Air Quality and Local Government Governance in China

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Abstract: China's economy has been growing rapidly for decades. Despite the increasing GDP, its rapid development has caused a string of serious environmental problems, especially air pollution. With the frequent occurrence of serious and complex air pollution phenomena such as smog, China's air quality problem has become a research focus of the international community, which poses severe challenges to the Chinese government to improve its environmental governance capability and governance methods. In spite of the central government's continuous attention to air quality issues, local governments tend to choose economic growth over environmental protection. The law enforcement of local governments to control air pollution is a direct factor affecting regional air quality. China's mode of environmental law enforcement has exposed many problems in the field of air quality control. Through direct leadership of the local Environmental Protection Bureau (EPB), the Chinese government has formed an old administrative mode and a one-sided guiding mechanism with economic development as an indicator. By analyzing the number of days with air quality on and above the Air Quality Level 2 in various regions in China, and by combining the analysis with the GDP of various regions in 2018, this study found that the number of days with air quality on or above Level 2 and the development of local GDP show a positive correlation. Therefore, in response to such management defects, China should focus on strengthening the response and implementation of local governments to environmental policies and form a management structure under the direct leadership of the Ministry of Ecology and Environment (MEE). Local governments should shift from the simple mode of "administrative supervision" to the comprehensive mode of "administrative supervision + coordination" to form a new mechanism of cooperative governance under the leadership of local governments and implemented by the Local EPB, to decompose the overall and stage tasks of air pollution control, and to specifically implement the governance tasks and objectives to specific local government departments and the local EPB. We need to improve the efficiency of regional air pollution control, and effectively curb the deterioration of air pollution.

1. Introduction
Throughout the history, London's Great Smog in 1952, the Photochemical Smoke event of Los Angeles USA in the 1950s, and the smog pollution near a Japanese petrochemical plant in the 1960s all promoted developed countries to control air pollution while developing their economy. According to the statistics of the World Health Organization, the number of deaths caused by air pollution in the world can be up to 7 million each year, 90% of which come from developing countries [1]. The food security problems caused by air pollution on crop destruction and production reduction causes about 5 trillion US dollars in economic losses every year. The food security problems caused by the destruction and reduction of crops caused by air pollution cause economic losses of about US$ 5 trillion per year [2].
The Chinese government has been paying close attention to the development of environmental protection. Over the years, The environmental legislation system has gradually been completed. However, the environmental enforcement by China's Local EPB has little effect. In 2013, Report on the National Environmental Analysis of the People's Republic of China Towards an Environmentally Sustainable Future jointly released by the Asian Development Bank and Tsinghua University pointed out that 7 of the 10 cities with the most serious air pollution in the world were in China, and less than 1% of the major cities in China met the World Health Organization (WHO) air quality standards. In the 2014 "Global Environmental Performance Index" (EPI) ranking list, China ranked 176, ranking third from bottom (178 countries in total), well below the average level of the same income countries [3]. The Environmental Performance Index Report released by Yale University in 2016 once again pointed out that China was already the world's worst hit area for PM2.5, with air quality ranking second from bottom among 180 participating countries. According to the 2017 China Eco-environmental Status Bulletin, 239 of China's 338 cities at prefecture level and above in 2017 exceeded the standard of environmental air quality, accounting for 70.7%. 338 cities had 2311 days of severe pollution and 802 days of severe pollution. The number of days with PM2.5 as the primary pollutant accounted for 74.2% of the number of days with severe pollution and above. According to the data of China's Air Quality Improvement Report (2013-2018), China's economy has continued to grow and energy consumption has continued to increase since 2013. Compared with the year of 2013, China's GDP in 2018 has increased 39%. However, behind its great achievements, China has also become the world's largest emitter of greenhouse gases. The scope and intensity of air pollution have been very serious.

In 2012, China promulgated the new "Environmental Air Quality Standard" (GB 3095—2012), carrying out real-time air quality monitoring and issuing air quality reports for 74 cities including Beijing, Tianjin and Hebei. According to the 13th Five-Year Plan for Ecology and Environmental Protection (2016-2020), the Chinese government has promised and initiated the implementation of the strictest environmental protection system and fought for the prevention and control of air, water and soil pollution. Based on this, it is of great academic significance to study the specific behavior and execution of local governments in controlling air pollution, and to explore and establish an effective incentive mechanism for local governments in the field of preventing and controlling air pollution. In recent years, a large number of relevant research results on air quality have emerged. To some extent, there is a lack of regional analysis. Therefore, it is urgent to sort out and summarize the current research on air quality and economic development in China's environmental governance process, so as to provide reference for promoting sustainable development. According to China's air quality online monitoring and analysis platform and China's environmental status bulletin, 2019 values have not yet been fully published. Considering the completeness of the year, this study uses the new environmental air quality standard to conduct comparative analysis on the relationship between the number of days of air quality grade II or above in various regions of China in 2018 and economic development, providing important empirical basis for the prevention and control of air pollution in China. The logical structure of this study is as follows: The first section discusses the driving factors that affect air quality and the basis of the interactive coupling mechanism between economic development and air pollution based on the data analysis of China's air quality above Grade II in 2018. The second section discusses the coupling relationship between air quality and mutual coercion of economic development based on the analysis of GDP data of various regions in China in 2018. The third section seeks the coordination between the local government and the local EPB, pointing out that we should start from the direction of building a management structure under the direct leadership of MEE and standardizing the environmental law enforcement system, and explore the optimal path of new economic construction under the constraints of air pollution, so as to promote its high-quality development. The conclusion is drawn in the last section.
2. Air quality management and economic development

Table 1: Days of Air Quality Equal to or Above Grade II in 2018 (Unit: Day)

| Region          | Days of Air Quality Equal to or Above Grade II (Day) |
|-----------------|------------------------------------------------------|
| The Eastern Region | 243                                                   |
| The Central Region | 241                                                   |
| The Western Region | 286                                                   |

Source: China Air Quality Online Monitoring and Analysis Platform, China Environmental Status Bulletin

Table 2: Schematic diagram of GDP in 2018 (Unit: Billion)

| Region          | GDP (Billion) |
|-----------------|---------------|
| The Eastern Region | 506311.49     |
| The Central Region | 224094.14     |
| The Western Region | 156318.73     |

Source: Statistical Yearbook, Statistical Bulletin of National Economic and Social Development

The eastern region has made the greatest contribution to China's economic growth, while the economic development in the central and western regions is less obvious, and even some places have stagnated. Data from three regions show that the economic development in various parts of China determines the air quality in the region. Although the factors affecting the ambient air quality in different regions are different, the regional GDP has a great correlation with the regional ambient air quality. The root cause of this difference is that the central government lacks direct control over the local EPB, which leads to the emergence and spread of regional protectionism. Behind the widening economic gap is, on the one hand, due to the fact that after China's decentralization reform, the local EPB is under the management of the local government to obtain human resources, financial resources, etc. The government has absolute autonomy. On the other hand, it is a comprehensive manifestation of the goal of developing local GDP.

The air quality problem has become an important factor that disturbs China's sustainable development initiatives. It is urgent to effectively control the air quality problem. Since the reform and opening up, China's central government has carried out large-scale economy system reform, gradually decentralizing its financial and planning systems. Following this trend of decentralization, although the central government maintains its authority in the making of environmental policies, law enforcement responsibilities have been assigned to local governments [4]. As a result, the Ministry of Ecological Environment has gradually formed, which is mainly responsible for formulating national environmental policies, while the local EPB is mainly responsible for implementing policies [5]. Decentralization is a double-edged sword. On the one hand, it actively promotes the development of China's economy; on the other hand, it generates criticism of abuse of power by local governments. Some scholars have suggested that local governments can use their discretion in law enforcement to protect polluted enterprises, which may damage environmental protection and benefit local economic interests [6]. It is obvious that the enforcement of local government to control air pollution is a direct factor affecting regional air quality. Local governments tend to choose economic growth between the pressure of environmental protection and the economic growth in their jurisdictions, and exchange high investment,
high emission and high pollution for economic growth. Under the constraint of limited resources, local governments bring persistent air pollution to the competition for economic growth and the phenomena of "delay" mechanism and "vacancy" in relevant control links, resulting in market failure in the process of air pollution control. This explains to a certain extent that although the central government has continuously increased the number of air pollution control documents since 2013, the effect of air pollution control in some regions has not changed much. Under the background of regionalization, marketization and economization, the air pollution in a certain region not only reflects the internal governance problems of the region itself, but also reflects the dynamic cross integration of the governance effectiveness of the local government and the local EPB. 

3. Air pollution control strategies

For a long time, China's air quality legislation is not very backward in speed, but the problems in law enforcement have become increasingly prominent in recent years. Optimizing government law enforcement methods and improving law enforcement quality should become the focus of China's current air quality governance, and the relationship between governance quality and governance speed needs to be correctly understood and reconciled. Effective control of air pollution depends on the efforts of local governments. The ultimate control effect is reflected in the coordinated control behavior of local governments and local EPB. Optimizing the local government governance organization system is especially important.

China's mode of environmental law enforcement has exposed many problems in the field of air quality control. Through direct leadership of the local EPB, the government has formed an old administrative mode and a one-sided guiding mechanism with economic development as an indicator. It is especially important to strengthen the interest of local governments in environmental protection law enforcement. In September 2016, the general office of the CPC Central Committee and the general office of the State Council issued the Guiding Opinions on the Pilot Work of Monitoring and Supervising the Vertical Management System Reform of Law Enforcement by Environmental Protection Institutions below the Provincial Level and the relevant work requirements of the Ministry of Ecological Environment. The focus of law enforcement has shifted downward. Administrative penalty cases are mainly territorial, with provincial level focusing on environmental supervision. The circular issued by the general office of the CPC central Committee and the general office of the state Council (No. 64 [2018] of the general office of the CPC central Committee) on "guiding opinions on deepening the reform of comprehensive administrative law enforcement for ecological environment protection" requires that the level of law enforcement be reduced in accordance with the principle of territorial management and downward shift of the center of gravity. Some scholars have suggested that the reform of China's environmental governance should remove the local EPB from the financial control of the corresponding local government, and transfer the responsibility of managing the financial resources and administrative personnel of the local EPB to the Beijing Ministry of ecological environment. [7] The provincial ecological environment department is mainly responsible for supervision and guidance, investigation of major cases and organization and coordination of cross-regional law enforcement. Some scholars also pointed out that the institutional setup and management mode of the U.S. Local EPB are worth learning. Because U.S. regional environmental law enforcement agencies are directly controlled by the Federal Environmental Protection Agency, the tight management system enables the Federal Environmental Protection Agency to guide and deal with environmental pollution and other issues on an ad hoc basis. Therefore, in view of such management defects, this study attempts to propose an alternative practical method, that is, China should focus on strengthening the response and

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1 What needs to be explained is that the impact of economic development with GDP as the core on air quality is on the increase at the national level, with serious impact on the eastern and central regions, but not significant impact on the western regions. Of course, the air quality in the central and western regions of Table 2 is better than that in the eastern and central regions, which does not mean that the local governments in the western regions attach importance to environmental protection and air quality. Instead, the state has set up many nature reserves and ecological barriers in the western regions, such as the Sanjiangyuan Nature Reserve in Qinghai Province, Xilingou Grassland Nature Reserve in Inner Mongolia Autonomous Region, Xishuangbanna Nature Reserve in Yunnan Province, etc. The establishment of these nature reserves has made it impossible for local governments to implement local protectionism.
implementation of local governments to environmental policies, forming a management structure under the direct leadership of MEE, and local governments should change from a simple mode of "administrative supervision" to a comprehensive mode of "administrative supervision + coordination" to form a new cooperative governance mechanism under the leadership of local governments and implemented by the Local EPB. We need to decompose the ultimate objective into phased goals in air pollution control, and implement the control tasks and objectives to specific local government departments and local EPBs.

4. Conclusion
The implementation of environmental policies has no success in policy formulation, and the pursuit of economic growth by local governments at the expense of environmental degradation provides a strong impetus. [8] As for the government, it should focus on strengthening the response and implementation of environmental policies, forming a management structure under the direct leadership of MEE. The local government should change from a simple mode of "administrative supervision" to a comprehensive mode of "administrative supervision + coordination" to form a new cooperative governance mechanism under the leadership of the local government and implemented by local EPBs. It should break down the overall objective into phased tasks in air pollution control, and specifically implement the governance tasks and objectives to specific local government departments and local EPBs. At present, although China's air quality control initiatives have achieved certain results, the actual air quality still fall short of public expectation, comprehensive coordination, and construction of a pluralistic and coexisting air pollution prevention law enforcement system are required.

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