



Research Article

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## The economic analysis on the haze governance

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### ABSTRACT

*This article analyzes our country's haze situation and governance issues from the perspective of economics, and is mainly discussed by the principle of externality smog problem. The article points out that "market failure" and "government failure" is the economic root that causes the haze problem. Then, this paper analyzes the governance mode selection of haze problem. Finally, in view of China's national conditions, puts forward the countermeasures of the current atmospheric pollution advice.*

**Keywords:** Haze governance; Market failure; Government failure

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### INTRODUCTION

In recent years, the haze weather has become a significant impact on China's air pollution phenomenon in cities and regions. It is because the atmosphere caused by PM10 content exceeds bid badly, PM2.5 is just the "culprit" of this serious air pollution. Since 2013, the central and eastern regions in China has happened the larger range of haze weather process for many times. On January 13, 2013, Beijing meteorological observatory issued the first haze orange alert in Beijing meteorological history. After that, the China meteorological administration revised the haze warning standard on January 20, for the first time put the PM2.5 as one of the important indexes of haze warning. In December 2013, haze weather had a wide range of incoming again. This time the large area of haze weather caused by the "magic" Shanghai quickly transformed into "foggy city", and twice launched the heavy air pollution early warning quality in 5 days. In the haze weather, people's travel convenient is affected, travel security is threatened, each big hospital in patients with respiratory diseases increased dramatically, the masks and air purifier in stores become the most popular products. Haze weather has become a serious killer threat to people health and living environment, the governance of haze weather has become the focus of the current and future environmental governance in our country. This article will analyze the reasons for the formation of haze weather from the perspective of economics, aims to study the relationship between economic development and haze governance. Seeking with the minimum labor cost to achieve both can promote economic development, and governance haze weather, make the implementation of measures and the way to improve the air quality in China come true.

At present, there is few the economic analysis of literature to haze weather governance theory, is the study of air pollution characteristics during the fog, and most of these studies are only for a particular city, has a geographical limitations. Therefore, The writing of this article, is expected to have contribute a force from the perspective of economics for fog weather governance.

## 2. THE ECONOMIC CAUSE OF THE HAZE PROBLEM

Speaking of the root reasons of environmental problems, one is the impact of natural factors, the second is due to the influence of social and economic factors (Wang Y.B., 2003). From the cause of the haze weather has both natural factors, social and economic factors. The natural factors mainly due to the adverse weather conditions continue to accumulate pollutant. As the urban has low atmospheric pressure, and the wind speed is slow, small particles in the air at low air concentration can't spread, high humidity of the air make the droplets mixed with fine particles to form larger particles. The dense location layout in urban pollution to each other between the conduction, and then promote the pollution.

The social and economic factors is mainly due to the unreasonable energy consumption structure, industrial emissions, mechanization degree unceasing enhancement, and the urbanization construction dust and synthetic. Since China's reform and opening up, with the steady growth of our country's economy, the enterprise in the process of production have a more and more serious pollution to the environment. The formation is mainly due to the unreasonable energy consumption structure, industrial emissions in the process of production of our country's enterprise, and the mechanization degree unceasing enhancement, the urbanization construction dust and synthetic. This article will research the external conditions of the fog haze under the premise of the natural environment conditions, and then discuss the choice of the ways of governance of haze weather on the basis of preamble.

Externalities, refers to the affects that some economic activities generate to others or to the public, but the economic subject doesn't need to include these affects into their production cost, transaction cost and prices. Externality is a kind of economic power to another economic power's side effects of "nonmarket", there are positive and negative externality. When the social cost caused by the market subject's behavior is greater than the private cost, then the negative external effects will be produced. When the market subject's behavior generates a social benefits that outweigh the private benefits, then the positive external effects will be produced. Whether the existence of positive externality and negative externality will result in that the economic activity in conformity with the private benefits and social benefits, private cost and social cost, thus the price of a product cannot really reflect the social marginal cost/benefit of resources, this leads to the phenomenon of "market failure" and lead to the inefficiency of resource allocation.

For the haze problem, because of air pollution caused by negative externality, the commonality of air resources and the existence of environmental information asymmetry, the excessive emission of air pollution by the enterprise is hard to reflect through the way of trade, namely environmental resources configuration has the phenomenon of "market failure". As a result of the existence of "market failure", and the market mechanism itself cannot eliminate externalities, so it becomes useless to solve the problem of haze through the use of market mechanism. Japanese economist Masu Uekusa has pointed out, that if there is imperfect competition, externality and information asymmetry problem in the process of economic operation, then the government intervention has the potential to solve the problem. This can give our government the theory basis that they could solve the problem of haze through intervention.

However, in a long period of time, the government of our country don't have a conscious realize of the restriction relationship between the air quality deterioration and the economic growth. Also, the air quality deterioration that along with the economic growth to produce did not cause the attention of the government departments should have. Although as early as 1995, the Chinese government put the sustainable development strategy as one of two governing strategy, the environmental pollution caused by production problems still just as related to the economic development issues to get the attention of the environmental protection department, and not in the national overall development strategy and the policy are not fully reflected. The failure of the market regulation and the lack of government regulation, led directly to a sharp deterioration in the quality of air in the process of the economic development of our country. In recent years the increasingly serious fog haze weather phenomenon was gradually aroused the top government for warning smog harmfulness, makes the management of the government for smog problem increasingly on the agenda. However, how is the effectiveness of the governance of smog problem and geometry? This paper will have an in-depth analysis, and accordingly puts forward countermeasures and suggestions to the fog haze governance problem.

## 3. THE ANALYSIS OF THE HAZE EXTERNAL PROBLEM

In a sound property rights system, the market have a effective fundamental role in the allocation of resources through the price mechanism. The price changing reflects the degree of resource scarcity and the change of demand,

and thus make the best economic efficiency choice of stimulating production and consumption link, make the consumption and production to achieve pareto optimality, namely the marginal social benefit (MSB) must be equal to the marginal social cost (MSC). The marginal social benefit (MSB) must be equal to the marginal private benefit (MPB). Marginal social cost (MSC) must be equal to the marginal private cost (MPC). But, due to the unclear of the property rights definition, there are a lot of conditions on environmental issues that can't meet the pareto optimal state. Therefore, there comes to the environmental pollution problems, such as haze, "market failure". Haze of external reasons could analyzed from the following two aspects.

### 3.1. The negative externalities of the haze problem

Negative externalities refer to the negative spillover effects on the others by per unit product of production or consumption. Due to the bounded rationality of environment subjects and public characteristics of environmental resources, environmental pollution behavior has a strong negative externality. Haze problem is a kind of manifestation of environmental pollution, the environmental pollution is mainly refers to the contaminants or discharged into the environment pollution factors from human activity, exceeds the environmental capacity and environmental's self-purification ability, make the environment of the constitution and the state changed, and either the deterioration of environmental quality, thus influence and destroy the people's normal production and living conditions. Fog haze have a serious impact on people's daily life and the normal travel, this is what the reflects of the negative externalities of fog haze problem. The negative externality of haze problem is refers to the market subjects passed the adverse effects caused by the air quality on to the society as a whole, and does not bear corresponding responsibility of its own. For example, companies in the unreasonable energy consumption in the process of production, the excessive discharge of industrial waste gas, the improving motor vehicle ownership put excessive discharge of harmful gases into the atmosphere, causing a rapid deterioration in the quality of atmosphere, the cost is usually assume jointly by the whole society, and the corresponding gains for atmospheric quality damage the exclusive market players. And, if we only consider the private costs, regardless of the social costs, then there will be overly stimulating activities with negative externalities. Just like, a factory only pays attention to its own economic interests in the production process, and ignores the product industrial emissions to the quality of atmosphere. Under the production concept, the cost of the enterprise in production will be very low, the profit in per unit of product is very high. Which seems like we should significantly expand the production. But because it caused serious air pollution and brings a great burden to the society, it is not should to expand production considering from social costs. It can be represented in figure 1.

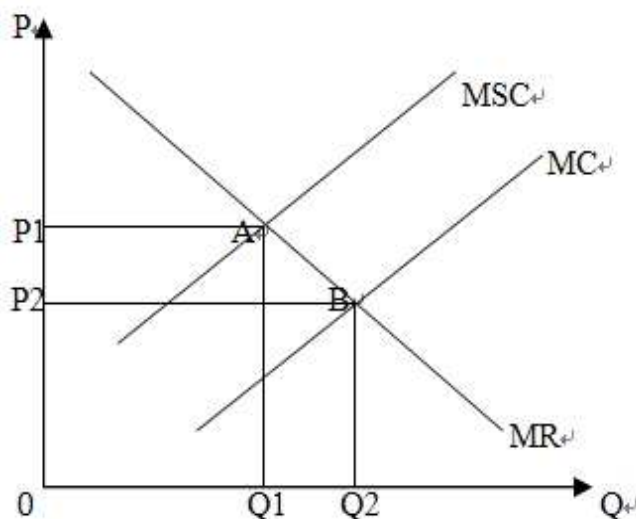


Figure 1. Negative externalities of haze problem

The marginal cost curve is the supply curve, thus supply is determined by the cost. MR represents the demand curve. If we don't consider the social costs, then the manufacturers will be producing at point B, the equilibrium output will be in  $Q_2$ , price is  $P_2$ . If we consider the social costs, the manufacturer's optimal production point should be point A, the efficiency of the production would have been reduced to  $Q_1$ , prices rise to  $P_1$ . That is to say, if the factory take the pollution treatment costs, then the cost curve will shift from marginal private cost (MC) to the

marginal social cost (MSC), namely the cost rise. Thus the demand of products reduced. Visible, if the subject of pollution does not undertake to atmospheric pollution treatment cost, they will press the private cost of enlarging production to  $Q_2$ , cause serious influence to the atmospheric quality. This situation shows that, from the point of the whole society, resources did not achieve the best configuration. The appropriate output from a social point of view is only to be  $Q_1$ , the price should be the  $P_1$ , so we can to deal with the pollution. If there is no corresponding constraint mechanism, the producers will proceed its economic activities from the maximize of their own interests, they will in the private cost (MC) is equal to the private benefits (MR) levels. Obviously, because of the deviation of the private cost to society, and private the optimal level of economic activity is bounded to deviated from the optimal state of society. The reality is too much pollution production performance result in pollution levels.

### 3.2. The positive externalities of haze governance

Positive externalities refers to a person or a group of people's decision making others better. Positive externalities of haze governance refers that, the market subjects improve the quality of atmosphere, but the benefits of the improvement in quality is not exclusive, and it must bear the full cost of atmospheric quality improvement alone. Production enterprises in the process of production, for example, emissions of industrial waste gas discharge, make the residents around the factories have enjoyed the improvement of air quality, and then the residents will not pay for it. Manufacturers could only bear the cost of industrial waste gas treatment alone, and can't be compensated. Therefore, if the incentive mechanism is not sound, it can produce opportunism behaviors of the "free rider" on the improvement of air quality problems. Namely the market subjects are reluctant to take the initiative to pay for public goods, they want to let others to provide public goods, and free to enjoy themselves. In this way, they can't realize the most effective use of social resources. For instance, a factory keep corporate social responsibility, in order to make its produce emissions on the quality of the atmospheric pollution to a minimum in the process of production, it discharge of industrial waste gas emissions of manufacturer's processing. Under the production concept, enterprise production cost is higher, profit per unit is low. Thus producing seems not be to expanded. But due to its handling of industrial waste gas, its production's quality have small influence to the atmosphere, the marginal social benefit (MSR) it brought about is greater than its marginal revenue (MR). For society, its production is suitable for further expanded, thus result in market failure, which can be represented in figure 2.

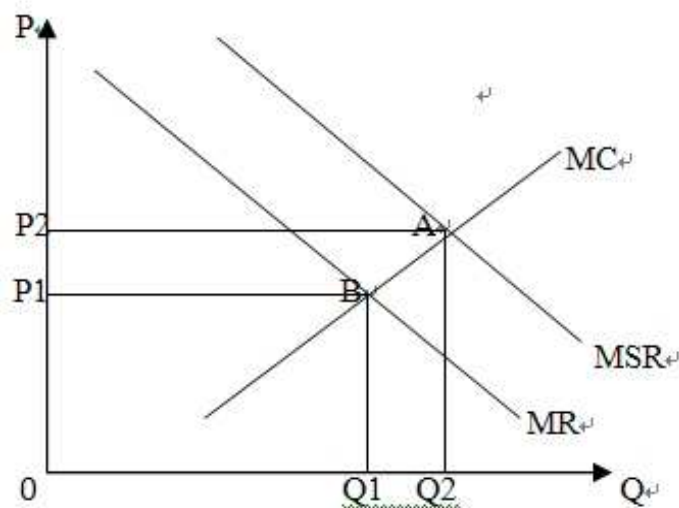


Figure 2. Positive externalities of haze governance

Marginal revenue curve is the demand curve, because the income is determined by the demand. MC represents the supply curve. Without considering the social marginal benefit, the manufacturer's optimal production point should be point B, equilibrium output is  $Q_1$ , price is  $P_1$ . If we consider the social marginal benefit, the manufacturer's optimal production should be point A, the efficiency of production increases to  $Q_2$ , prices rise to  $P_2$ . That is to say, as companies adhere to the corporate social responsibility, dealing with the industrial waste gas emissions, then the product of marginal revenue will be less than the marginal social benefit, the demand for their products will rise. This suggests that, from the point of view of the whole society, although the manufacturer in accordance with the production that most suitable for their own production, its production did not achieve the optimal allocation of

resources of the society. That is to say, from the point of the whole society, the best production should be  $Q_2$ , the price should be the  $P_2$ , so that the utilization of social resources to achieve the highest. If there is no corresponding incentive mechanism, the producer proceeds with production from profit maximization of their own, it will let its economic activities in marginal private benefit (MR) is equal to the marginal social benefit (MSR) levels. Obviously, because the marginal private benefit and marginal social benefits, private the optimal level of economic activity is deviated from the optimal state of society, the reality of it is conform to the social welfare maximization of production.

#### 4. THE GOVERNMENT FAILURE IN THE FOG HAZE GOVERNANCE

Government Failure, Government Failure, sometimes referred as the non-market Failure, is a series of inefficiency of public resource allocation that intervened by the government. The government failure tends to deteriorate the market failure (David L.W., 1999). In many cases, government failure and market Failure often interact each other, forming a Passive Government Failure.

The type of government failure is usually associated with the government's administrative system. The idea was created by American economist Roland. McCain (Roland M.C., 1965). It caused academic attention in the 1970s due to the popularity of public choice theory. The concept of government failure is: even if a particular market can't meet the standard of perfect competition, government intervention may make the economic environment worse. Market failure is not the failure of a special economic solutions, but it's a problem that hinder the market to achieve ideal efficiency. The same to its concept, government failure is not the specific of the failure of government policy also, it's a hinder the effectiveness of the aim of the government to solve problems. Government failure are common in the demand and supply (Connolly, *et al.*, 1999).

Government failure is very complex. Usually it will have different degrees of similarities and actions with the political system and government structure. Although it's extremely difficult for analysts to accurately analyze the results of government failure, a degree of prediction and analysis can avoid the worst the validity of the results led by the policy. In the governance of haze problem, because of that the government can't obtain the completeness and asymmetry of information, and the existence of the limitations in public decision-making, policy implementation of time delay and the rent-seeking activities, made the government can't formulate environmental laws and regulations as a "rational man", and can't enforce the law strictly law. "Government failure" accordingly appeared. As a result, we must consider the existence of the phenomenon of government failure when we to discussing the haze in the process of governance, thus we can put forward measures and suggestions more accurate.

#### 5. THE MODE SELECTION OF HAZE GOVERNANCE

Due to the external characteristics of haze problem, there are many problems and difficulties in the governance of haze problem. From the point of view of economics, the reason why there are difficulties and problems in solving the haze problem is the external characteristics of haze problem. And the existence of that the government can't obtain the completeness and asymmetry of information, the limitations of public decision-making, policy implementation of time delay and the rent-seeking activities, make the government can't formulate environmental laws and regulations and can't enforce the law strictly as a "rational man". Then "government failure" accordingly appears. Further more, the correction of market failure is not the main goal of government intervention, and the stability of the economic growth in the practical choice is superior to general environmental goals. The government's intervention often have to strengthen the government's policy rather than correcting the trend of resources and environment market distortion (Regier, *et al.*, 1989). This shows that in the governance of fog haze issues, the field of "market failure" is not necessarily be "government efficiency", "market failure" and "government failure", so the air quality become worthy of the name "Commons". To promote the coordinated development of economy and environment, it's impossible to regulate only by the government or only by the market (Cai N., 1995). Now we will analyse the effect of several of the effective haze market mechanism and government intervention.

Market effective and governance effective, government failure and market failure exists the following four conditions: (1) the market effectively, the government effectively; (2) the market effectively, government failure; (3) market failure, government effectively; (4) market failure, government failure. After analysis of these four possibilities, we can draw the following conclusion:

- a. The combination of market effective and governance effective is possible. And at this time, there will be no environmental problems. But both can only appear at one time could only in the case of complete information effectively;
- b. In some cases, the choice between market mechanism and government intervention is not only must be between perfect and imperfect, but also could between the degree and type of incomplete, and also between the type of defects.
- c. Make the choice more inclined to market mechanism, then the system will face more risk of "market failure". Make the choice more inclined to government intervention, the system will face more risk of "government failure".
- d. When facing "market failure" and "government failure" at one time, air quality will deteriorate further. Then haze problem becomes a unsolving problem forever. Haze governance gets into trouble. In this case, we must introduce new mechanism or system to control air pollution.

The analysis shows that the reason of the haze problem is not just a "market failure" or "government failure". But also the more fundamental, more fundamental reason. To solve the problem of haze, first of all, we must avoid the "market failure" and "government failure" as far as possible, let the market mechanism and government intervention play efficiency as more as possible. But due to the existence of incomplete information and asymmetric information, the market is unlikely to be completely competitive market, and the government also can't be with a complete information of the government. Then comes to the effectiveness of market and government, and the probability is less than the probability of "failure". In this case, as long as we can find as much as possible to reduce or avoid the "market failure" and "government failure" in the system arrangement, we can solve the problem of air pollution better. Namely that institution failures is fundamental and basic reason of haze problems, "market failure" and "government failure" is merely a product of the "system failure".

Based on the analysis above, in order to solve environmental problems and the low economic efficiency and social injustice led by environmental problems, modern economists put forward a series of measures, altogether there are two main types: One is the environmental regulation. Second is the economic incentives, namely environmental economic means. Though, these two kinds of environmental control measures have certain effect to prevent environmental degradation, but because under the guidance of thought that they are both in the traditional thought that the environment problem can be solve through market mechanism and government intervention. The practice proved that they did not solve the problem of environmental pollution effectively, the implementation of the environmental governance must also from other aspects.

For now, in the process of dealing with environmental problems, there are two main types of direct control and ways of combination of economic incentives: (1) Use a combination of economic means and control means. Look from the definition, some economic means itself is a part of this kind of combination, such as emission permits trading is established on the basis of the regulation means, according to the environment standard to determine pollution gross, converting total sewage discharge permit allocation or auctioned to each enterprise pollution charges are often combined with controls, or to strengthen the control, or to obtain the necessary funds. (2) The economic means could be priority to existing control measures of adjustment or new rules formulated, or major control measures because this needs time, especially when it comes to international institutions more. Economic means with fiscal settings can often before the actual execution, so that it can make effective implementation of relevant regulation. In addition, combination between two different economic means also been recognized as a combination of effective environmental governance. For example, tax difference methods is a tax on traditional products and a means of cleaning products subsidies (Shen M.H., 1997).

## 6. THE COUNTERMEASURES AND SUGGESTIONS OF HAZE GOVERNANCE

Through the analysis above, we believe that the measures of the haze governance should be diverse. In protecting the atmospheric environment, on one hand, we need to make all aspects of the actors, such as legislation and law enforcement agencies, social organizations, the media, enterprises and residents all play its unique role, forming a proper relationship. On the other hand, administrative control, legal sanctions, financial penalties, moral and public pressure to inspire also need to form a reasonable structure. That is to say that both mechanisms exist the possibility of failure and risk. For this, this article puts forward the following Suggestions of haze governance:

- (1) Make full use of the basis of social public power. To solve the problem of haze thoroughly, we need to put social forces in foundational status. Rely both on market mechanism and the premise of government intervention, improve people's environmental protection consciousness, and improve the social mechanism and informal institution, etc.

We can get twice the result with half the effort through arouse both of the public and the enterprise. In the long run, improve the level of education, enhance the public's environmental protection consciousness is more effective than simple administrative intervention.

(2) Improve the economy mechanism of atmospheric pollution governance. First of all, we must strengthen the efforts of environmental protection management system reform, overcome "government failure" of environmental governance, create conditions to let the market mechanism to play a greater role on the control of atmospheric pollution. At the same time, strengthen the regional air quality monitoring and recording. This is the premise condition of improving the work of environmental air pollution according to the market value law applied economic means.

(3) Increase environmental investment, promoting the industrialization of environmental protection. There exists a negative correlation relationship between the environmental protection industrialization degree is higher, the degree of environmental degradation, the more light. Industrialization of environmental protection is to prevent environmental pollution, protect the ecological technology guarantee and material basis. Therefore, we should speed up its industrialization. This needs to increase the environmental investment.

(4) Learning and using the experiences of atmospheric pollution governance in developed countries. Since the 1960s, many developed countries realized the improvement of environmental quality by different environmental pollution control countermeasures. The price also varies widely. For example, Britain pays more attention to the relationship between economic development and environmental improvement than the United States, and have a better practical operation and the effect. Therefore, we should not only strengthen the environmental legislation in our country, makes the pollution of the environment has a strong legal support. But also deal with the relationship between the economic development and environmental improvement.

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