

# Chapter 73

## The Social Costs of Rent-Seeking in the Regulation of Vehicle Exhaust Emission

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**Abstract** The regulation of vehicle exhaust emission requires the regulators to establish the vehicle exhaust emission level desirable for the society and then select inspection agencies to check every registered vehicle periodically. Both these decisions create opportunities for rent seeking. In this paper, we present the incentives of rent-seekers for being selected as inspection agencies and analyze the consequences for social welfare. We find differences in firms' rent-seeking choices compared to a traditional rent-seeking model. We see that a fundamental aspect of firms' incentives to seek rent depends on the number of incumbent inspection agencies and the present value of every successful rent-seeker's rent income, which mainly depends on the distortion degree of inspection process and which is inversely related to social welfare.

**Keywords** Rent seeking · Regulation · Vehicle exhaust emission · Social costs

### 73.1 Introduction

Substantial resources are devoted to altering government policies in the form of rent-seeking in China. It is unanimous among economists that rent-seeking is socially wasteful, if rational from the rent-seeker's perspective. The entire

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literature on rent-seeking that has developed over the past 40 years has focused on (a) building rent-seeking contest models from different perspectives, such as under varying cost structure, under uncertainty, and with the assumption of rent-seekers being symmetric or asymmetric, risk-neutral or risk averse, and so on (Stein 2002); (b) discussing the scope of the social costs of rent-seeking activities; (c) studying how the following factors influence rent-seekers' expenditures at equilibrium: the marginal return of rent-seeking, the winning chance of rent-seeking, that is, the probability of being successful, and entry costs, etc. (Ritz 2008; Anderson and Freeborn 2010). So far, economists have almost clarified the scope of the social costs of rent-seeking, which, at first, were considered to consist of "Harberger Triangle" and "Tullock Rectangle", then include the social cost of improper selection of high-cost producers in the rent-seeking contest, the social cost of policy-making in the rent-seeking contest and the social cost that the whole economy incurred because of rent-seeking (Sobel and Garrett 2002; Ihuri 2011; Gao 2011).

Rent-seeking is quite rampant and prevalent in the transition of China from the planning economy to the market economy with the Chinese characteristics and it has led to serious distortion of government policies. The regulation of vehicle exhaust emission is no exception. Rent-seeking in the regulation of vehicle exhaust emission has caused large social loss to the sustainable development of the Chinese economy, so the development of low-carbon transportation and logistics has attracted increasing attention in recent years in China. The purpose of this paper is to report our first-stab efforts in this regard. We build a slightly different model from Tullock's classic Efficient Rent-seeking model to analyze the social costs of rent-seeking in the regulation of vehicle exhaust emission. Our findings, based on the regulation of vehicle exhaust emission in China, verify the existence of the social costs to rent-seeking.

This paper is organized as follows. Some realistic rent-seeking cases in the regulation of vehicle exhaust emission in China are presented in [Sect. 73.2](#). [Section 73.3](#) contains a model slightly different from Tullock's efficient rent-seeking model to analyze the rent-seeking contest and a presentation of other social costs in addition to the direct rent-seeking expenditure in the regulation of vehicle exhaust emission in China. [Section 73.4](#) offers conclusions and suggestions for further research.

## 73.2 Some Relevant Cases

In January 1998, Liu Gongchao, one car owner in Beijing, China, installed one automobile exhaust purifier produced in Korea, which was testified to overpass the vehicle exhaust emission standard stipulated by the relevant authority in Beijing. However, in July of the next year, the Environmental Protection Bureau of Beijing,

the Transportation Bureau of Beijing, and the Traffic Management Bureau of Beijing jointly issued an announcement, which stated that all the minibuses fixed with carburetor that were registered after January 1, 1995 shall be equipped with an electronic air supply device and a three-element purifier; otherwise, they cannot be accepted for annual inspection. Liu's car was rejected for annual inspection. Liu thought that the three bureaus had abused administrative power and restricted car owners to purchase the designated goods, so he filed a case to the People's Court of Haidian District of Beijing against the Environmental Protection Bureau of Beijing.

The court held that because the announcement jointly issued by the Environmental Protection Bureau, the Transportation Bureau, and the Traffic Management Bureau of Beijing was not aimed at specific vehicles and could be used repeatedly, it belonged to abstract administrative behavior which is generally binding on all vehicles, and it should not be considered as administrative monopoly. The court turned down Liu's claim thereafter.

Some similar problems took place in other cities. In Nanchang, the capital of Jiangxi Province of China, in order to regulate the vehicle exhaust emission, the environmental protection authority firstly required vehicle owners to install filters, then carbon monoxide canisters, and then clean the cylinders during the past 10 years. These measures did not improve the environmental quality of Nanchang, only helping the relevant authority reap a large amount of easy money. Further, it was reported that in Xiangfan, one city of Hubei Province of China, Lanzhou, the capital of Gansu Province of China, and other cities, as long as the car owner purchased designated purifier, their car can pass annual inspection no matter whether the car owner install the purifier on the car or not. It was even reported that as long as the car owner paid money, he would get a certificate for his car.

### **73.3 Social Costs of Rent-Seeking in the Regulation of Vehicle Exhaust Emission in China**

The regulation of vehicle exhaust emission has created a lot of opportunities for rent-seeking, which reallocates resources away for productive, positive-sum, activities into unproductive, zero-sum, activities. Therefore, it is unanimous among economists that rent-seeking is a socially wasteful activity. Theory tells us that the real social costs of rent-seeking are not only the expenditures of rent-seekers, but the opportunity cost of these resources in terms of forgone production, which are hard to observe and notice in reality. It can be seen from the above cases that, in addition to the traditional opportunity cost of rent-seeking, they included the social cost of higher efficient device being replaced by lower efficient device, the social cost of vehicles with high level of exhaust emission passing annual inspection and the social cost of various kinds of artificially created barriers which help breed rent-seeking activities.

(a) **The traditional cost of rent-seeking**

Rent-seeking in the regulation of vehicle exhaust emission in China is slightly different from other rent-seeking activities.

The purpose of rent-seeking in the regulation of vehicle exhaust emission in China is to obtain the inspection license of vehicle exhaust emission. At present, there already exist some inspection agencies in nearly every city. Rent-seekers can only obtain part of the rent if rent-seeking is successful. In the future, part of their rent will be absorbed away by the later successful rent-seekers. Therefore, the number of incumbent inspection agencies and the duration of the possible rent have a more significant effect upon the equilibrium expenditure of rent-seekers than in the other rent-seeking contest models.

Assume there are two identical risk-neutral players, A and B, where *a* stands for A's rent-seeking expenditures, *b* for B's expenditures, *n* for the number of incumbent inspection agencies, *t* for the average number of days that a new comer needs to enter the market, *r* for the interest rate for the time period of *t* and *R* is the total rent created within one day. Then the successful rent-seeker can get  $\frac{tR}{(n+1)(1+r)}$  for the current term, and when the next inspection agency enters into the market, his rent will change to  $\frac{tR}{(n+2)(1+r)^2}$ . Similarly, we can get the present value of the total rent for a new comer when there already exist *n* inspection agencies as follows:

The present value (PV)

$$= \sum_{N=1} \frac{tR}{(n+N)(1+r)^N} \tag{73.1}$$

Because of entry barriers, such as fixed entry costs, close relationships with the relevant authority and so on, the number of new inspection agencies which can enter into the market, *N*, is limited.

Player A maximizes the expected value

$$E(a) = \frac{a}{a+b}(PV - a) + \frac{b}{a+b}(-a) \tag{73.2}$$

which is reduced to

$$E(a) = \frac{a}{a+b}PV - a \tag{73.3}$$

It can be seen that A's optimal investment depends on B's effort and the present value of the rent at stake.

B faces an identical choice and generates a similar reaction function. If both players behave according to their strategy of maximizing the expected value, a simply Cournot-Nash equilibrium appears, each player bidding  $\frac{1}{4}$  of the present value of the rent at stake ( $\frac{1}{4}PV$ ). With *m* identical players the equilibrium investment by A is  $\frac{m-1}{m^2}PV$  and the total expenditures by all the players reach  $\frac{m-1}{m}PV$ . If *m* is big enough, then complete dissipation of the rent will be realized.

The social loss is quite large because of a very high PV, which can be seen from the PV's equation. PV depends on five variables: the number of incumbent inspection agencies, the number of new inspection agencies, the interest rate for  $t$  days, the total rent  $R$  in the market and the average days that a new comer takes to enter into the market. The bigger  $t$  and  $R$  are, the smaller  $n$  is, the larger the present value is, the more social resources will be exhausted.

**(b) The social cost of higher efficient device being replaced by lower efficient device**

The second category of social cost caused by rent-seeking in the regulation of vehicle exhaust emission in China is the social cost of higher standard device being replaced by lower standard device. In order to control vehicle exhaust emission, the relevant authority often limit car owners to purchase their designated equipment by issuing announcements or notices. So long as the announcement or regulation is not aimed at specific objects and can be used repeatedly, it is legal and does not belong to administrative monopoly, which is subject to the Chinese Anti-Monopoly Law.

**(c) The social cost of vehicles with high level of exhaust emission passing annual inspection**

It has been mentioned above that in many cities of China, as long as car owners purchased the designated vehicle exhaust purifying equipment, they can pass annual inspection even if they do not install the purchased equipment on the car. In some places, as long as car owners make the payment to agencies or individuals, which have close relationships with the regulator and which have already developed into a huge industry in China, they can bet the certificate for their cars. On the basis of "hazard risk", cars with higher level of exhaust emission are more willing to turn to those agencies and escape real annual inspection, causing serious damage to the environment. Even in some cities where car owners must drive their cars to the inspection site and accept real annual inspection, they can also pass annual inspection even if their exhaust emission level fails to meet the standard, as long as they pay some "lubrication money" to the relevant "helpers".

**(d) The social cost of various kinds of artificially created barriers**

The next but not the last measure for inspection agencies to reap easy money is to set different kinds of inspection items as barriers. These measures have two purposes; one is to reap money directly and the other is to create opportunities for rent-seeking. The watchdog of environment issues standards, announcements or regulations on a frequent basis. Sometimes, it is only a short period of time between the implementation dates of the old and new announcements or standards. Although the old equipment is still useful and efficient, it should be discarded and replaced with the new purifying one, according to the new regulation, which constitutes a social loss of resources.

As for obscure obstacles, such as waiting time and psychological pressure while waiting to get cars inspected, car owners find it hard to overcome them except for rent-seeking. It is a well-known fact that car owners have to queue and wait at several places before getting inspection finished. The forgone productive activities constitute a social cost, too.

## 73.4 Conclusions

In this paper, we have explored several aspects of the social costs of rent-seeking activity in the regulation of vehicle exhaust emission. It seems that rent is under dissipated in the regulation of vehicle exhaust emission; however, the resources exhausted for rent seeking only account for a small share of the social costs and they constitute the direct costs of rent seeking. In addition to these costs, higher efficient device being replaced by lower efficient device, vehicles with high level of exhaust emission passing annual inspection by rent-seeking and various kinds of artificially created difficulties and obstacles which help breed rent-seeking activities constitute much higher social costs. Vehicle owners are easily exposed to rent-seeking in China. Even if he follows laws and regulations issued by the state, or purchase the most expensive and best exhaust purifier at the time, he will not necessarily pass annual inspection, if he does not observe the announcement or notice issued by the local authorities.

Therefore, how to regulate the regulator of vehicle exhaust emission may be the key issue to eliminate rent-seeking and reduce waste of social resources. According to the Chinese Administration Law, all abstract administrative behaviors, usually in the form of announcements and notices issued by industry regulators or local authorities, belong to legal behaviors and thereafter have legal effect. Only concrete administrative behaviors which are targeted as specific objects and cannot be used repeatedly may be taken as illegal. Such provisions create lots of rent-seeking opportunities for regulators and authorities. Therefore, the first step to control vehicle exhaust emission in China shall be the rigorous regulation of the regulator.

The second measure lies in the establishment of a transparent and uniform emission standard, which can eliminate confusion among vehicle owners. The next but not the last step is to rigidly combat any collusion between regulators and inspection agencies, inspection agencies and vehicle owners, and inspection intermediaries and vehicle owners. Only in this way can the blue sky return to China.

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