**Book Chapter**

**A Research Review on Car Ownership Control Policy in Shanghai, China**

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**Abstract**

With the rapid development of urbanization and motorization in China, a few cities have carried out a series of car ownership control policies, including auction, ballot and hybrid approaches. The regulatory policy is necessary to assess after implementation for a few years. Based on the theory of public regulation and some econometric methods, this paper discusses the effects of Shanghai quota auction policy on the control of car ownership
growth. First, this paper sorts out the key events to describe the policy evolution and analyzes the motivating and resistance factors acting on the motorization level to reveal the nature of regulatory policy. Second, it focuses on the features of the quota auction market and uses elasticity analysis of car ownership per thousand residents to GDP per capita and macro-effects analysis to reveal the policy impacts. Finally, it also analyzes the influence of external factors and the internal correlation of the quotas, number of bidders and average price to show the whole diagram of impact mechanism. It suggests the car ownership control should work with car usage control and other TDM measures to realize the ultimate objectives of urban transportation management like system optimization and congestion elimination.

Keywords

Car Ownership Control; Quota for Private Cars; Econometric Methods; Policy Effects; Shanghai

Introduction

The car ownership control refers to the governmental intervention of residents’ right to own private car, which is commonly known as car purchase restriction policy in China. Beginning in 1986, Shanghai has carried out an interesting car ownership control policy, namely an auction of the right to register private car license. This regulation is officially named as the quota management for non-commercial vehicle policy and the Shanghai International Commodity Auction Co. Ltd operates the auction once a month. Working with other policies like public transport priority, parking charge and restriction on nonlocal license, it has changed into an instrument for local government to manage the transportation system.

In more than two decades, Shanghai was the only city in China to carry out license quota auction and served as a model for other cities. However, as the market approach to grant license quota, the car ownership control policy faced great political, economic and social obstacles. Opponents argue the policy hinders the
growth of the automobile industry. Besides, the competitive auction rule which benefits those with the highest bids discourages low-income people from owning cars, thus creating social inequity. This policy even contradicts to carry out an open and inclusive talent strategy. It is difficult for new urban immigrants to get license quota in a competitive auction with a lower winning rate around 5%.

Learning from the weakness and disputes of Shanghai’s auction, Beijing took a ballot to assign the license quota in 2011. It was not until 2013 that Guangzhou began to impose a mixed strategy of auction and lottery, taking advantages of Shanghai and Beijing [1]. In the following years, Guangzhou's hybrid model spread to Tianjin (2013), Hangzhou (2014) and Shenzhen (2014). Following Beijing's lead, Guiyang also adopted the ballot in 2011 but stopped at September, 2019 to stimulate automobile consumption.

The motorization developing pattern of private cars in Chinese cities is different from that in developed countries of North America and Europe. Most downtown of Chinese cities have dense population, leaving rare land for car use. Because of such national wide circumstance, developing private cars has to accord with orderly and strictly-regulated policies. Shanghai has lifted the cost for owning a car by assigning quota through auction and slowed down the growth of private car. Owning to the developed transit and regular bus in Shanghai, residents can travel conveniently and effectively without degrading their travel utility.

The world famous case about the car ownership control is the Vehicle Quota System (VQS) in Singapore. Researchers evaluate the policy performance, including policy evolution [2,3] and car growth control [4]. The effects on environment, congestion and auto market [5,6], relief of auction price variation [7] and market fairness [8,9] are also assessed.

About the practice of car ownership control policy in China, some studies focuses on macroscopic impacts [10], opportunity costs of participants [11] and attitude and acceptance of the
public [12], etc. Compared with Singapore’s case, car ownership control policy in Shanghai is not so famous and because of the institutional reasons, Shanghai’s experience is not easy to copy to other cities. The uniqueness of Shanghai’s car ownership control policy is worthy to exploring systematically and revealing the reproducible experience to the possible follower in the future.

Shanghai has enforced the private car quota auction policy for decades. Thus it can provide more open data for analysis and give a chance for this paper to summarize our relevant research findings in recent years. This paper is arranged as follows: Section 1 introduces the key events of car ownership control policy in Shanghai and tries to give a full picture of policy evolution since 1980s. Section 2 analyzes the motivating and resistance factors on motorization level and displays how the regulatory policy of car ownership control forms its shape during the life cycle. Section 3 further uncovers the features of the quota auction market and explores the policy effects by elasticity analysis and macro-effects analysis. Section 4 gives a diagram of impact mechanism, exploring the external influencing factors on the key variables of auction market and the internal correlation among three key variables. Section 5 draws the conclusion.

**Key Events of Car Ownership Control Policy in Shanghai**

Shanghai’s quota management for non-commercial vehicle policy can be broadly divided into four stages: the budding period (1986-1993), the growth period (1994-2002), the maturity period (2003-2012) and the strengthening period (2013-present) [13].

Table 1 lists the key events in the policy life cycle. During the budding and growth periods, the policy objectives appear diverse, variable and vague, and once the license quota even became a "bargaining chip" to stimulate the real estate and automobile industry around 2000. The turning point came when Shanghai released the Metropolitan Transport White Paper [14] in 2002. The White
Paper promotes a wide range of transportation demand management (TDM) policies and reinforces collaborative strategies for the car ownership control in Shanghai. Parking with spatially differentiated charges was introduced in 2006 to discourage car use, especially in the congested city center. Differential treatment of nonlocal vehicles was also set up to regulate the increasing number of cars with nonlocal licenses. Nonlocal vehicles were forbidden from using the elevated expressway during rush hours including from 7:30-9:30 a.m. and 4:30-6:30 p.m. on weekdays excepting national holidays.

By 2008, the quota policy had become an integral part of the Shanghai’s transportation management framework. Since then, in 2008 and 2013, the auction rules were revised to address information asymmetry and excessive increase of bidding price during the intense competition for license quota. Thus the effect of regulating the car growth gradually became obvious.
### Table 1: Summary of key policy events.

<table>
<thead>
<tr>
<th>No.</th>
<th>Year</th>
<th>Key policy events</th>
<th>Interpretations of policy events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1986</td>
<td>Private car license quota auction began with reserve price.</td>
<td>Owning private property like land, house and vehicle had been forbidden for a long time since 1949. Lifting of prohibition on private car ownership in 1986, with quota assigned by auction instead, was regarded as a milestone in “Reform and Opening” period since 1978.</td>
</tr>
<tr>
<td>2</td>
<td>1980-1990</td>
<td>Motor vehicle tailgating restriction according to single- and double-numbered licenses in the Central District.</td>
<td>Car with private license was not subject to traffic restriction, and the road space after the restriction was conducive to private car travel.</td>
</tr>
<tr>
<td>3</td>
<td>1994</td>
<td>The automobile industry was established as a pillar industry of the state.</td>
<td>With the developing automobile industry, it was possible for the residents owning private cars.</td>
</tr>
<tr>
<td>4</td>
<td>1995</td>
<td>The first subway line in Shanghai, Line 1, was built.</td>
<td>Increasing the supply of high-capacity public transport attracted the residents to travel by bus and subway.</td>
</tr>
<tr>
<td>5</td>
<td>1998</td>
<td>Special quota auction with lower bidding price was set for Santana Motors.</td>
<td>Local industrial protection policy was set to promote Santana Motors in Shanghai.</td>
</tr>
<tr>
<td>6</td>
<td>2000</td>
<td>Cancellation of auction reserve price for domestic vehicles; Bundled sales of housing and car with lower quota prices; Public service vehicle reform with price discount of license quota.</td>
<td>No-frills bidding lowered the threshold of access to own domestic vehicle and license quota once served as a 'bargaining chip' to stimulate the real estate and car consumption.</td>
</tr>
<tr>
<td>7</td>
<td>2001</td>
<td>Non-Shanghai residents can apply for local quota with their temporary residence permits.</td>
<td>Broadening the beneficiary base of the car ownership control policy.</td>
</tr>
<tr>
<td>8</td>
<td>2002</td>
<td>Shanghai was the first city in China to release the Metropolitan Transport White Paper.</td>
<td>The White Paper defined the overall objective to develop Shanghai’s transportation and the car ownership control policy gained its local legal status.</td>
</tr>
<tr>
<td>9</td>
<td>2003</td>
<td>Combined quota auctions for domestically produced vehicles and imported vehicles.</td>
<td>Granting the same “citizens of the State” to imported vehicles as domestically produced vehicles.</td>
</tr>
<tr>
<td>11</td>
<td>2005</td>
<td>Public Transit Priority strategy was proposed nationwide.</td>
<td>Setting the main theme of priority development for public transport in China.</td>
</tr>
<tr>
<td>12</td>
<td>2006</td>
<td>Parking with spatially differentiated charges were introduced in Shanghai.</td>
<td>Raising the cost of motor vehicle use by regulating parking behavior.</td>
</tr>
<tr>
<td>13</td>
<td>2008</td>
<td>The auction rules were revised for the first time.</td>
<td>Increasing information transparency, reducing price volatility and stabilizing the auction market.</td>
</tr>
<tr>
<td>14</td>
<td>2012</td>
<td>Vehicle with nonlocal license was forbidden to use the elevated roads during peak hours.</td>
<td>Pushing up local demand for quotas and leading to “consecutive increases for ten months” in auction prices.</td>
</tr>
<tr>
<td>15</td>
<td>2013</td>
<td>Auction rules were revised for the second time and the White Paper was also revised.</td>
<td>A “warning price” was introduced during the auction to curb rapid price increases and the revised White Paper highlighted the car ownership and usage control objectives.</td>
</tr>
<tr>
<td>16</td>
<td>2016</td>
<td>Traffic order overhauled through enforcement and fines.</td>
<td>Carrying out a citywide campaign to adjust traffic violations, strictly managing all types of traffic violations and setting up good traffic order improved the efficiency of transportation system.</td>
</tr>
</tbody>
</table>
Motivating and Resistance Mechanisms in Policy Evolution

Regulatory policy changes are generally driven by three sources: changes in public value, mega-event or contingency, such as "black swans" or "grey rhinos", and city managers' knowledge and experience from practice. For regulating private car ownership, some motivating and resistance factors coexist in the policy evolution process and collide to form a new pattern of public interest. This paper takes the level of motorization as an indicator to examine the policy evolving process.

The motivating factors which affect motorization include urbanization, car ownership and economic growth. The resistance factors contain spatial constraint from urban population density, cost of owning and using cars and regulatory instruments which vary with public issue.

On one hand, three motivating factors contribute to motorization during the policy evolution.

First, urbanization has led to the continuous concentration of population in large cities like Shanghai and the supply of basic public service (such as housing, compulsory education, health care and transport, etc.) has increased correspondingly. The public transport to guarantee the basic right to travel for all groups has been improved. The employment opportunities and life quality in large cities attract a one-way flow of talents from the other parts of the country. With developing automobile industry, car consumers expand to the new middle class, occupying major part of automobile consumption.

Second, in large cities, the motorization causes a continuous rise in car ownership and the car use closely relates to the car ownership. For those who own cars, expanded travel distances and improved life quality make more people expecting to own cars. This creates a positive feedback and even induces the car pride [15]. At the same time, the motorization consumes urban space, produces high social cost and even increases the
difficulties of traffic management, facing the mixed movement of motorized and non-motorized transport in most Chinese cities.

Third, in the eastern coastal region of China, the high quality of life accompanies with the steady economy growth. The convenience of car travel induces the demand for cars. With increasing disposable income, the potential consumers have much money to buy cars. In Shanghai, the demand for cars and license quotas expand and turn to be rigid. The number of residents applying for quotas has a continued growth in last decade and the price of license quota auction continues to rise. Because of no limit on purchase and free access to license quota, the demand for new energy cars, including pure and hybrid electric cars, has a significant increase in recent years, diverting some demand for petrol cars.

On the other hand, the resistance factors which affect motorization also consist of three.

First, in the built-up region of large cities like Shanghai, the density is extremely high. With greater constraint on space, the road supply and parking has fallen far short during the motorization. Public transport is subject to soft budgetary constraints and bus services are less responsive to the demand changes. Technological advance and its application to parking have released some space for car use, however, the technological breakthrough to resolve urban space conflicts in high-density region has yet to occur.

Second, as parking difficulty and road congestion increase, the direct and indirect cost of owning and using cars climb up quickly and defeat the willingness of some residents who plan to buy cars. In some high-density communities, because of too much cars and shortage of public space, car driving and parking produce big friction and conflict with non-motorized modes like walk and bicycle. In Shanghai, because of the high cost of car purchase and inconvenience of use, some cars have parked for a long time and the utility of owning a car is greatly diminished.

Third, as to some Asian high-density countries and cities such as Singapore, Tokyo and Hong Kong, their experiences in managing motorization are widely spread. More and more cities
in China realize the negative externalities of motorization should be planned and addressed as early as possible. As the public awareness of car ownership and usage control policies increases in these cities, public rationality continues to converge and serves as a fundamental background for building on locally distinctive experiences to regulate motorization.

Figure 1 shows some key events extracted from Table 1 during the policy evolution, implying how the motivating and resistance factors act on motorization. Served as policy shocks, these key events once pushed the motorization forward or drew it backward. Two phases in Figure 1, before 2003 and after 2003, are clearly distinguished. Before 2003, most events marked in yellow boxes are to promote the motorization. However, after 2003, most events marked in blue boxes are set up to regulate the motorization. It is clear that 2003 is a critical year in policy evolution for motivating or resistance to the motorization.

![Figure 1: Policy shocks with key events on motorization.](image)

**Analysis on Policy Effects**

This section focuses on the features of the quota auction market. It applies the elasticity analysis of car ownership to GDP per capita and macro-effects analysis to describe the impacts of car ownership control policy in Shanghai.
Features of the Quota Auction Market

The license quota auction in Shanghai has been running for a long time and time series data are available since 2002. This section describes some key features of the auction market such as the released quota volume, the bidders and the winning prices by using some statistical learning methods [16]. Here are some findings:

- Auction prices reflect the scarcity of license quota in the auction market. The high cost of space in mega-cities like Shanghai and the limited nature of space regeneration decide the auction price has a constant inertia of growth (Figure 2).
- The economic status of the residents, like disposable income per capita, positively affects the number of bidders and the average winning prices. Thus the impact of economy development on the auction market cannot be ignored.
- The volume of quota increases with the number of bidders and the average winning prices and their correlations display positive incentive characteristics.

Figure 2: Trend of average winning prices.
These findings imply the local government tends to release more quotas when the bidders and prices go up quickly to avoid their volatilities during the monthly auction.

Econometric analysis also shows that, although Shanghai has made the car ownership control policy strengthening since 2003, the motivating factors are greater than the resistance factors to motorization. Even with the warning price-cap in the auction, quota price will continuously climb up with a long-term trend. As the marginal external cost of each issued quota rises, the release of quota demand by increasing the volume of quota will produce greater spillovers outside the auction market, which would finally make the objective of car ownership control distorted.

**Elasticity Analysis**

Since the car ownership has a strong correlation with urban economy development, this section uses the elasticity coefficient of car ownership per thousand residents to GDP per capita to measure the motorization growth in Shanghai. Compared with the key events of policy evolution, the effects of car ownership control are discussed and evaluated.

From 2000 to 2019, the average elasticity coefficients of civilian vehicle ownership and private car ownership to GDP per capita in Shanghai are 1.4834 and 3.6041 respectively. Both are close to or exceeding the average elasticity coefficient of about 1.5 in western developed countries.

Figure 3 shows three distinct stages of interaction between the regulatory policy and automobile market during this period.

- Over the period from 2000 to 2007, the regulatory policy has led to a steady change in the elasticity coefficient of civilian vehicles, especially after the policy grew to its maturity in 2003. At the same time, the elasticity coefficient of private cars decreased significantly.
- The two notable bulges on the curves in Figure 3, referring to the years of 2008 and 2012 are two key points
in the rapid growth of motor vehicle ownership with GDP per capita. Two outstanding reforms of auction rule in 2008 and 2013 were timely response to the sudden changes in demand.

- During 2013 to 2019, regulatory policies made the change in elasticity coefficients declined and stable again. Overall, the policies responded well to the demand changes in the motor vehicle market. The average annual growth rate of civilian vehicles and private cars since 2013 were controlled at 10.71% and 13.07%, respectively.

Figure 3: Elasticity of Shanghai’s motor vehicle (civilian vehicle and private car) ownership per thousand residents to GDP per capita (Data source: CEInet Statistics Database).

**Macro-Effects Analysis**

At a macro level of policy performance, an important issue focuses on what economic and social factors will affect the key variables of auction market.

Shanghai was the first city in China to issue the Metropolitan Transport White Paper in 2002. The White Paper promises to restrict the car ownership and usage by several comprehensive measures, including license quota auction and congestion charge. And further the White Paper was revised in 2013. It announces
that the quotas would be determined by some factors including road capacity and its level of service, parking capacity and its level of service, and the quality of environment. Then in practice what factors will actually affect the quotas’ assignment? How do the key variables in the auction market, e.g. quotas, number of bidders, and average price affect one the other? With the annual data from Shanghai Statistical Yearbook (2002-2014), this section applies the Three-Stage Least Squares (3SLS) method to establish five groups of regression model [13]. And by judging whether the regression coefficients are stable, significant and within an acceptable and interpretable range, the external factors affecting the key variables of auction market can be determined and the internal correlation can also be calibrated (see Table 2).
### Table 2: Quotas, number of bidders, and annual average price with 3SLS equations.

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Quota $\ln QT_T$</td>
<td>One-year Lagged Road Area Per Vehicle $\ln RoadArea_{T-1}$</td>
<td>0.54</td>
<td>-0.22</td>
<td>-0.16</td>
<td>0.11</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>One-year Lagged Change in Rail Length $D\ln RailLength_{T-1}$</td>
<td>-0.29</td>
<td>-0.11</td>
<td>-0.14</td>
<td>0.40</td>
<td>0.75***</td>
</tr>
<tr>
<td></td>
<td>One-year Lagged Change in SO2 $D\ln SO2_{T-1}$</td>
<td>-17.02***</td>
<td>-14.52***</td>
<td>-14.45***</td>
<td>17.90</td>
<td>15.30</td>
</tr>
<tr>
<td></td>
<td>One-year Lagged Change in NO2 $D\ln NO2_{T-1}$</td>
<td>1.00***</td>
<td>0.90***</td>
<td>1.03***</td>
<td>1.03***</td>
<td>0.79***</td>
</tr>
<tr>
<td></td>
<td>Annual Average Price $\ln P_T$</td>
<td>0.35**</td>
<td>0.26</td>
<td>0.97**</td>
<td>1.31***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One-year Lagged Average Price $\ln P_{T-1}$</td>
<td>0.07</td>
<td>-0.61</td>
<td>-1.11**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R-Squared</td>
<td>0.66</td>
<td>0.70</td>
<td>0.72</td>
<td>0.36</td>
<td>0.12</td>
</tr>
</tbody>
</table>

| Annual Number of Bidders $\ln QB_T$ | One-year Lagged Rail Utilization $\ln RailUtil_{T-1}$ | -2.89* | -3.27* | 1.38 | 0.42 | 1.82 |
| | One-year Lagged Bank Deposit Per Capita $\ln DEP_{T-1}$ | 1.88*** | 0.47 | 2.16*** | 1.97*** | 2.75*** |
| | One-year Lagged Change in Population $D\ln POP_{T-1}$ | -20.62 | -0.95 | -4.24 | -2.15 | 0.64 |
| | Annual Average Price $\ln P_T$ | 2.16 | -3.23** | -2.27*** | -4.11 |
| | One-year Lagged Average Price $\ln P_{T-1}$ | 3.00*** | 2.46*** | 3.43*** | |
| | R-Squared | 0.70 | 0.52 | 0.89 | 0.92 | 0.78 |

| Annual Average Price $\ln P_T$ | One-year Lagged Average Price $\ln P_{T-1}$ | 1.00*** | 0.90*** | 1.03*** | 1.03*** | 0.79*** |
| | Annual Quota $\ln QT_T$ | -0.37 | -0.46 | -0.48 | -0.24 | -0.67 |
| | Annual Number of Bidders $\ln QB_T$ | -0.42*** | -0.34** | -0.43*** | -0.43*** | -0.28** |
| | One-year Lagged Bank Deposit Per Capita $\ln DEP_{T-1}$ | 1.12*** | 1.11*** | 1.19*** | 1.10*** | 1.20*** |
| | R-Squared | 0.93 | 0.93 | 0.93 | 0.93 | 0.92 |

Note: ***, **, and * denote significance level of 1%, 5%, and 10%, respectively.
Here are some main findings in Table 2:

- The residents’ economic status, such as the bank deposit per capita, plays a positive role on the number of bidders and the average price, which indicates the economic variables on the auction market cannot be ignored. If Shanghai enjoys a stable economic development in the coming years, the number of bidders and the annual average price are expected to increase steadily.

- The rail transit construction and the rail utilization (represented by the number of passengers served per mileage in Table 2) have lessened the quotas (with no significant) and the number of bidders (partially significant), which suggests the continuous supply of rail transit construction and the service improvement can relieve the quota demand.

- The air quality (SO$_2$) leads to a drop in the quotas. Since air pollution comes from car exhaust, the air quality is regarded as an important reason during the public decision-making of quota release.

- The increase in the annual average price boosts the quotas.

- In the same period (year), the number of bidders and the annual average price mutually restrain each other, and the increasing number of bidders in the same period (year) can ease the price rise.

- Due to the market expectation, the auction price continues to rise based on its own inertia.

**Summary of Impact Mechanism**

Based on the analysis, this section summarizes the external factors affecting the quota auction market and the correlation of internal variables (see Figure 4).

The external factor like the higher residents’ income has driven up the number of bidders and the average price. However, the rail transit construction and the air quality have lessened the number of bidders and the released quotas.
Inside the auction market, the quotas, the number of bidders and the average price form a more complicated correlation:

- The auction price reflects the scarcity of license plate quota. The rising price of land and the limited space generation in megacities have decided the quota price has a lasting growth trend. Thus the auction price has an innate growth if the local economy continuously increases.
- Before setting the price cap in April 2013, the number of bidders and the average price inhibited each other in the same period but reinforced each other in a long run. Meanwhile, the rate of price volatility could recover to the median level, which contributed to make the price increasing stable. However, after setting the price cap in April 2013, the rate of price volatility turns to be flat. This released a signal the price would not climb up sharply so that more bidders would like to join in the auction. The winning bid rate declines continuously.
- In a long-term, a positive incentive in the auction market shows the volume of quotas and number of bidders would increase with the average price. In turn, both the growth
of bidders and the average price will help to boost the quota release. This trend will easily lead the quotas to exceed the planned upper limit and the expected objectives of car ownership control policy are hard to achieve.

Conclusions

Shanghai has taken the car ownership control policy for more than thirty years. Taking Shanghai as an example, this paper highlights the quota auction for private car license by key policy events and analyzes the motivating and resistance factors of the policy evolution. It also evaluates the policy impacts, especially macro-policy effects with elasticity of motor vehicle growth and some statistical learning methods and regression models. Since more cities in China join in the line to make car purchase restriction in practice, some systematic evaluation is needed for fulfilling such regulatory policies.

The car ownership control policy direct slow down the car growth, however, the policy impacts on the automobile industry, upstream and downstream industries, traffic congestion and environment, car management with nonlocal license and social justice still need analysis in detail. And its correlation with other transport policies of car use also needs further clarification. Besides, many issues related to consumer behavior, such as car preference, selection of local or nonlocal license, individual and family spending on travel, still need to carry out delicacy analysis. The future research will eventually form a closed loop of policy evaluation from micro level to macro level.

As a high-density city like Shanghai, the conflict between motorized development and space constraint will persist for a long time. This contradiction is displayed in various symptom of market failure, such as imbalance in traffic supply and demand, network congestion and regional pollution from car emission. Compared with regulating car use such as congestion pricing and parking charge, car ownership control is traditionally regarded as an inefficient alternative. It is not conducive to automobile
industry, hinders the individual right from motorized travel so that it is not applied in most countries.

However, in recent years, with the haze and traffic congestion worsening, a few cities with high-density use the car ownership control as means of slowing down the car growth from the source. Some regulatory policies on car ownership have also been implemented and promoted in China. For the urgency of environment improvement and the pressure on urban traffic management, car ownership control still has some positive policy value, such as better achieving the expected objective to slow down the car growth, gaining a valuable opportunity for transit development and delaying new control on car use in these cities.

For a few cities which apply the quota auction to assign the private car license, the continuous increase of bidding price suggests a stronger car and quota demand. This also sets up a difficulty of quota management. The demand for cars has raised up the bidding intensity and the winning price increases continuously, further driving up the volume of quota release in turn. This trend can easily lead to quota assignment exceeding the planning limit, making it difficult to achieve settled target for car ownership control.

One particular example that can be taken for reference is Singapore. The Land Transport Authority has stopped adding new cars to the road from February 2018 and plans to lessen the annual growth rate of cars from 0.25% to 0%, considering land constraints and competition demand, and the limited scope for further expansion of the road network. Then, new car owners will need to buy a certificate of eligibility that allows them to hold the car for 10 years. And a limited number of certificates will be issued by monthly auction.

For regulating the mobility, is it a matter of waiting to get worse, or is it a matter of being proactive and curing an untreated illness for the future? Each city owns different public value and has its rational choice to answer this question. In recent years, shared mobility service such as ride-hailing and car rental has brought
new opportunity for deregulating the private mobility, however, coordinated multimodal development has always been the ultimate goal of transport policy.

References