

An Objective View of China's Toll Highway Development

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Abstract: Toll highway belongs to the highways financing system in essence. In the practice of financing highways in China and in many developed countries, two main models are found: one through tolls of highway users and the other through taxes of highway users. The practice of these two models is the most typical in different periods of highways construction in America.

1. Tolls and taxes in American highways

1.1 Toll highways under the state and local affairs

Before 1956, when the U.S. federal began large-scale funding in highways, according to the U.S. Constitution, infrastructure construction, including highways, was an internal matter of the States. That is, the construction of highways is the responsibility of states and local governments. During this period, key highways in America were mainly funded by states and local governments. Due to the limited financial resources of states and local governments, and the lack of large-scale funding from the federal for highways, many states and local governments usually encouraged private companies to fund in toll highways.

The toll highway is marked by the development of the toll highway company at that time. In 1792, the construction of the first toll highway in America began, namely the famous Philadelphia to Lancaster toll highway (gravel laying). At the height of the toll highways construction, Connecticut had more than 50 toll highway companies, New York State had 67, and the rest were located in areas such as Massachusetts. Since the construction of toll highways began in the late 1890s to 1830, more than 8,000 miles of highways have been completed or converted into toll highways with the approval of the states.

In the toll highways, except that the line connecting the central city has enough traffic to cover the cost, most toll highways are financially unsuccessful. Despite financial difficulties, toll highways were the best highways in America at the time. However, with the rapid development of the railway network, toll highways have lost almost all passenger and freight services, long-distance toll highways have failed, and only short-distance toll highways play the role of railway extensions. By 1900, most toll highway companies had ceased operations, and states and local governments had assumed responsibility for the maintenance of some highways. During this period, due to the failure of toll highways, it caused confusion in people's understanding of toll highway, which directly led to the subsequent contempt for toll highway.

The First World War raised awareness of the important role of highways, particularly in manufacturing centers. At the same time, by the end of the 1920s, more than half of American households owned cars, especially in major cities such as New York, Boston, Los Angeles, and San Francisco, and the demand for highways (bridges, tunnels) was very large. As a result, with limited financial resources on the part of states and local governments, and without large-scale funding from the federal, the practice of toll highway has been applied to many highways. For example, the Dutch Tunnel project in New York was completed and opened to traffic in the mid-1920s and was called "the eighth largest miracle in the world." The Golden Gate Bridge toll project built in San Francisco in the 1930s.

The Second World War gave people a new understanding of the important role of highways, namely the important defense function of highways. At the same time, some states recognize the

need to build high-grade highways. The first successful construction of high-grade toll highways was in Pennsylvania. In the decade from 1945 to 1955, many states (mainly in the northern and eastern parts of the United States) began to build large-channel toll highways within their jurisdiction.

During this period, the U.S. federal failed to fund in highway on a large scale. In addition to legal obstacles, budgetary constraints are also an important factor. At that time, the U.S. federal budget was mainly dependent on tariff revenues and was small by current standards. Some people feared that large-scale funding in highways would overwhelm the budget.

1.2 U.S. federal special taxes

In 1947, the U.S. federal proposed an interstate highway plan for the needs of national economic development and strategy. The first overall layout plan proposed the plan of 60,640 kilometers of interstate highways. However, under the system of state and local affairs, the construction of highways was still due to the limited financial resources of states and local governments, coupled with the impact of rising construction costs. By the time President Eisenhower took office in 1953, the States completed a total of 1,0327 kilometers of interstate highways improvement, only 17 % of the plan. At the same time, it also exposed the drawbacks of funding in highways with general budget funds provided by the government: not only can it not guarantee the demand for funds, but more importantly, it does not have long-term and stable conditions, which contradicts the long-term development of the highways.

Faced with the financing difficulties of interstate highway, President Eisenhower submitted a report to Congress in 1955 that the current problems of the National Highway construction must be solved and a practical plan should be proposed. The report also stated that as a unified country, it is maintained by the free exchange of ideas and the easy flow of people and goods. The combination of transport and communication is the driving force behind a unified country, otherwise we would be merely a union of many separate regions.

When the U.S. federal designed the financing system for interstate highway, it considered and eventually rejected three options: general taxation, toll highway, and Corporate bond.

General taxation: At that time, American tire manufacturers, the Automobile Federation, the oil industry, etc. proposed that highway funds should be provided by general tax revenues, on the grounds that highways benefited society as a whole through economic growth and improved transportation. The main reason for this proposal was rejected: First, the strength of these industries was insufficient at the time, and second, the long-term contradiction between general taxation and the development of the highways.

Toll highway: Toll highway was an important option at the time, and President Eisenhower supported toll highways. But the lessons of America's failure to get up early to develop toll highways are hard for policy makers to decide. In addition, the Federal Highway Administration believes that it is not feasible to use the toll highway to fund interstate highways across the mainland (there was no ETC at the time).

Corporate bond: In 1955, a special presidential committee proposed the formation of a new federal highway company to pay for interstate highways costs by issuing \$25 billion in 30-year bonds. Repayment with the then 2 cent/gallon federal gasoline tax (going into the general budget and not related to highway spending). This plan was eventually rejected because the establishment of an independent federal highway company would weaken Congress's control over the highways, and the legislature believed that Corporate bonds would pose a threat to the federal budget system.

After fierce debates, in June 1956, the U.S. Congress approved the interstate highways budget and authorized 25 billion U.S. dollars for interstate highways in 1957-1969. The federal expenditure ratio was 90 %. At the same time, following the model of the Social Security Trust Fund, Highway Trust Fund (HTF) was established and the highway user taxes were incorporated into the HTF account for the interstate highways.

In 1956, under the Federal-Aid Highways Act and the Highway Tax Act, the federal began to collect federal fuel taxes, which included: gasoline tax 18.4 cents per gallon, diesel tax 24.4 cents

per gallon, and tax revenue included in the HTF account. At the same time, vehicle-related taxes were separated from the total tax revenue, of which about 70 % of vehicle-related tax revenue was included in the HTF.

At the beginning of the HTF, the highway user taxes included: fuel tax, tire tax, inner tire tax, tread rubber tax, truck trailer tax, and heavy vehicle use tax. Since then, specific taxes and tax rates have been partially adjusted, such as the 1966 increase in the lubricating oil tax and the auto parts tax. In the 1980s, the taxation of lubricating oil taxes, auto parts taxes, inner tire taxes, and tread rubber taxes were gradually stopped. The main reason was that these tax bases were not wide and taxes were small, and they contributed little to the fund. The taxes currently included in the HTF mainly include: fuel tax, tire tax, truck trailer tax, and heavy vehicle use tax.

According to U.S. highway experts, the HTF reflects the federal three-fold policy commitment: First, the highway user tax is specifically used for highways, thus guaranteeing the long-term stability of highway funds and reducing policy uncertainty; The second is that the decision-making body has given up the possibility of misappropriating highway income and kept the tax rate at the level necessary for the cost of highways; The third is the commitment to avoid debt and rely on general tax revenues.

1.3 Refurbishment of toll highways

The HTF was established and implemented half a century later. Since 2008, the growth in fuel tax revenues has slowed as a result of slowing economic growth in America and the introduction of new fuel efficiency standards, which have depressed fuel consumption, and the HTF accounts have run out of money. To cover the deficit in the accounts, the Congress approved \$8 billion from general budget funds for the HTF account in 2008, \$7 billion for 2009 and \$6.2 billion and \$12.6 billion for 2013 and 2014, respectively. According to the Congressional Budget Office, the HTF account will accumulate a deficit of \$82 billion by 2020.

In fact, as early as the 1980s, due to insufficient federal funds (because the federal could not continuously increase taxes), a number of early interstate highways had been damaged and repaired, resulting in signs of aging of the National highway system. In the context of the "dilemma" of the tax collection, the toll highways has been proposed again in recent years.

Another reason for this is the widespread use of electronic information technology for identifying vehicles and recording and storing vehicle information, as well as its ability to support the effective implementation of toll highways. ETC can not only greatly reduce the management costs of toll, but also reduce the operating costs of vehicles and directly benefit the public. With the public's familiarity and acceptance of ETC, it is very likely that in the near future, the toll highways will once again be more widely applied to highways in America.

2. Comparison of tolls and taxes

2.1 Factors: financial and external

In the early stages of highways in America, the federal basically did not fund due to the implementation of state and local affairs. With the limited financial resources of states and local governments, the toll highway became an inevitable choice for the US highways at that time. However, in the 1950s, as the U.S. government and society put forward higher needs for highways, the original financing system could not meet the needs of highways, so the federal decided to increase its funds in highways.

However, in the choice of specific models, it is influenced by various external factors. Although the idea of toll highway was supported by the President of the United States, it was difficult to unify knowledge, coupled with technical immaturity and some legal obstacles that existed at the time, which led to the rejection of toll highway.

In this context, the federal has adopted a highway special tax to solve the problem of expanding highway funds. At the same time, due to the large number of types of highway special taxes, and large income scale, it basically met the funds of the large-scale construction of highways at that

time. However, in the 21st century, with the continuous increase in the demand for highways, the highway special tax system has begun to be difficult to meet the increasing funds, so the demand for toll highway has gradually increased.

From the perspective of the United States 'highway, the two modes of tolls and taxes collection have played an important role in different periods and have fulfilled the mission given by that era. There is no distinction between good and bad. The specific choice of the model depends on the funds of highways at that time, and on the other hand, it is also constrained by external factors such as people's ideological awareness, legal and budgetary systems, and technical levels at that time.

As far as china's highway is concerned, after the reform and opening up, China's economy and society have continued to develop rapidly, and the masses have traveled more and more frequently, and the demand for highways has continued to expand and increase. However, at that time, the status of highways was seriously lagging behind and became a bottleneck that restricted the rapid economic and social development. In order to solve the bottleneck constraints on economic and social development, the 54th executive meeting of the State Council in 1984 made "loans to construction highways", the major decision to pay back the tolls. The implementation of the toll highway has formed a diversified financing system of "state funding, local financing, social financing, and the use of foreign capital". It plays an important role in the highways in china.

According to the National Toll Highway Statistics Bulletin in 2017 of the Ministry of Transport, by the end of 2017, the total length of highways in china had reached 4.77 million kilometers, which was 5.2 times that of the end of 1984. Among them: the expressway reached 136,500 kilometers, and the mileage ranks first in the world; The first class highway is 105,200 kilometers, which is 350 times the end of 1984; The secondary highway is 380,500 kilometers, which is 20 times the end of 1984. Among the country's existing highway networks, over 98% expressways, 61% first class highways and 42% second class highways were built on toll highway. The rapid development of highways has greatly improved the highway capacity and transportation efficiency, and promoted the sustained and healthy development of china's economy and society.

At present, china's highways is in the stage of a large-scale construction, which is speeding up into a network. The task is heavy, and the need for funds is large. It is still difficult for the special taxation and general public finance to fully bear the burden. According to estimates, the vehicle purchase tax in china now only meets about 15 % of the capitals for highways construction, and the fuel tax is only enough for 30 % of the capitals for highways maintenance, leaving a gap for construction and maintenance. There is still a need to attract social capital through toll highway and to address them through bank loans. That is to say, the basic environment of china's highway needs, and the financial budget at all levels is difficult to meet the needs of the basic environment has not changed. Therefore, adhering to the toll highway is the internal requirement and the only choice for china's highways.

2.2 Highway special tax: the international practices

At present, the United States, Germany, Japan, Australia, South Korea and other developed countries have adopted a special tax(or government fund) system for highways(even after large-scale construction has ended), rather than adopting a general tax. That is, according to the principle of "user payment" fairness, a long-term and stable financing mechanism is established through special taxes(or government funds) to ensure the funds for highways.

In addition to the HTF, Germany's "Transport Finance Act" promulgated in 1955 stipulated that fuel taxes were used as a special source of financial resources for highways. Japan established a highway special financial system in 1953. Gasoline tax, diesel tax, liquefied petroleum gas tax, vehicle purchase tax, automobile tonnage tax, automobile weight tax, volatile oil tax, local highway tax, oil and gas tax, and other taxes related to the purchase, retention and use of vehicles are successively used as special sources of financial resources for highways, Transfer to a special account as a special fund for highways. A system of special funds for highways has been introduced in Australia, and national and local governments have collected special taxes and fees from highway users, which have been grouped into "pools of funds" for direct use in the construction,

operation and maintenance of highways. South Korea established a special highway account in 1989, and 90 % of its funds comes from special excise taxes on gasoline, light excise taxes on gasoline, and special excise taxes on cars. In 1994, when South Korea reformed the fuel tax, special excise taxes such as gasoline and light gasoline were changed to transport taxes.

2.3 Toll highway: A passer paying system reflecting the principle of fairness

In the course of the development of the two modes: tolls and taxes, the understanding of concept of tolls and taxes is also deepening. At present, the national decision-making institutions and theoretical circles in America have formed the following understandings:

Highway special tax: A passer paying proxy system. The highway user tax represented by the HTF based on the fuel tax is considered to be a passer paying system. But since the fuel tax does not directly correspond to highway consumption(miles), it is more easily understood as a passer paying proxy system.

Toll highway: A passer paying system that reflects the principle of fairness. On the contrary, because toll highway is directly linked to the length of highways used, they more directly reflect the principle of fairness in the use of tolls. Therefore, the American economics community believes that toll highway is a higher level passer paying system that reflects the principle of fairness.

3. China's toll highway urgently needs to be improved

3.1 Toll highway needs to be adapted to the new requirements

At present, with the reforming of the national fiscal and tax system, the toll highway needs to be improved in line with the new requirements. In 2014, it issued the Opinions of the State Council on Strengthening the Management of Local Government Debt, and the Decision of the State Council on Deepening the Reform of the Budget Management System. It calls for the establishment of a unified local government debt management mechanism for borrowing, using and paying back, and the implementation of a comprehensive, standardized, open and transparent budget system. Subsequently, the new Budget Law was promulgated and implemented, which promoted the requirements of the national fiscal and tax system reform to the National legal will.

According to the requirement of the national fiscal and tax system reform, the traditional financing system of highways in China should undergo fundamental changes. The "unified loan and unified repayment" model that was originally implemented by the highway authorities should be transformed into the "unified borrowing, unified charging, and unified repayment" model implemented by the provincial people's governments. That is, the government needs to pay off the government toll highways. This model of unified collection, unified support and unified management of highways in provincial units can effectively reduce the financing and operating costs of government toll highways, improve management efficiency, enhance highway debt service capacity, and reduce government debt risk.

Under the requirements of the national fiscal and tax system reform, the local government financing platform was originally the main model for the construction of highways, and it was necessary to change to the government franchise highway. The local government financing platform should be transformed into a market-oriented one. That is, through the establishment of a highway franchise system, the use of bidding and other competitive methods to select investors. By signing the franchise agreement, it clarifies the highway maintenance management, service quality, information disclosure obligations of the franchisee, reasonable return, and risk sharing. In highway construction, toll operation, maintenance and other links actively and flexibly promote a variety of PPP models, can effectively prevent and control and reduce the overall debt risk of toll highways.

Also under the requirement of national fiscal and tax system reform, the government needs to further strengthen the supervision and information disclosure of toll highways, and promote the normative and healthy development of toll highways in China. We will improve the information disclosure system for toll highways, standardize, institutionalize, and normalize information disclosure, improve the transparency of toll highway information, refine the contents of public

information, and fully accept public supervision. At the same time, we will improve the toll highways franchise system, strengthen the government's supervision over franchised projects, guide toll highways operators to make reasonable arrangements for the use of tolls, effectively control expenditures, and highlight the public welfare and social service attributes of highways.

3.2 Innovative approaches effectively to reduce highway costs

To Improve the credit system in the field of construction. To improve a credit system for bidding, surveying and designing, testing, and supply of materials and equipment for projects. To improve the standards of the credit system, and further strengthen institutional development in areas such as credit information collection and disclosure, credit rating, credit rewards and punishments. To establish a credit evaluation mechanism, actively carry out the design of key projects and credit evaluation of construction enterprises, constantly improve the procedures for collecting, reviewing, evaluating and publishing information, and strengthen the application of evaluation results.

To Promote the integration of highway debt repayment into budget. After the local government's debt budget, it can use the low cost financing to replace the high interest rate of the loans, such as government special bonds, to reduce the financing costs and ease the pressure on debt repayment. According to the National Toll Highway Statistics Bulletin in 2017 of the Ministry of Transport, by the end of 2017, the balance of government debt to pay off loans on highways nationwide was 2828 billion yuan. If we replace them with government special bonds and reduce the interest burden by 1%, the annual interest expenditure will be reduced by 28 billion yuan, accounting for 14% of the highway tolls paid by the government in 2017. The current pressure on toll highways to service their debt can be greatly reduced, and the government debt risk of toll highways can be effectively reduced.

To Promote the toll highways system in due course. In light of the requirements and opportunities for reforming state institutions, promoting government procurement of services and transforming government functions, and accelerating the market-oriented transformation of local government financing platforms, the toll highways management system will be promoted, and a market competition mechanism will be introduced. We will innovate management system, improve the efficiency of the use of financial resources, effectively reduce management and financing costs, improve the efficiency and level of public services, and promote the sustainable development of highways.

Appendix: Privatization of the Japanese state-owned Highway Public Associations

In Japan, the special taxes alone could not meet road fund needs. In 1952, Japan promulgated the "Special Act on the High-grade Highways" to establish a toll system for National highways as a way to raise funds for high-grade highways to make up for funding gaps, operating costs, and repayment of related debts. In 1956, Japan established a state-owned Highway Public Association (HPA), which was fully responsible for the implementation of the plan of toll highways.

The problems exposed by the HPAs. Since the funds for the highways mainly came from the central Budget funds and loans, there was no need for local governments and local residents to bear the burden. For a long time, local governments and local elected members of parliament have used the fight for local highways as an important capital to please voters. Under such political pressure, highway plans have been repeatedly expanded, and many new lines could not achieve balance of payments due to low utilization rates. With the increase in loss routes, the fees for the entire expressway network have increased accordingly, making Japan's expressway toll rates among the highest in the world (about US\$ 23 / 100 km). According to the highway revenue and expenditure situation announced by the HPA in 2004, of the 43 lines in operation, 23 were not covered. At the same time, the HPA ignored the economic rationality in its operations, constantly borrowed funds for new lines, and lacks cost awareness in financial management, resulting in low operating efficiency.

Privatization of the HPAs. In 2004, the Japan parliament passed the "Law on the Privatization of the Four Highway Public Associations". The HPAs opened the privatization reform and split the original HPAs into six new companies responsible for highways construction and management, and

one highway retention and debt repayment institution. The original assets and debts of the HPAs are held on behalf of the government by the newly established independent administrative legal person, the Japan Expressway Retention and Debt Repayment Agency. On behalf of the government, the agency signed a toll highway operation agreement with the highway company. The toll highway was handed over to the highway company for operation in the form of a lease. After the completion of the newly built toll highways, assets and debts were held by the agency. In addition to the highway rental relationship between the agency and the highway company, there are also financial transactions and a certain degree of supervision relations. Highway companies can obtain interest-free loans or government-guaranteed bonds from the government, but have the obligation to reduce operating costs and be supervised by the agency.

The results of the privatization of HPAs: First, the average toll has been reduced by 10 %, and another 10 % can be reduced by abolishing the prepayment preferential system. The second is to significantly reduce the construction and management costs. The original plan was to continue to invest 20 trillion yen in the construction of the 2000-kilometer expressway. After the change to a privatized new company, only 7.5 trillion yen was funded in the construction of 1,300 kilometers.

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