vehicles, and the EV car industry undergoes exponential growth.

In 2024, the annual production and sales volume of EVs in China exceeded 10 million units [1]. However, while the central government is promoting transitions and developments in the EV industry, local implementation reveals policy deviations. Policy deviation generally refers to the differences between the macro aims set by the central government and the more specific measures

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made by local governments. There are three types of policy deviation: Objective, Resources, and Execution.

The primary reason that Anhui province is the case studied is that in 2023, the production of EVs in Anhui reached 876,000, accounting for 9.2% of the national total output, ranking first across all provinces [2]. Secondly, Anhui owns a cluster of EV car-related companies, including NIO, BYD, Volkswagen (Anhui), and JAC Automobile [3,4]. In 2023, the output value of the EV car industry exceeded 300 billion yuan. Lastly, Anhui is one of the provinces that shows a very active attitude towards the policies made by the central government, and reacted in a quite rapid way [5,6].

Hefei is chosen because it has contributed 84.5% of the province's total production capacity of EV cars. Anhui has emerged as a key base for China's EV car industry owing to a comprehensive layout, policy incentives and technological innovation [7]. Investment from outside the province and the energy structure are the main factors contributing to the increase in industrial carbon emissions in Anhui [8]. Besides, Hefei government has heavily invested in the EV car industry and provides multiple subsidies and policies that bring convenience to local firms [9].

This article provides research significance in many areas. From a theoretical perspective, this paper enriches the understanding of policy deviation, especially in the context of China. This research also introduces the concept of policy deviation into regional economic and industrial development research, providing an evaluation of the impacts of policies made by the central government and the local ones. This enhances the understanding of relationships between central and local governments at the same time. From a practical perspective, this article reveals the potential negative impacts of policy deviations on the EV industry chain and regional economy, providing decision-making references for the central and local governments, which is likely to help optimize policy formulation and implementation.

The article will focus on the deviation of the EV car industry policies of Anhui Province, Hefei City, and the central government, analyze their economic impacts and propose countermeasures and suggestions. Literature research method and policy text analysis method are the main research methods, combined with the comparative analysis method and case analysis method.

2. Literature review

Previous study has shown how that the deviation of policies is very likely to distort the industry structures and cause potential harm to the future development of China’s economy [10]. The possibilities and origins of policy deviation can be converted into the breakthroughs in optimization of modern policies and institutions [11]. Moreover, fiscal subsidies and other policies are playing a significant role in promoting the industrial foundation and policy design [12].

3. Policy background

The central government of China has established multiple policies and targets related to EV car development. According to the General Office of the State Council of China, it issued a plan in 2022 to promote the high-quality development of new energy in the new era. It requires the governments at different levels to follow the "two carbon" targets and promote the transition towards sustainable energy.

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3.1. EV industry policies from central government

In 2020, the General Office of the State Council of China specifically published a development plan for the EV car industry, encouraging China's EV car industry to transition from "Policy Guidance" to "Market Dominance". It also emphasizes the importance of shifting from "scale leadership" to "technology leadership" to have a more sustainable development in the long run [13]. Five years later, the State Council Information Office reiterates the future plan to continue and optimize the vehicle purchase tax reduction policy for EV cars, to consolidate and expand the advantages of the development of EV cars and accelerate the construction of charging stations, energy storage facilities, and the renovation of supporting power grids [14]. The State Council of China has designated the development of EV cars as a national strategy. The Ministry of Transport of China also stated that it will fully support the transformation towards EV cars [15].

3.2. EV industry policies from province government

For policies published by Anhui, in 2021, the Office of the Anhui Provincial Government issued the Action Plan for the Development of EV cars in Anhui Province. It plans to occupy at least 10% of the EV car market across the country. Besides this, it especially points out the importance of making the whole supply chain of the EV car industry, and aims to have the ability to manufacture approximately 70% of the components used in EV cars. Having 3 to 5 leading vehicle manufacturers, along with a massive amount of measures like constructing accompanying infrastructure such as public chargers, promoting cooperation with other industry centres, and achieving full electrification of vehicles in the public domain [16].

The differences lie in the detailed parts and the degree of importance. Meanwhile, Anhui made specific EV industry support measures, like enforcing the transformation to electric vehicles in the public transportation system and developing local leadership companies. Anhui also bases on its already owned firms to build up a complete industrial chain without fully achieving the broadness of "technology leading" in the whole EV car industry, which is emphasized by the central government heavily.

3.3. EV industry policies from city government

Hefei is the capital city of Anhui province, where concentrated most of the EV car industry of Anhui. Actively following the guidance and targets set by Anhui, Hefei clearly announced to support certain EV car brands to further improve their production capacity, improving the supply chain capabilities of automotive component manufacturers and building sub-segment niche champion enterprises [5]. The government of Hefei city integrates an industrial fund with a total scale of over 60 billion RMB. For instance, in 2020, Hefei invests 7 billion RMB in NIO and further invests 2 billion RMB in 2024 [9]. It also helps Jianghuai Group to cooperate with Volkswagen and construct a new factory in Hefei. It also allocated a large amount of funds to support manufacturers in setting up research centers, company bases, and selling centers in Hefei, and established a special fund to support enterprises in going public and conducting mergers and acquisitions. Many policies are also directly towards the consumers. For example, a maximum subsidy of 5,000 RMB for individual car purchases is implemented, as well as a fee cut in public parking places inside Hefei city for EV car owners and an individual use charger subsidy [17,18].

Most of the policies made by Hefei City from a general perspective are aligned with the aggregate target set by Anhui province and the central government of China. By means of heavy

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asset investment and the cultivation of the industrial chain, provincial goals are supported. However, the ways of promoting EV car development, levels of support and focus range are likely to generate a certain amount of policy deviation at both the provincial level and the government level. The central government of China hopes to make the EV car industry more market-oriented, while the large number of policies made by Hefei is likely to be contrary to this objective. The broadness of the policy is also relatively limited for Hefei, which is tightly forming a partnership with leading enterprises within Hefei and quickly achieving the scale effect. The heavy investment in the EV car industry is not directly mentioned at the provincial and country levels. Though several technology breakthroughs are made by firms inside Hefei City, it inevitably generates concerns of over-speed development ignores the quality.

4. Policy deviation analysis

4.1. Policy objectives deviation analysis

The core objectives for the central government of China are to maintain sustainable growth, lower carbon emissions to reach the carbon emission targets. The central government also wishes to have a more balanced development across the whole country. When it comes to Anhui, it places more emphasis on the scale of output value and the construction of the local supply chain. But the high targets of localizing the supply chain are very likely to lower the quality of development, which is likely to contradict the high-quality development requirements at the central government level [16]. The introduction of large-scale automobile production will inevitably increase carbon emissions in Anhui province. Anhui province likely ignores the potential detrimental to its environment to increase its GDP. It is also very likely to cause an imbalance in development without enough cooperation with other suppliers or manufacturers outside the province. Sustainability in the long term is of concern. As for Hefei, the imbalance of development is reflected in a more salient way, where a very large proportion of the EV car industry is concentrated. At the executive level, Hefei's goal is more focused on rapidly achieving industrial scale and generating economic data that makes it stand out as a leader, to create a better political performance. In 2024, the GDP of Hefei reached 135.077 billion yuan, which increased 6.1% compared with the previous year, while is accompanied by many high-energy consumption programs [19]. The average annual growth rate of carbon emissions in Anhui Province is approximately 3.5% [20]. So, generally, the central government focuses more on long-term ecology, while local authorities, especially at the municipal level, pay more attention to short-term economic data which caters more to their own interest.

4.2. Policy executive deviation analysis

The central government usually only provides vague direction. The ways of interpreting the objectives are highly fluctuating in different provinces. In our example, Anhui province, it regards the EV car industry as a critical area that is highly valued. By contrast, Heilongjiang province only mentions the development in the EV car industry in its officially published future plan, while no real actions or investments are taken. Meanwhile, the subsidies to EV cars are significantly different in different provinces. For instance, for the same "replacement update" subsidy, the upper limit of the subsidy for EV cars in Hebei province is 2.5 times higher than that of Anhui. At the city level, real measures are taken, Hefei through a large amount of investments and a series of guiding policies to promote the rapid EV car industry growth despite the concept of marketization at the central government level. The budget deficit for the Hefei government can also be a problem, and a

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significant opportunity cost is involved. There is no clear instruction on which the local government should be involved in the development. So, it is very likely that a huge deviation is produced [21].

4.3. Resource allocation deviation analysis

The biggest deviation is likely generated at the resource allocation side. One of the issues is the disproportionate allocation of funds which is reflected in excessive concentration and repetitive construction. From the objectives of Anhui province, it is highly dependent on a few leadership firms and that may reduce the development and survival space for small enterprises. Most of the funds are used in doing production scale expansions instead of doing research and development. Meanwhile, the land resource allocation faces the problem of selling at too low a price and allocating inefficiently [22]. For instance, lots of lands are sold at a very low price to EV manufacturers in Hefei to attract those large companies constructing factories in Hefei. The deviation of talent policies is another problem: most talents move to Hefei instead of other places in Anhui. In general, the high risk of imbalance in the whole industrial chain across different places appeared.

5. Policy deviation analysis

5.1. Impacts on the industrial structure

The first possible cause is an imbalance in industrial structure which might cause uneven development of the upstream and downstream sectors. Local governments prefer to directly introduce the whole car manufacturer. This might cause the issue of most core parts still depend on other firms outside the province and convert themselves into an assembly site, in which no real valuable technologies are brought in and might cause excessive carbon emissions. Second, the too massive production is probably causing great resource waste and contradicting to eco-friendly target. It is worth mentioning that excessive supply is taking the EV car selling market into a price war. Quality problems are mentioned quite frequently as well. Public chargers are a typical example, due to overspeed expansion, many public chargers lack maintenance and are in a desolate state [23].

5.2. Impacts on the technological innovation

For the reason that most policies tend to encourage the enlargement of production. Firms prefer to put less money into innovation in order to exchange for larger short-term profits. According to Statistical Bulletin on Science and Technology Funding of Anhui province, the research intensity (research and development expenditure / operating revenue) was only 2.1%, which was lower than the national average of 2.4%. The technology innovation also faces the problem of imbalance. In Anhui, almost a quarter of the funds to the EV car industry sector are invested in NIO a single firm that is the leading firm in Anhui province. This may ignore or limit the innovation potential for those minor firms [4].

5.3. Impacts on the market competition and different regions

When considering the effects on market competition, negative influences have already appeared. The Government of China published an article on Regulating the Competitive Order of the EV car Industry. The different policies in different places already distort the market [24]. Overcompetition can increase the burden on all the firms and governments [25]. At the same time, local protectionism

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is also prevalent, which increases the entry barriers for enterprises from other provinces and causes unfair competition. A prime example is Anhui provides a special subsidy to support firms that develop battery-swapping mode, and NIO is currently the only large-scale EV car manufacturer in China that promotes battery swapping on a large scale (NIO is one of the biggest EV manufacturers in Anhui) [26]. The unfair competition can also be found in the supply chain: many local governments want to protect and help the local firms, so some of them have compulsory policies to require manufacturers who build factories inside their province to prioritize procurement of local suppliers' parts. Policy dependency is derived as well. Many businesses went off as long as the subsidy is removed. Too much subsidy is unable to stimulate the firms to innovate or enhance the competitiveness of their products, creating market failure [4].

6. Conclusion and policy suggestions

The key feature of the policy deviation problem intensifies as the government level gets lower and lower. And the deviation mainly happened in the "grey area" which refers to the area that the upper level of government did not point out. For each level of government, under the guidance of the central government, they are more likely to be self-interested. The deviation mainly appears in objectives, execution and resource allocation, showing by diluting or strengthening certain parts of it, which satisfy the developing strategy of each specific province or city. Among these issues, resource misallocation is the most salient one. The effects of these policy deviations are mainly about the imbalance in development between regions, between upstream and downstream, and between the detailed measures towards different firms. Market disorder, lack of innovation, and overproduction are also issues waiting to be solved. More comprehensive policies are supposed to be implemented to address the problems.

There are a few limitations to this research. The research methods used in this article mainly rely on policy text analysis and case studies, there is a lack of large-sample quantitative empirical analysis. Also, there is insufficient consideration of the dynamics of policies. The policies are constantly changing, this article fails to adequately reflect the lagging effects of policy adjustments and the dynamic changes.

Based on the current situation, several possible solutions are supposed to be considered. The first is to set a rigid constraint, such as setting carbon emission decrease targets to make sure local governments follow the long-run overall national targets. Second is that local governments are required to submit monthly reports on deviations in policy implementation directly to the central government to make sure it is aligned with the central core targets. The local governments should be forced to incorporate the completion rate of long-term goals into the assessment. This can ensure the local government not only focuses on the short-run economic growth. The over intervention of the government also needs to be strictly prohibited. A special regulatory group guided by the central government is supposed to be established to supervise the market and take action to regulate the market when needed. The balanced development across the regions is critical as well. Government at the provincial and city levels should have mechanisms that can directly cooperate with other provinces or cities to enhance cooperation. In general, there are many ways to lower the policy deviation, the key points are to establish a supervision and communication mechanism, and prevent only focusing on short-term profits and having a high-quality development.

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