

A Research of Congestion Pricing to Beijing Traffic

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Abstract: The paper analyzes the congestion cause of Beijing by listing the policy implementation and its effect. We have a discussion about the possible congestion control measures. A congestion charging is discussed and we analyze the principle and its practicability in our country.

Keywords Traffic policy, Urban congestion, Congestion charging

INTRODUCTION

The urban congestion is a serious problem which is complicated and significant among the world. It's necessary to categorized the major congestion mode and discuss the new research theory to find the key to control the traffic congestion specifically.

This paper introduces and discusses the new methods and advanced experience in foreign country. And according to the Beijing actual condition, we come up with a congestion pricing. Meanwhile, the paper analyzes the principle of congestion pricing and demonstrates applicability of the strategy in Beijing.

THE MAIN TRAFFIC CONGESTION MODE OVERSEAS

Increasing supply mode

At the early time in Europe, the major focus of urban traffic is drew attention to hence the traffic infrastructure construction and improve the capacity of network.

The main contribution of the mode is meet the demand with the reasonable traffic planning, technical equipment and resource effectiveness.

The negative side of the mode is the slow degeneration supply can't fully meet the demand of fast degeneration. The accuracy of supply and related fund should be guaranteed. Meanwhile, the coordination of government plays a key role in increasing supply mode.

Demand management supply mode

This mode is to diminish urban traffic demand by guidance and management of traffic source. Transfer and distribution the demand is effective to alleviating traffic.

The unreasonable planning city can't be popularized of this mode. The area where are under the low level of technology has trouble in the fee adjustment application. Moreover, the complete public traffic system requires huge investment.

Institution improving mode

According to the view of new institutional economics, the rules and regulations will cut the cost of transaction by decrease collision and uncertainly.

By forcibly regulating the behavior and ensuring the sustainable development, the major contribution of this mode is to supply the civil equipment and resource in formal and informal regulation. The regret part, however, it's a sufficient condition for improving traffic not a necessary one, can't work separately.

THE MAIN METHODS TO CONTROL TRAFFIC CONGESTION OVERSEAS

Congestion pricing

In congestion pricing, price system plays a significant role in selecting traffic mode aiming at dynamic and static state by congestion and park pricing.

Singapore is earliest country to put congestion pricing into application in 1975. ETC system has a positive effect for the traffic improvement. In England, many were opposed to it at begin. The congestion condition has decreased for 30% since the congestion pricing in 2003. According to recent report, English plan to expand the region within congestion pricing. In Tokyo, private vehicles seldom are in central area, drivers can't afford the high park fare.

Intersection signal control

Microscopic traffic is the basis of region traffic organization. Foreign universities has comprehensive researches about it including crossroad release, channelized lane, optimize signal control, etc. We can improve intersection capacity and lane capacity by signal control.

Nowadays, there are plenty signal system, America has TRANSYT, England has SCOOT, Australia has SEATS. For now, the major cities who has signal control to manage traffic learn from overseas in China.

Main road control

2.3.1 One-way traffic

One-way traffic allows vehicle run towards one direction. In civil road system, many joint one-way streets integrated as one-way road system.

In America, one-way traffic has been used in 1906, which has popularized in whole country. Half streets in cities which have more than 50,000 people have one-way traffic. Around 80% streets in cities which have more than 1 million people have one-way traffic. In the same period, the counties in Europe have begun popularized one-way traffic. In Japan, Tokyo has 30% one-way street. Osaka has 38% one-way street.

2.3.2 Exclusive lane

Since 1974 when Brazil built first rapid bus line, variety of rapid bus have been used in world. The traffic demand, earth plan and finance can't match the increasing of vehicles, the rapid bus still has promoted successfully.

In 1937, Chicago brought the concept of BRT. For now, many cities in world has built BRT system whose effect are obvious.

The BRT system in Curitiba of Brazil is the best and practical urban public transport system according to UN. The BRT in Curitiba has fast lane which bus color is red, branch lane which bus color is yellow and section lane which bus color is green. The color of bus depends on the special lane service. Citizens are only required to pay a single ticket during any OD no matter transferring or not. With the preferential policy of public and commercial, the BRT which has developed fast has brought a positive effect to the Curitiba public transport. Trip frequency decreases 2.7million times per year owing to 55% share rate of public transport.

Parking management

Cohen in Germany plans park area within the region surrounding city central which separate vehicle and people. People walk into central area after parking at around place.

Paris advocates limiting vehicle parking encourages investment into underground parking and puts pollution control into law.

Japan advocates parking outside road which can decrease the occupying time of vehicles on road since the law "Parking" is published in 1957. The thought of purchasing park has impressed people and suppress the vehicle.

THE CONGESTION GENETIC ANALYSIS OF BEIJING

Incoordination between urban plan and traffic plan

The urban plan is based single center city expansion pattern in Beijing. The central business district, financial area and administrative area is within third ring road which causes tide traffic trip.

The area in second ring concentrated 30% traffic volume of whole city where is 6% in measure. It's difficult to solve the congestion problem with the resource limiting on central roads and ways in and out city.

Contradiction between supply and demand seriously in traffic

With the rapid development in economy these years, the amount of vehicles is increasing that causing the congestion.

Among 15 years, the increase rate of vehicle has 15 % been more than 15% per year. And the road length and road area has been 1.2% and 3.7. The situation expand the gap between traffic demand, especially in vehicles and the total traffic volume in Beijing urban area.

The lag of public traffic development

Giving priority to public traffic has the negative effective in reality though the policy was made in 2005, In Beijing, the average speed of public buses is 15 km/h during the morning and evening traffic peak. There are plenty of passengers in subway which affects public service seriously.

The unreasonable way of traffic trip

The government should lead and adjust people traffic methods positively by price, service level, etc. The traffic methods has transferred from walk, bicycle to vehicle these years. It shows the unreasonable structure in traffic trip because of the changes.

The insufficient static traffic capacity

Lack of park resources, unequal distribution of park stations, these problems are showed causing by the amount of vehicles increasingly.

The unreasonable management of city traffic

Nowadays, the passive adaption traffic mode is used by our cities. The government tends to increase the traffic supply through massive road construction which has the little effect.

With the improvement of infrastructure and ITS application in urban, the requirement of management in traffic is higher.

THE CONGESTION CONTROL MEASURES OF BEIJING

Beijing has made plenty of measure to ease the congestion. The following measures are discussed by traffic supply, traffic demand management and regulation.

Increasing traffic supply

To control the traffic congestion, Beijing has planned the road network, park and other infrastructure constructions besides applying ITS. Beijing has integrated the existing traffic

management resource and perfected the network to increase the traffic capacity.

Traffic demand management

The main purpose of taking varied measures is to control the increase of vehicles, improve public traffic and adjust the congested traffic where mostly are in economy.

Improving traffic regulation

There are two mainly rule about urban traffic: "City Planning Law" and "Road Traffic Safety Law". Based on people foremost, Beijing has focused on management of non-motorized traffic including maintaining regional restrictions in traffic peak, control vehicles.

TRAFFIC CONGESTION PRICING

Congestion pricing is a system of surcharging users of public goods that are subject to congestion through excess demand such as higher peak charges for use of bus services, electricity, metros and road pricing to reduce traffic congestion. This pricing strategy regulates demand, making it possible to manage congestion without increasing supply.

Description

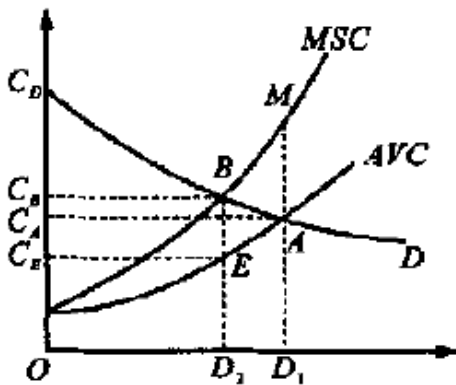


Figure 1 Congestion pricing principle diagram

X-coordinate means car flow, Y-coordinate means cost, AVC means the marginal private cost curve, MSC means marginal social cost curve, D means demand curve. Before congestion pricing, D1 is the car flow where got balance between supply and demand. After congestion pricing, the flow is D2. The cost of travelers is CB-CA, the economic benefit is EBCDEC. The congestion pricing ensures the traffic capacity and bring economic benefit without administrate methods. The benefit can be put into perfect public traffic.

Discussion about congestion pricing application in Beijing

There are some suggestions to support the application of congestion pricing in Beijing.

5.2.1 Following the sustainable development and effective traffic, the purpose of making regulation is to achieve rationalizing traffic structure by social

resource distribution. It's reasonable to solve congestion by taking congestion pricing through examples across the board. By rational leading of management and implement congestion pricing, the traffic department can disperse distribution of traffic traveling from congestive district effectively.

5.2.2 There is an increasingly congestion phenomenon under the larger potentiality to purchase vehicle by the improving income. Through congestion pricing, the government can control vehicle use and affect appetite to vehicle by increasing traffic cost. The larger of range among congestion pricing is in, the huger effect the traffic control has. Public traffic priority needs finance from government. The direct result of congestion pricing is to increase revenue, decrease the number of vehicle generally.

5.3.3 Technically, the electronic toll collection system can charge automatically and accurately in the condition of protection privacy. The majority of people who own vehicle are high-salary class. It's fair to distribution and improve public service by congestion pricing which is benefit for commuters by public traffic in society.

5.3.4 Public traffic priority is a significant strategy of traffic development these years. A strike from vehicle has affected public traffic strongly. As a market measure, congestion pricing supplies convenience for public traffic, whose lanes always are occupied by vehicle in peak.

RESULTS AND DISCUSSION

There is a hot discussion about traffic congestion pricing which has plenty of links with variety programs should to be concerned. It's necessary to set an access to open opinions and critics from kinds of fields. Before taking into practice, government should consider the convenience to avoid increasing traffic costing for citizen. And a management regulation is required to modify expenditure and supervise fund which should be put into improving traffic infrastructure.

CONCLUSION

Generally, congestion pricing should be restrained by sturdy law and firm supervision system. For the sustainable development, mega city which trouble by traffic congestion should take congestion pricing after serious consideration and planning.

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