

The Balance between Urban Development and Environmental Protection: Evidence from Chinese Cities

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Abstract

China has experienced a fast-growing economic growth rate over the past decades. Its economic development is mainly attributed to the reform and opening-up of the Chinese government. However, one of the pressing problems our nation faces today is balancing the relationship between economic development and environmental protection. This paper theoretically studies how to equilibrate circumstances and economic advances and aims to find the optimal pathway for solving this imbalance qualitatively. To this end, we propose multiple potential solutions to fixing environmental issues. This paper provides insightful comments on the above mentioned policies, which greatly relate to government, enterprises, and residents.

Keywords

Urban Development; Environmental Protection; Balance; Policy; China.

1. Introduction

China has an integrated industrial system and a large market as the world's second-largest economy, most important industrial country, and largest trader of goods. These are the primary conditions for foreign investors to be optimistic about the Chinese market. Second, China's highly stable political and social environment, reasonable expectations of high-quality economic development, and internationally competitive business environment have provided foreign investors with stable and favorable investment expectations. Third, China's extensive and complete industrial system, high-quality labor force, great attention to scientific and technological innovation, and constantly improving scientific and technological innovation strength provides an excellent investment fertile ground for foreign enterprises engaged in high-tech industries. Due to the pandemic and geopolitics, the Chinese economy is facing the impact of falling demand, supply shocks, and weakening expectations, and the downward pressure on the economy is still considerable. However, the fundamentals of the Chinese economy are sound, and the long-term trend will not change.

However, China's rapid industrial development and economic growth have taken their toll on the environment. China has six main environmental problems: air pollution, water pollution, garbage disposal, desertification, soil erosion, drought and flood. Air pollution is the most environmental pollution problem in China. Over 70 percent of China's 47 major cities do not meet the second-level standards the Chinese government sets. Of the 338 cities that participated in the environmental statistics, 137, or 40 percent of the cities surveyed, had air quality that exceeded China's level 3 standard, making them heavily polluted cities. In 2011, China's annual sulfur dioxide emissions reached 22.179 million tons, soot 11.59 million tons and industrial dust 11.75 million tons (Ministry of Ecology and Environment of China 2012).

In addition, Dangerous water and air pollution levels have become a daily phenomenon in China. Secondly, water pollution is also serious in China. The pollution degree of the seven river systems is in order: Liao River, Haihe River, Huaihe River, Yellow River, Songhua River, Pearl

River and Yangtze River. 42% of the water quality exceeds class 3 (cannot be used as drinking water source). The water quality of large freshwater lakes (reservoirs) and urban lakes was generally poor, and eutrophication was aggravated in more than 75% of lakes, mainly caused by nitrogen and phosphorus pollution. According to statistics before July 2011, more than 400 of China's 660 cities are short of water, and two-thirds are short of water. The annual water shortage in Chinese cities is about 6 billion cubic meters, of which 110 cities are seriously short of water.(China science and Technology Museum 2011-7.13).

Thirdly, garbage disposal problem. China produces 820 million tons of industrial solid waste annually, with a comprehensive utilization rate of about 46 percent. The annual production of municipal solid waste in China is 140 million tons, less than 10% of which meets the requirements of harmless treatment. White pollution caused by plastic packaging and agricultural film has spread across the country. The annual production of industrial solid waste in China is 820 million tons. From 2012 to 2019, the production of industrial solid waste fluctuates. From 2012 to 2016, the production fluctuates and declines (332,509 to 3,144.5 million tons), and after 2017, the production decreases (338,390 to 354,268 tons). In 2019, China produced 3.543 billion tons of industrial solid waste, an increase of 1.68 percent over the previous year. The comprehensive utilization rate is about 46%. The annual production of municipal solid waste in China is 140 million tons, less than 10% of which meets the requirements of harmless treatment. White pollution caused by plastic packaging and agricultural film has spread across the country.(statistic from FORWARD THE ECONOMIST [11]).

The remainder of this paper is organized as follows. Section 2 briefly reviews the relevant literature about environmental problems and policies. Section 3 introduces several solutions proposed to fix the issues. The last section discusses some policy implications and provides some concluding remarks useful to include view orientation in future hedonic pricing models.

2. Literature Review

Since 2013, with continuous economic growth and energy consumption, China's ambient air quality has generally improved (Wang K, Yin H, Chen Y). In 2019, the national average PM_{2.5} concentration decreased by 20% compared with 2015 (Cheng Z, Li L, Liu J.). The effectiveness of various control measures is also reflected in the changing trend of PM_{2.5} component concentration. Taking the Beijing-Tianjin-Hebei region and its surrounding cities as an example, the concentration of significant components of PM_{2.5} in the region decreased in the autumn and winter of 2018-2019 compared with that in the autumn and winter of 2016-2017, among which organic matter and sulfate ion decreased the most, reaching 31% and 42%, respectively, indicating that the coal burning treatment has achieved remarkable results (Jiash H, Li).

The environmental quality in mainland China has improved, but the pollution in many cities is still serious (Aunan, K., Hansen, M.H., & Wang, S. 2018). The suspended particulate matter concentration in the urban atmosphere generally exceeds the standard. Huo, H., & Zhang, Q. 2002) pointed out that sulfur dioxide and nitrous oxide pollution has been high. Therefore, the total emission of vehicle exhaust pollutants increases rapidly.

It should be noted that air pollution is more severe in economically developed areas. China's eastern seaboard is rapidly developing and urbanizing. The production of daily life and industrial waste will be massive (Chan, C.K., & Yao, X. 2008). As time goes by, the garbage in cities will produce harmful gases or pollute the soil, seriously affecting environmental protection. In terms of spatial distribution, air quality in China shows apparent spatial agglomeration and differentiation, with heavy air quality in the north, lighter air quality in the south, and lighter air quality in the east and west. The Beijing-Tianjin-Hebei region and its surrounding areas are heavily polluted. (Chen H W, CAI H Y, Zhang Y) The southern coastal

areas with the Pearl River Delta as the core, Yunnan-Guizhou Plateau, and Qinghai-Tibet Plateau are excellent perennial areas.

Besides, air pollution is also severe in the countryside. In recent years, many yellow-label cars, old cars, and even some illegally modified scrapped cars have flowed into the rural market, transferring pollution sources from the cities to the countryside. Rural China's indoor air pollution is significant and seriously affects human life. It is closely related to chronic obstructive pulmonary disease, lung cancer, respiratory symptoms, and pulmonary function changes in farmers (Tong, R., Cao, L., Yang, X., & Zhang, B.2021). Mainly from burning biomass, especially coal, which harms farmers' health (Bikkina S, Andersson A, Kirillova E N). Above all, economic development and environmental protection are mutually reinforcing (Dogaru L.). We should strike a proper balance between economic development and environmental protection and promote economic development based on strengthening environmental governance and not at the expense of ecological resources and the environment. The 18th National Congress of the CPC emphasized the comprehensive strengthening of ecological civilization construction and put ecological civilization construction in a prominent position in the overall work. Developing a circular economy has become the best balance between economy and ecology.

The rest is about China's policies on environmental protection and economic development[12].

(1) We will innovate environmental and economic policies to promote green production and consumption. We will continue to promote the use of the comprehensive ecological and environmental protection list in the optimization of industrial structures and increase the types of products listed as "high pollution and high environmental risk." We will accelerate the establishment of a pace-setter system for ecological and environmental protection and explore the establishment of pace-setter policies such as government subsidies and financial credit support. We will strengthen the audit mechanism for cleaner production and promote the construction of a green supply chain. We will play the leading role in green consumption and promote environmentally marked products. We will improve green trade policies, promote China's green product standards, and promote green Belt and Road cooperation. (2) We will implement pricing, fiscal, and tax policies and motivate market entities. We will accelerate the implementation of the national pricing mechanism for green development, and local ecological and environmental departments will actively cooperate with pricing departments to establish and gradually improve pricing mechanisms for sewage treatment, solid waste treatment, water conservation, and electricity for energy conservation and environmental protection. Research and improve the market-oriented pricing mechanism of environmental rights and promote environmental rights and future earnings rights to become qualified pledges. Cooperation with tax authorities, vigorously promote the construction of environmental protection tax collection and administration capacity and supporting facilities, and gradually improve pollutant projects and tax standards applicable to the region. Cooperate with relevant departments to formulate preferential tax policies and subsidies for ecological and environmental protection and actively implement preferential policies for enterprise income tax of special equipment for environmental protection and enterprise income tax of third-party governance. (3) We will accelerate the implementation of ecological and environmental projects to unleash effective demand from the environmental protection industry. With the focus on the seven landmark campaigns in the critical battle against pollution, we will advance the construction of significant treatment projects and effectively boost the development of the environmental protection industry. We will guide local governments to plan for the reserve of pollution prevention and control projects and timely disclose project information and investment needs to the public. We will establish and improve the central reserve of environmental protection investment projects. We will improve the performance evaluation system for projects supported by special government funds and include the progress of project implementation, efficiency of operation and maintenance, and performance of services in evaluation. Establish linkage mechanism of

project reserve, implementation effect, and fund arrangement. We will accelerate the formulation and revision of standards and regulations for the discharge of water and air pollutants in critical industries and give full play to the expected role of the standards in guiding and promoting the development of the environmental protection industry.

3. Data Description and Results

Data source[13].

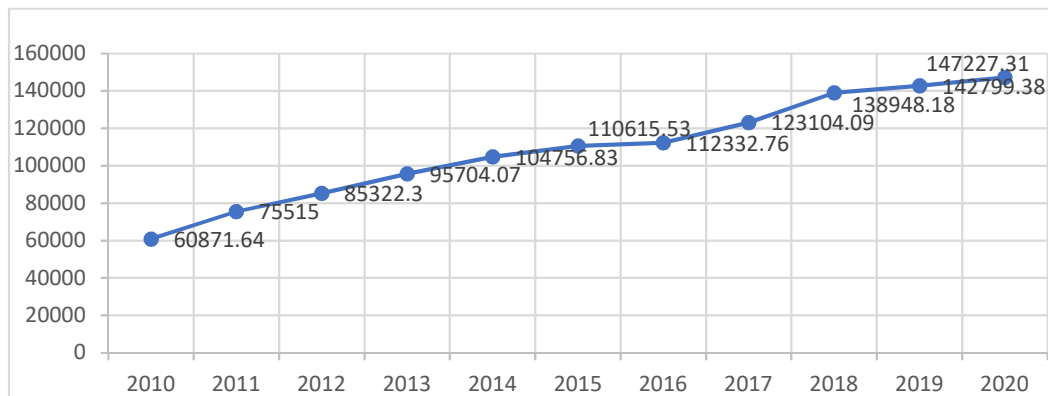


Figure 1. China's GDP(billions of dollars)

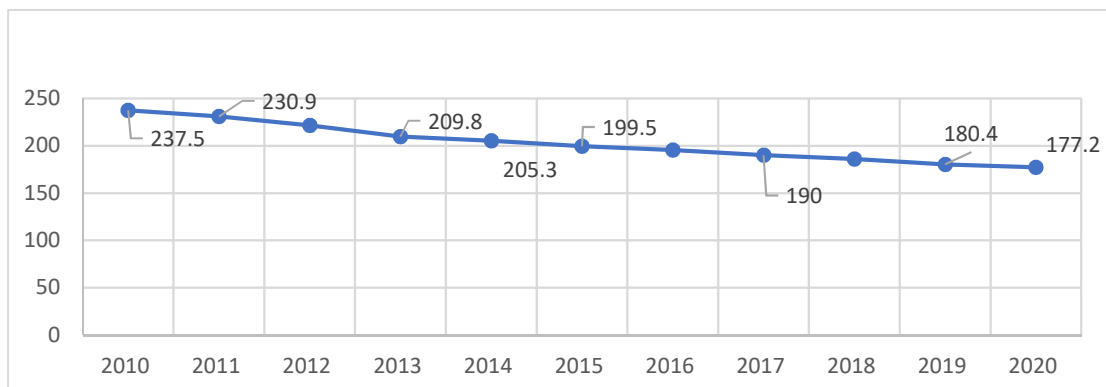


Figure 2. industrial wastewater discharge(100 million tons)

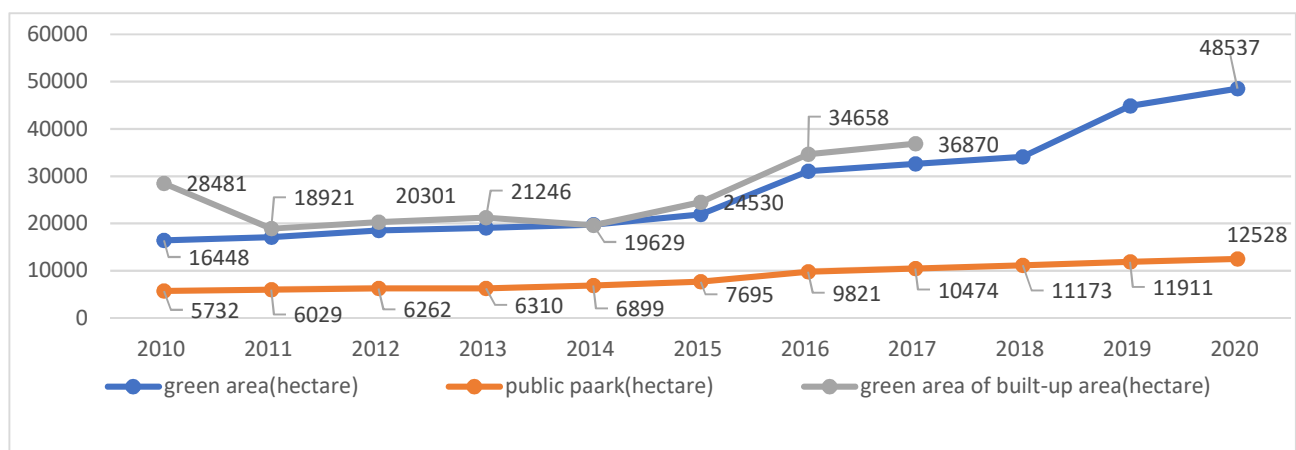


Figure 3. Time trend of air pollution

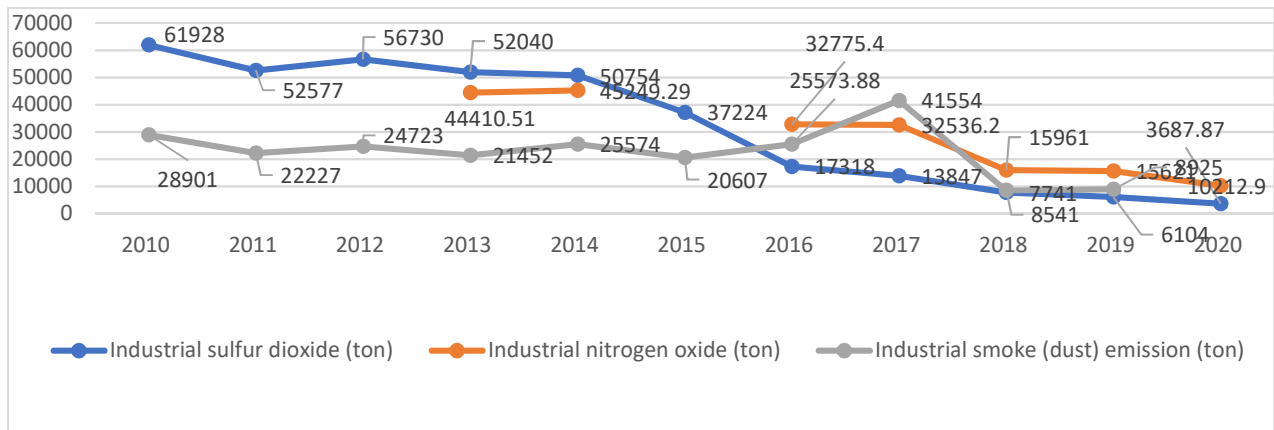


Figure 4. Time trend of air pollution

As can be seen in the GDP line graph, starting at 60871.64 billion dollars, it showed an upward trend to 147227.31 between 2010 and 2020. The figures for Industrial sulfur dioxide and Industrial smoke (dust) emissions represented a downturn from 28901 to 20607 and 61928 to 17318 tons between 2010 and 2016 in Chengdu, respectively. It is worth to worth noting that under the influence of the policy, the green area has been rising, from 16448 to 48537 hectares.

4. Results

For the coastal cities with higher GDP, firstly, they should strengthen coordinated management of river basins and sea areas. Taking "ecological priority and systematic protection" as the fundamental starting point, we will accelerate the comprehensive treatment of crucial sea areas, establish a joint mechanism for the prevention and control of pollution in river basins, estuaries, and coastal waters, and promote the protection and construction of beautiful bays. To trace the source of sewage discharge into the sea as the starting point, classify critical problems, and comprehensively eliminate untreated sewage directly discharged into the sea phenomenon. We will carry out a comprehensive campaign to eliminate pollution in rivers flowing into the sea, control the inflow of runoff that causes eutrophication of water bodies, and strengthen the control of total nitrogen and phosphorus pollution in rivers flowing into the sea. It is suggested to study and determine the scope of crucial sea areas in the coastal waters, and formulate guidelines or guidelines for the division of crucial sea areas and their control areas, to further clarify the division principles of key sea areas and their control areas. Strengthen the sea as a whole in the vital area of the ecological environment management system and management ability construction, to establish the same basin area inland sea as a whole system of ecological environment protection, standards and specifications, control, management standards and requirements, land, and sea as a whole the synergy strengthen water ecological environment comprehensive management and protection, establishing regional cooperation mechanism, strengthen the organization and coordination, We will strengthen the coordination of the vertical (upstream and downstream areas of rivers entering the sea) and the horizontal (key sea areas and coastal areas involved in the control areas of key sea areas) to lay the foundation for building a Marine ecological, economic circle in an all-round way. Secondly, we will intensify efforts to protect ecosystems. We will set higher protection standards and adopt stricter protection measures, such as a ban on fishing and fishing, and strengthen the comprehensive management of coastal waters, the protection and restoration of ecosystems, and the construction of beautiful bays. We will vigorously promote the comprehensive protection, management, and restoration of coastal sea ecosystems and shorelines. Establish a complete range of coastal wetland types of natural protected areas, strictly control the total area of coastal wetlands, and determine the list and area of essential protected coastal wetlands in

batches. We will speed up efforts to improve the ecological environment of estuaries and bays and steadily and effectively carry out approved renovation and restoration projects in estuaries and bays. Pilot projects will be carried out to restore the topography and ecosystems of typically damaged islands. For the protection of coastal biodiversity, we will conduct a Marine biodiversity survey, monitoring, and assessment to understand the background of Marine biodiversity in coastal waters and establish and improve a Marine biodiversity monitoring and assessment network system. Priority conservation areas will be designated for rare and endangered Marine mammals, birds and another Marine biodiversity, and standards for no-fishing and no-fishing will be formulated to control the intensity of fishing within the protected areas strictly.

For the cities in the western region, (1) Rational industrial distribution. This is an important measure to solve air pollution. Factories should not be over-concentrated to reduce the pollutants emitted in an area. The relationship between chemical plants and raw material supply should also be put together to reduce the emission of waste gas through comprehensive utilization of waste gas. (2) Reduce the pollution of traffic exhaust. Reduce vehicle exhaust pollution, adopt preferential policies, improve the quality of vehicle gasoline combustion, and reduce harmful emissions. (3) Afforestation. Trees can purify the air and significantly improve the urban environment. Therefore, afforestation should be strengthened to improve urban and afforestation areas.

On top of the local governance, from the nationwide perspective, balance the national natural resources and urban development in China.

(1) Actively adjusting the economic structure. This is the main direction of accelerating the transformation of the pattern of economic development. It is also a fundamental measure to prevent and control pollution at the source. Adhere to the road of new industrialization, vigorously promote the optimization and upgrading of industrial structure, speed up the development of advanced manufacturing industry and high-tech industries and services, also form a conducive to resource-saving and environment protection industry system: the development of circular economy and realize resources products recycling; strictly implement national industrial policy, resolutely eliminate backward production capacity. (2) Promote the progress of environmental science and technology. International experience shows that the maintenance or improvement of environmental quality must rely on scientific and technological progress. We must speed up the implementation of primary environmental science and technology projects to prevent and control water, gas, and heavy metal pollution and strive to make breakthroughs in generic and core technologies. (3) Implement total emission control. We will strictly implement the responsibility system for total emission reduction targets, fully play a critical role in environmental impact assessment, and ensure access to the system. (4) We will introduce market mechanisms and use economic leverage well. Pollution control cannot be driven solely by laws and administrative forces. It is a long-term solution to actively promote the role of the market. We will implement the emission permit system and develop the emission permit trading market. (5) We will improve the testing system and weave a dense prevention and control network. We will strengthen the development of an advanced environmental detection and early warning system, increase the screening and assessment of hidden risks, and nip environmental pollution incidents in the bud. (6) To participate in international cooperation in the governance of environmental issues. As a responsible major environmental country and a major developing country, China should actively participate in international cooperation in the field of the global environment. In multilateral environmental cooperation, we should adhere to fairness, justice, and reasonableness principles, actively participate in it, strengthen dialogue and seek joint development. We will vigorously strengthen and promote cooperation with neighboring countries or relevant regions and participate in the institutionalization of regional cooperation.

5. Conclusion

China has adopted several measures to strengthen environmental protection over the past 30 years, especially in recent years. Positive progress has been made. However, the environmental situation is still dire. Citizens' awareness of environmental protection is not strong. The ecological environment depends on the citizen's good environmental protection awareness, closely related to social and economic development, education level, and the rule of law construction. It has to admit that the environmental protection awareness of people in our country is still low.

"The challenge for humanity is not just to alleviate poverty, but in the process to build an economy that is compatible with the nature of the planet: an ecological economy that is sustainable," said Lester Brown, a former adviser to the U.S. Secretary of Agriculture. Survival and development is the eternal theme of human beings. Social development is a process of coordinated development between human beings and nature. Natural history and human history restrict each other. Once the harmonious relationship between human beings and nature is destroyed, the development of society will have disastrous consequences. Develop in the face of increasingly depleted natural resources. To be or not to be is a question.

References

- [1] Aunan K, Hansen M H, Wang S. Introduction: air pollution in China[J]. *The China Quarterly*, 2018, 234: 279-298.
- [2] He, K., Huo, H., & Zhang, Q. (2002). Urban air pollution in China: current status, characteristics, and progress. *Annual Review of Environment and Resources*, 27, 397.
- [3] Wang C, Xu J, Yang L, et al. Prevalence and risk factors of chronic obstructive pulmonary disease in China (the China Pulmonary Health [CPH] study): a national cross-sectional study[J]. *The Lancet*, 2018, 391(10131): 1706-1717.
- [4] Bikkina S, Andersson A, Kirillova E N, et al. Air quality in megacity Delhi affected by countryside biomass burning[J]. *Nature Sustainability*, 2019, 2(3): 200-205.
- [5] Chan C K, Yao X. Air pollution in mega cities in China[J]. *Atmospheric environment*, 2008, 42(1): 1-42.
- [6] Cheng Z, Li L, Liu J. The effect of information technology on environmental pollution in China[J]. *Environmental Science and Pollution Research*, 2019, 26(32): 33109-33124.
- [7] Jiash H, Li C. Spatiotemporal analysis of China's agricultural bulk coal governance[J]. *Sustainable Energy Technologies and Assessments*, 2022, 51: 101945.
- [8] Wang K, Yin H, Chen Y. The effect of environmental regulation on air quality: A study of new ambient air quality standards in China[J]. *Journal of Cleaner Production*, 2019, 215: 268-279.
- [9] Dogaru L. The importance of environmental protection and sustainable development[J]. *Procedia-Social and Behavioral Sciences*, 2013, 93: 1344-1348.
- [10] Xiang-chao P. Research on Xi Jinping's thought of ecological civilization and environment sustainable development[C]//IOP Conference Series: Earth and Environmental Science. IOP Publishing, 2018, 153(6): 062067.
- [11] <https://d.qianzhan.com>.
- [12] <https://www.mee.gov.cn>.
- [13] <https://www.swguancha.com> cn.chinagate.cn pt.people-energy.com.cn.