

Economic Analysis of Urban Traffic Congestion

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Abstract: Based on economics supply and demand theory, this article analyzes the problem of urban traffic congestion in China and possible solutions. This article first explains the causes of traffic congestion from the perspective of economics supply and demand, and then analyzes the advantages and disadvantages of existing solutions to solve the problem. From the perspective of supply and demand, it is difficult for the existing schemes to fundamentally solve the problem of traffic congestion. Therefore, this article attempts to demonstrate the necessity and feasibility of collecting urban traffic congestion fees, and proposes a new solution to the problem of urban traffic congestion in China.

1. Introduction

The situation of traffic congestion in our country is very serious. At the end of 2018, the total mileage of national highways was 4,486,500 kilometers, the density of highways was 50.48 kilometers per 100 square kilometers, and the national mileage of national highways was 218,800 kilometers. The average daily traffic volume of motor vehicles was 14,179 thousand vehicles, an increase of 3.5% over the previous year, and the annual average daily traffic volume was 3.09393 million vehicle kilometers, an increase of 2.5%. Among them, the annual average daily traffic volume of the national expressway was 26.435 million vehicles, an increase of 5.4%, and the annual average daily traffic volume was 13.84 million vehicle kilometers, an increase of 6.0%. , An increase of 1.4%. From this point of view, the number of highways and vehicles in China is relatively mismatched, and traffic congestion is more serious. Therefore, it is necessary to solve the problem of urban traffic congestion [1].

Possible innovations in this article: This article is dedicated to using a new way to analyze the problem of traffic congestion. In the analysis of urban traffic congestion, road users are divided into two types: first-in and first-in. The root cause of the congestion problem is that the social marginal cost of first-comers and later-comers is different, resulting in a failure to unify the supply-demand equilibrium.

2. Economics of Congestion

The essence of urban traffic congestion is the problem of supply and demand of commodities. Economics supply and demand theory refers to the relationship between supply and demand of commodities. When supply exceeds demand, there will be oversupply and a buyer's market will be

formed. When the supply is less than the demand, there will be a shortage of supply and a seller's market will be formed. When there is an imbalance between supply and demand, the market's price mechanism will automatically adjust prices to bring the commodity market back to equilibrium. Supply is determined by the social marginal cost of the first and last entrants of the road, and demand is determined by the price. In urban transport, the vehicle is the supplier and it provides the demand for use. The road as the seeker, it needs this use demand.

In traffic problems, because roads are public goods, the marginal cost of supply is different from ordinary goods. Public goods are the goods supplied by the authorities to meet the public needs of society. Public goods are non-competitive and non-exclusive. Non-competitive means that when one person consumes certain public goods, it will not affect other people's consumption of such public goods at the same time; non-exclusiveness means that we have no way to stop people from consuming a certain product or service. There will be significant costs. Take the road as an example, when the road is not congested, it is a pure public good, and once the road is congested, it will bring a great time cost to users[2].

The marginal cost of economics refers to the increase in total cost brought by each unit of increased production. As the total output of a product increases, its opportunity cost also increases. In a perfectly competitive market, the supply curve is a marginal cost curve. Therefore, in the process of production, the manufacturer will adjust the total production according to the marginal cost curve to maximize profits. During the use of roads, roads are special public goods. When the roads are not congested, the social marginal cost is zero. When the roads are congested, the marginal cost will continue to increase, and it cannot be unique to one person.

3. Economic Analysis of Existing Congestion Management Solutions

3.1. Improve the Efficiency of Existing Public Transport Operations

Improving the driving efficiency of public transportation means increasing the number of passengers and operating efficiency of public transportation. Improving the driving efficiency of public transportation is an effective solution. According to the image above, the cause of the congestion is that the cost of the first-in and the last-in is different, and the positions of the equilibrium points are different. Improving the operation efficiency of public transportation only moves the entire line up and down, and does not really make the balance between first-comers and second-comers. Therefore, although this solution can achieve the goal of alleviating the problem of urban traffic congestion, it is only solved on the surface and does not touch the root cause of the problem of urban traffic congestion, so it cannot solve the problem of urban traffic congestion in essence[3].

3.2. Build Road

Building roads can alleviate the problem of urban traffic congestion, but it cannot be implemented effectively. First, the cost of building roads is high[4]. Existing local fiscal budgets usually cannot meet the excessively high demand for road construction. Although the supply of roads has been increased, there has been no agreement on the equilibrium point of the marginal cost of the first-comers and the latter-comers of the road. Second, the construction of roads may affect the spatial planning of cities. If road construction disrupts the city's spatial planning, it will have a negative effect on the city's future development and expansion. Therefore, the implementation of roads in China is difficult, and feasibility needs to be carefully considered.

3.3. Vehicle Limit Number

Vehicle number is a policy proposed to avoid traffic congestion, which refers to restricting the travel of different vehicles every day. This method is now used in many cities, such as Beijing. Beijing's limit number only allows vehicles with a certain number to end each day. The surface upper limit number reduces the number of vehicles and eases the problem of urban traffic congestion, but it does not solve the difference between the first-comer and the last-comer. The fundamental problem. The limit number is to control the demand side to reduce demand, causing problems such as high social costs and loss of social welfare. Therefore, limit numbers are not a reasonable solution

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