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THE EFFECTS OF ECONOMIC RESTRUCTURING ON CHINA'S SYSTEM FOR FINANCING TRANSPORT INFRASTRUCTURE

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Abstract—Since the late 1970s, the Chinese government has introduced new measures based on a Beneficiary-Pay System for financing transport infrastructure. In this paper, first we review the changes in the system for financing transport infrastructure over the last 50 years in China and analyze the characteristics of the current system. Second, we compare the Chinese Beneficiary-Pay System with those implemented in the U.S. and Japan. Finally, we highlight several problems in the present Chinese system, focusing mainly on the Beneficiary-Pay System, and derive possible solutions for them. © 1998 Elsevier Science Ltd. All rights reserved

1. INTRODUCTION

In order to supply sufficient transport infrastructure to support economic growth, a considerable amount of investment is essential. Experience in many countries reveals that it is difficult to depend on the public sector alone to bear such a heavy burden. In developed countries, governments have various long-established institutions to guarantee sufficient financial resources to supply transport infrastructure. In many of these countries, the so-called Beneficiary-Pay System (BPS) has been examined. As a result, besides efficient toll-systems, there are many examples of taxation and levy systems related to the benefits created by transport infrastructure supply.

The situation in China is quite different. Formerly, China implemented a purely planned economy in which the state owned and controlled all resources including land and, therefore, there was no need for a taxation system. In this situation, the central government was the only economic entity in the country and thus the only investor in transport infrastructure supply. Since the late 1970s, the implementation of the 'reform and open' policy has formed a semi-planned semi-market economy in which independent economic entities can share benefits from investment. This economic restructuring resulted in rapid economic growth (Gross Domestic Product grew at an annual average of about 9% during 1980–1992) and, on the other hand, a widening gap between transport demand and supply. The insufficient transport infrastructure has made the traffic and commuting conditions in both urban and rural areas worse. Taking Beijing as an example, the average speed on main urban roads dramatically decreased between 1980 and 1985, as shown in Table 1.

China recognized that, without diversifying and increasing the resources available for investment, it would not be possible to improve transport infrastructure to catch up and keep pace with the progress of economic reform. Therefore, during 1980–1985, the government reformed the financing system for transport infrastructure based on the Beneficiary-Pay principle.

The aim of this paper is to point out the problems in the present system for financing transport infrastructure in China. In order to achieve this objective, in Section 2 we review the changes in the system for financing transport infrastructure and analyze the characteristics of the present BPS-based system. In Section 3, we compare the Chinese BPS with those systems implemented in the U.S. and Japan and highlight the existing problems in the present financing system, focusing mainly on BPS. Finally, in Section 4 we derive possible solutions for these problems.

Table 1. Road operating speed in Beijing

Name of road	Operating speed ($km\,h^{-1}$)		Change (%)
	1980	1985	
North No. 3 ring road	44.7	28.8	–36
Quianmen Street	30.4	11.9	–59
No. 2 ring road west	19.5	13.3	–32
No. 2 ring road east	18.5	9.3	–50
Changan Street	28.5	14.7	–49

2. CHANGES IN THE SYSTEM

2.1. General financing system

Here, we divide the government in China into two levels, central and local government, the latter including provincial, city, county and town governments. As shown in Table 2, before 'reform and open', a financial system dominated by central government and a revised version of it were implemented during 1950–1952 and 1953–1979, respectively.

After 'reform and open', a financial system with authority shared among central and local governments as well as enterprise was implemented during 1980–1994. The consequent change in the budgetary and extra-budgetary investment and revenue are verified by Figs 1 and 2. 'Budgetary investment' means state budgetary appropriation which includes: (a) funds appropriated to construction enterprises or entrusted to banks for lending to construction enterprises from the state budget, local finance and responsible institutes; (b) funds appropriated to enterprises by central government for technical updates and transformation, and (c) special funds arranged by central government. It represents the amount invested by central government. On the other hand, 'extra-budgetary investment' includes domestic loans, foreign investment, stocks, bonds, self-raised funds and other resources. It represents the amount invested by entities other than central government (Statistical Yearbook, China 1994). As shown in Fig. 1, the share of extra budgetary investment has steadily increased in the last 20 years. After 'reform and open', the share of budgetary investment decreased from 78% in 1977 (300 bn Yuan) to 9% in 1992 (308 bn Yuan) while the remaining share was covered by extra-budgetary investment which increased from 22% in 1977 (82 bn Yuan) to 91% in 1992 (2704 bn Yuan). As shown in Fig. 2, in 1952, extra-budgetary revenue occupied only 7% of total revenue but, in 1982, this share increased to 41% and, in 1990, further increased to 50%.

From the above figures, we can see that central government has decentralized much of its fiscal authority to local government and enterprises since China embarked on economic reform in 1979.

2.2. System for financing transport infrastructure

The system for financing transport infrastructure had a similar evolution to the general financing system. During the period 1950–1979, the enterprises had to submit all their income except the earnings stipulated by the state to be retained for workers' rewards and welfare. Also, decision-making power rested totally with central government. Central government was the sole investor

Table 2. History of main characteristics of the general financial system in China

System during 1950–1952	System during 1953–1979	System during 1980–1994
Central government dominated most of the decision power	Revised version of the former system with minor changes	Revenue and decision authority are divided into several levels
Central government paid all of the expenditures and owned all of the revenues		
Local government, enterprises and households carried out tasks assigned by central government	Local government had a limited decision right subject to central government approval	Besides central government, local government, enterprises and households can arrange their own plans according to their financial resources

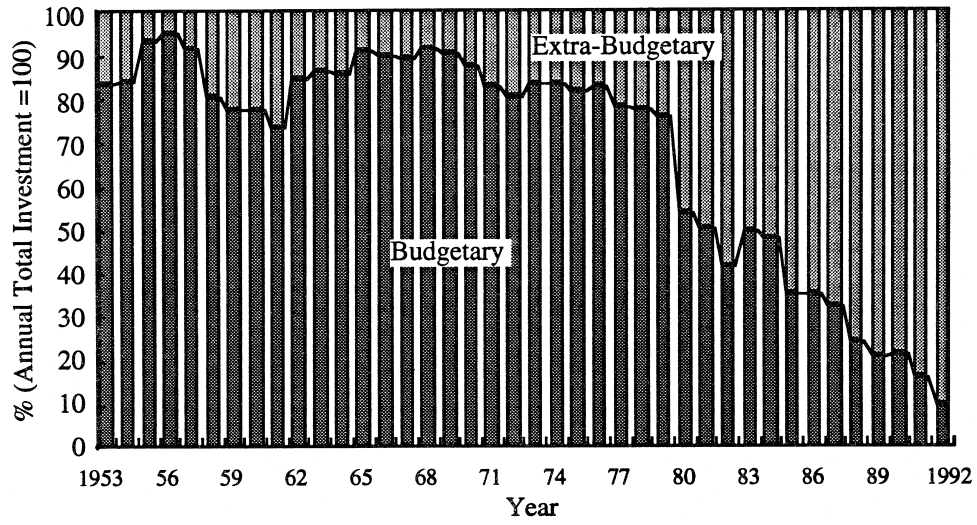

Fig. 1. Share of budgetary and extra-budgetary investment in capital construction. Source: Statistical Yearbook China (1987, 1991, 1994).

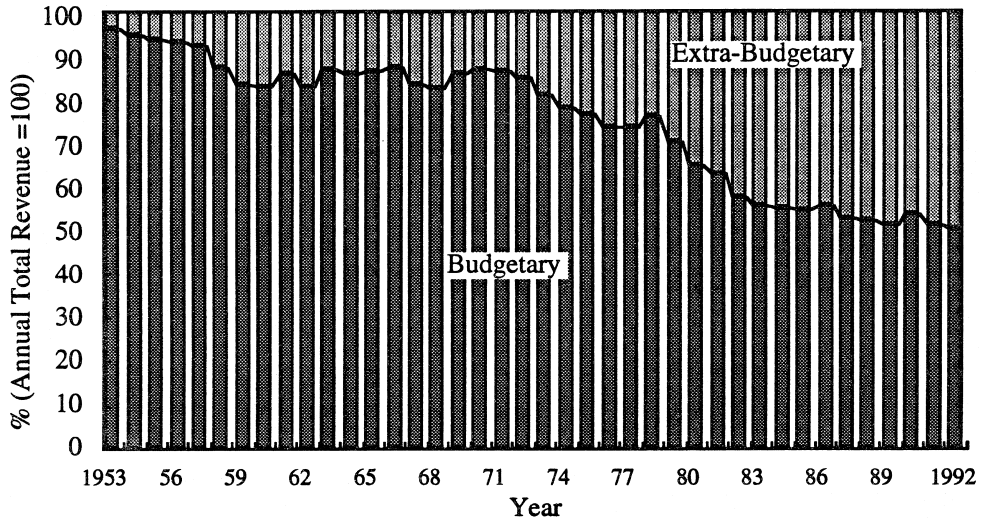

Fig. 2. Share of annual budgetary and extra-budgetary revenue. Source: Statistical Yearbook China (1987, 1991, 1994).

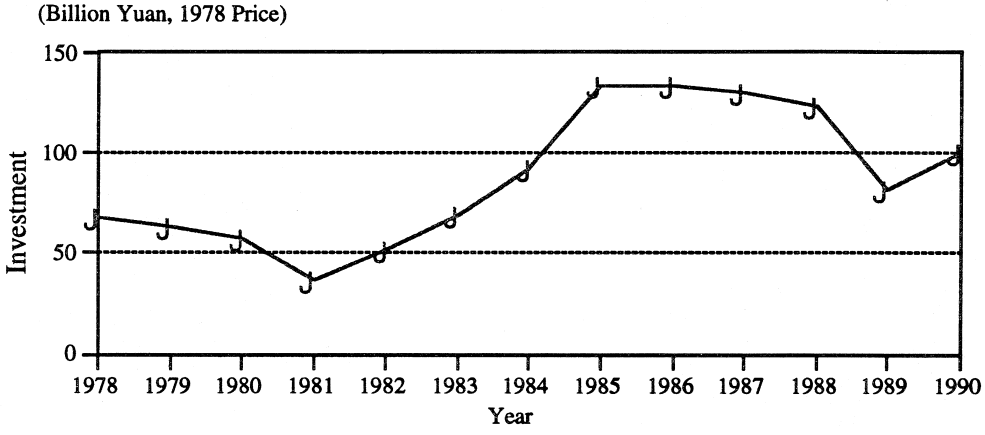

Fig. 3. Annual capital construction investment for transportation, postal and telecommunication services. Source: Statistical Yearbook China (1991).

Table 3. Measures for raising funds for financing road infrastructure in China

Measure	Date	Characteristics	Rate	Remarks
Road maintenance fee	Introduced in 1950 Revised in 1980	Earmarked fund Tax on transportation companies revenues Tax on vehicle ownership Revenue to provincial government used for inter-city road construction	15% of the gross revenues of transportation companies Based on tonnage	
Permission for toll roads	Introduced in 1980	Direct beneficiary-pay Access-controlled expressway Tunnel and bridge Toll belongs to constructor Toll levels are set by the province concerned	About \$0.04 per km	Mainly collected at the infrastructure which is financed by loan, bonds or foreign investment
Transferring road Infrastructure development Rights to foreign enterprises	Introduced in 1980 (Guangdong Province)	Toll road can be constructed and managed by foreign or private companies		Mainly a means of constructing or managing by joint-venture
Local beneficiaries pay the cost of labor and materials	Introduced in 1980	Indirect beneficiary-pay Often used in the countryside where the benefited farmer-group has to supply and bear the cost of labor and material		Often used in the countryside for getting labor or material from farmers
Collecting fund	Introduced in 1980	Government uses its authority to raise any required additional funds for financing local urban infrastructure by charging enterprises and households in the vicinity of such projects	Case-by-case	Fund accrues to local government. The scope, time, and amount of these charges change from case to case with the emphasis on burden ability rather than equity
Collecting land-use fee	Introduced in 1981	Foreigners as land users pay the charge for land Revenue to city government for improving urban construction	Land price differs from city to city	Levied on foreign investment enterprises
Funds for development of energy industries, transportation and key construction projects	Introduced in 1983 Cancelled in 1994	Revenue to central government		

(continued)

Additional public utilities fee	Introduced in 1984	Levied according to the business income of water supply, electricity, public transport, gas and telephone companies Revenue of city government Earmarked fund	5–8% of income	Exclusively used by city governments for intra-city road construction
Tax on city construction and maintenance	Introduced in 1984	Levy based on the sum of 'product tax', 'capital gains tax' and 'business tax' paid by enterprises Revenue of city government Earmarked fund	City 7% Town 5% Other areas 3% } of sum	Exclusively used by city governments for intra-city road construction
Contribution from land developers in the vicinity of their development regions	Introduced in 1984	Indirect beneficiary-pay		Obligation against land development right
Land use tax	Introduced in 1985	Land users except foreigners pay land charges Revenue to city government for improving urban infrastructure	Cities: large : 0.5–10 medium: 0.4–8 small: 0.3–6 Yuan/m Other area : 0.2–4[2]	
Vehicle purchase fee	Introduced in 1985	Revenue of central government for inter-city road construction Earmarked Fund	10% of the selling price for domestic vehicles 15% of the CIF price and customs tax local charges for imported vehicles	Exclusively used by central governments for inter-city road construction
Selling land development rights by the government	Introduced in 1987	Land use right can be traded to developers Revenue of city government used for urban construction	Land price differs from city to city	
Land capital gain tax	Introduced in 1990	Capital gain repayment system Revenue shared by central, provincial and city government	Added value (%) rate (%) 100 30 100-200 40 Over 200 50	Revenue of city governments mainly for urban infrastructure
Intergrated development of land use and infrastructure		Contructor of transport infrastructure develops land in the vicinity of the infrastructure to internalize development gains		Frequent intra-city use
Foreign borrowing, domestic loans and bonds		For subway and expressway construction, loans from the World Bank and Japan are often used		Caused the boom in expressway and subway contruction

and beneficiary. There was no other economic entity to invest in and benefit from the transport infrastructure. After 'reform and open', however, the system for financing transport infrastructure has changed. Figure 3 shows that the investment level for transport capital construction increased rapidly between 1981 and 1985. This remarkable increase can be attributed to the change in the financing mechanism for transport infrastructure during this period following the general principle of 'reform and open'.

To achieve this increased investment level, measures for boosting and diversifying resources have been introduced since 1980. These measures are summarized in Table 3.

Revising existing measures and introducing new ones enabled government to increase resources in a more effective way. We can see that, while some revenues accrue to central government, others accrue to provincial or city governments. As an example, the breakdown by source of the total investment in urban infrastructure construction during 1985–1990 in Changzhou (designated as a model restructuring city) is illustrated in Fig. 4. Similarly, the share of each funding sources for inter-city road construction in 1990 in Guandong, the most open province in China, is illustrated in Fig. 5. The expected funding sources for intra-city transport infrastructure in Guangzhou city, the capital of Guangdong Province, are shown in Fig. 6.

So far, we can see several trends appearing in the system for financing transport infrastructure:

1. The share of grants from central government and local governments has gradually decreased while the share of 'beneficiary-pay' has increased (Fig. 4).
2. Foreign enterprises and the private sector can now invest in road infrastructure construction and management areas, which were formerly monopolized by the public sector (Fig. 6).
3. Earmarked tax/road maintenance fee is the main financing source for the inter-city road (Fig. 5).
4. The revenue from the land market is being used for financing intra-city road infrastructure (Fig. 6).

2.3. Entities related to road infrastructure investment

Besides reforming the structure of the financing system for increasing and diversifying resources, several independent entities have appeared in the field of transport infrastructure investment. They are central, provincial and city governments, foreign and private contractors, industrial/business enterprises and households. With the new structure, central and provincial governments are responsible for inter-city transport infrastructure while city governments are responsible for intra-city transport infrastructure. Foreign and private contractors, however, can invest in both. Also, as beneficiaries of the transport system improvement, enterprises and households pay taxes for financing road infrastructure as well as direct tolls or fares. This structure is illustrated in Fig. 7.

Under the old structure, central government, as the sole entity involved, could not invest rationally to keep pace with demand. With the new structure, authority and responsibility are clearly divided among several entities. Therefore, each entity can act reasonably according to its goals and constraints. Formerly, transport infrastructure investment depended totally on general

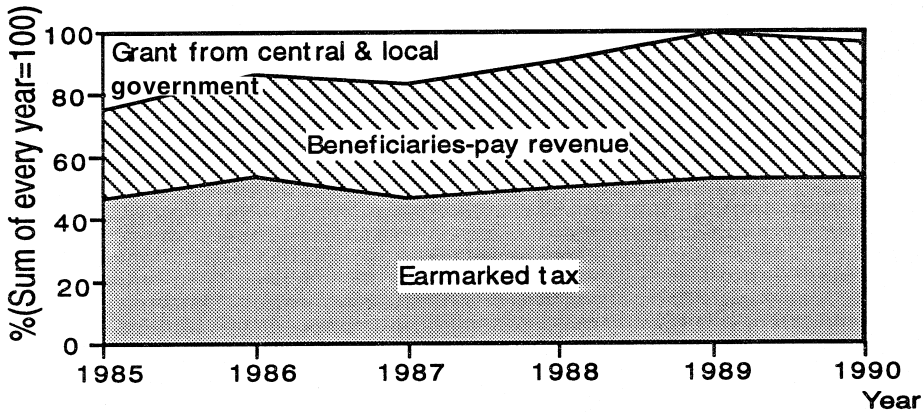

Fig. 4. Urban construction financing resources in Changzhou. Source: Seki (1994).

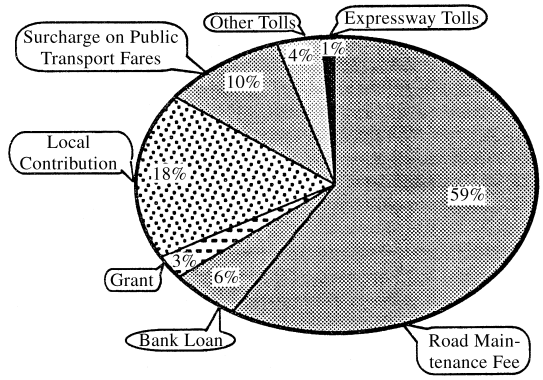

Fig. 5. Highway financing resources for Guangdong Province (1990). Source: World Bank (1994).

financial resources, and was strongly affected, therefore, by the policies of central government. Diversified financing resources, especially the earmarked tax relating to demand levels, can enable transport infrastructure investment to catch up and keep pace with demand.

2.4. New issues to be addressed

Although the amount of actual investment increased up to 1985, it stabilized and even fell thereafter. This is because the new financing system is an unfamiliar one to China, and there are still several issues which have to be addressed. Evidence of these issues is also reflected in the unstable investment level shown in Fig. 8 and in the widening gap between transport infrastructure supply and fast increasing transport demand (illustrated in Fig. 9).

As several entities appeared due to 'reform', benefits can no longer be confined to the central government as in the former system. Thus, how to establish a benefit repayment system is a new challenge for the government. In the field of road transport infrastructure, the beneficiaries fall into two categories: direct and indirect. Direct beneficiaries are users of road infrastructure. Indirect beneficiaries include developers, land owners, land users and users of existing alternative transport infrastructure. In dealing with this challenge so as to stabilize resources and balance demand and supply for road transport infrastructure, it is necessary to study the following issues:

1. Who are the beneficiaries and to what extent they should pay?
2. What kind of 'beneficiary-pay' system should be introduced and how should revenues be allocated among the different entities involved?
3. How to deal with foreign and private investment in this field? What kind of subsidy and land acquisition system would provide incentives to foreign and private investors?
4. How to decide and revise land prices and taxes?

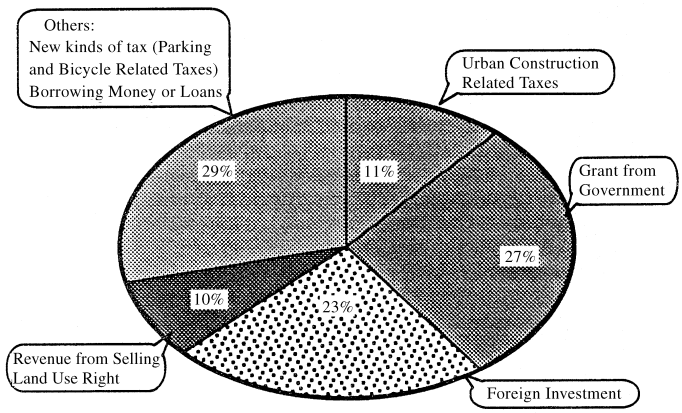

Fig. 6. Expected financing resources for urban transport infrastructure in Guanzghou City.

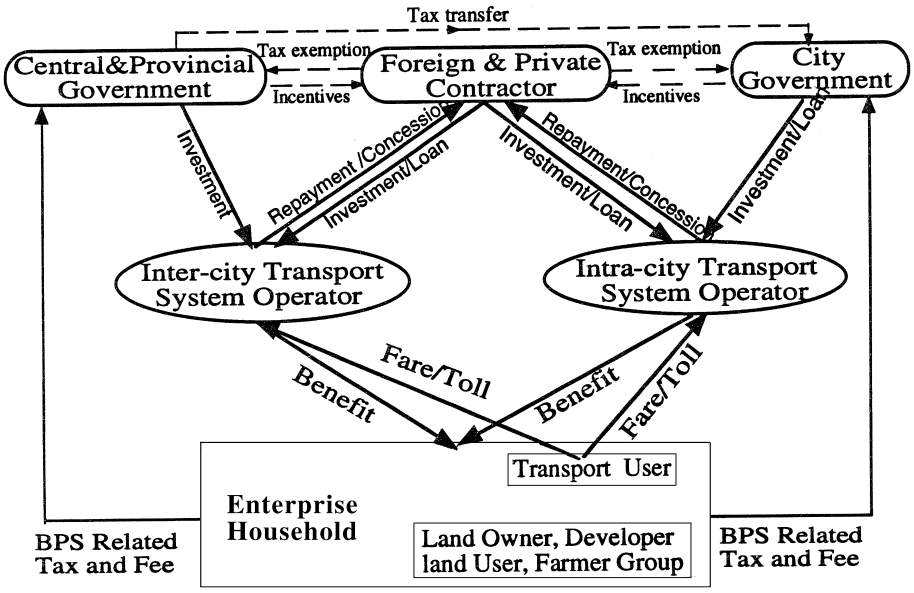

Fig. 7. Present transport infrastructure investment and benfit frame.

In fact, in many developed countries these issues are being tackled through the implementation of various forms of the BPS. Therefore, in China now it is essential to study such systems which have been long regarded as capitalist instruments and thus not introduced into China until its economic reform.

3. COMPARISON OF BPS IN THE U.S., JAPAN AND CHINA

Table 4 shows the main characteristics of the BPS implemented in the U.S., Japan and China (Hayashi and Tomita, 1992; Hoel *et al.* 1990; Road Bureau Ministry Of Construction, 1995; Varma and Sinlal, 1990; Walton and Mark, 1990; World Bank, 1994). The following comparison and discussion are based on the information given in this table.

3.1. Consciousness about repayment

Both the U.S. and Japan have market economies where governments depend on taxation to guarantee revenues to cover government expenditure. In these countries, the public is aware of the importance and rationale of taxation. Especially in the U.S., when a beneficiary-pay related tax is imposed, the evidence and reasons are usually open to the public. In each state, the court has established the relevant laws for capturing the benefit induced by transport infrastructure improvement. In Japan after World War II, the BPS contributed to keeping road investment at a high level — over 2% of GDP in the period 1965–1994 (Hayashi *et al.*, 1995). In both cases, the equity criterion has been recognized by beneficiaries, thus their systems can be regarded as mature.

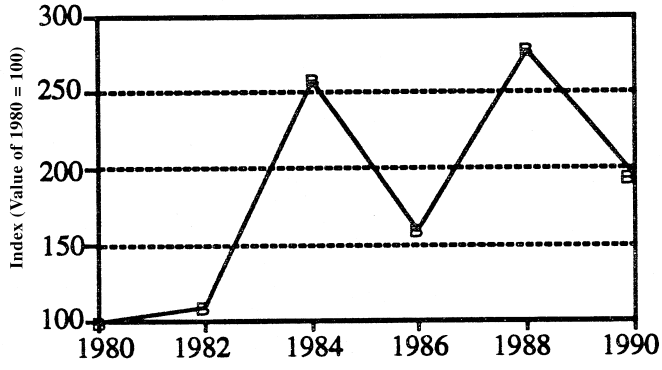

Fig. 8. Budget for urban infrastructure construction in Changzhou. Source: Seki (1994).

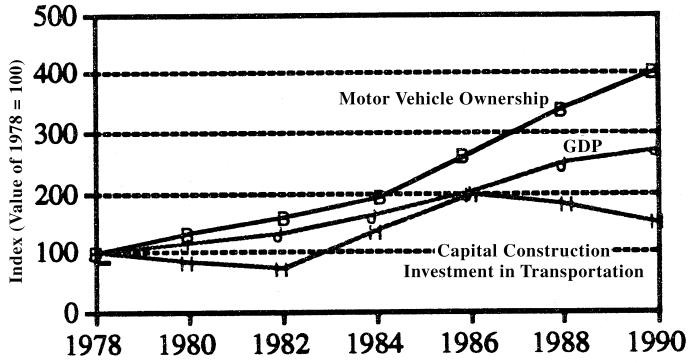

Fig. 9. Comparison between economic growth and transport infrastructure demand and supply. Source: Statistical Yearbook China (1991).

In China, however, the change from a planned to a market economy started only 15 years ago and its economy is still in transition. Taxation is a new concept for its citizens. A land market was established only in 1987. The government still manages the economy with market-oriented as well as administrative methods. For example, when government levied a land use tax, state-owned enterprises were often exempted from the tax due to their limited financial ability. This has caused beneficiaries in China to lack any perception of paying for benefits. For a long time, citizens had been accustomed to using transport infrastructure either with no or very low payments. The situation was similar for foreign enterprises as a result of the government policy of encouraging foreign investment by introducing many policies that were favorable to them. As a result, both enterprises and households now often consider beneficiary repayment as an unacceptable burden and, when land capital gains tax was levied, it was heavily criticized.

3.2. Earmarked tax for road improvement

In the U.S. and Japan, besides general investment, there are also earmarked taxes such as gasoline, diesel and motor vehicle related taxes. This system provides stable and demand-elastic revenue sources for financing transport infrastructure. In Japan, comprehensive resources are used (Hayashi *et al.*, 1995). They are: (a) a special fund raised from automobile related tax; (b) a general fund from general tax, and (c) a fiscal investment and loan system with resources from postal savings. All of them helped keep the stability of the financing sources.

In China, besides general funds, inter-city infrastructure is mainly financed by road maintenance and vehicle purchase fees. Although these are earmarked taxes and are used exclusively for roads, the contribution of this revenue source is not as much as of fuel tax in Japan.

In the case of intra-city transport infrastructure, several financing sources are stipulated for exclusive use for urban infrastructure. They are not levied as independent taxes but, rather, as an excess levy from products tax, business tax and capital gains tax at a very low rate. The resources for financing infrastructure is strongly influenced, therefore, by fluctuations in the economy and is thus quite unstable. With only these revenues, urban road infrastructure supply level cannot keep pace with the rapidly increasing demand (Yue, 1993).

3.3. Project-based financing

The U.S. has plentiful beneficiary-pay policies (Hayashi and Tomita, 1992). Special project based measures are particularly successful. They are: (a) impact fee; (b) special assessment or financing districts and (c) tax incremental financing. Such policies usually target limited regions and particular entities who benefit from special development projects. In this way, equity of the BPS is guaranteed. In contrast, China's beneficiary-pay policies target a wide area with a broad scope. The only method with limited regions and particular entities targeted is the 'collecting fund'; other taxes/fees are levied on all enterprises and/or households. The benefit may be substantially different between sites, however, depending on whether they are close to transport facilities such as railway stations and expressway interchanges. Therefore, it might be preferable for China to have a more precise levy system which can clearly reflect the benefit levels of specific projects to ensure the equity of the payment.

Table 4. Beneficiary-pay system in the U.S., Japan and China

Country	Economy type	Age of BPS	Public awareness of BPS	Source of revenues				Integrated development of land and transport infrastructure
				Direct beneficiary		Indirect beneficiary		
				Fares	Earmarked tax	Land related taxes	Developer-pay	
U.S.	Market economy	Mature	Well aware and informed	Fares Toll	Gasoline, LPG and diesel taxes Motor vehicle purchase and registration fees Vehicle related products taxes Ton-mile, axle-mile taxes	Property tax Special financing district Special assessment district Tax incremental financing	Impact fee Connector fee Additional contribution to infrastructure	Exists
Japan	Market economy	Mature	Aware and informed	Fares Toll	Gasoline tax Motor vehicle LPG tax Light oil Transaction tax Motor vehicle purchase tax Motor vehicle tonnage tax	Beneficiaries-pay system based on urban planning Laws Office tax Land price tax Fixed asset tax Donation for stations	Impact fee Developmental interchange project Payment by New Town developers Connector fee Land readjustment project	Exists
China	Semi-market semi-planned economy	Immature	Not aware or informed	Fares Toll	Road maintenance fee Motor vehicle purchase tax Tax for city construction and maintenance Additional public utilities fee	Charge on selling land use rights Land use fee and tax Land capital gains tax Collecting fund	Urban construction and compensation fee Transport and energy construction fund Additional contribution to infrastructure	Exists

3.4. Allocation of vehicle related taxes

Regarding the allocation of vehicle related taxes, there are also differences between China and other countries. In Japan, for instance, vehicle purchase tax is an earmarked tax and its revenues accrue to local governments. Revenues from vehicle-tonnage tax and gasoline tax are also allocated between central and local government. In China, however, similar tax revenues are used exclusively by the central government, mainly for financing inter-city roads. Obviously, vehicle users who have to pay road maintenance and vehicle purchase fees use not only inter-city roads but also intra-city roads. The same is true for transportation companies since their base is usually inside cities. Therefore, this levy and allocation method contradicts the rationality of the beneficiary-pay principle.

3.5. Land related taxes

One of the most important development gains induced by transport infrastructure is the incremental increase in land value/utility. In Japan and the U.S., there are property taxation systems and authorized property valuation systems. In China, the only land related tax is land capital gains tax which is levied on land-use rights transactions and used for the improvement of urban infrastructure. The situation of land capital gains tax in China is illustrated in Fig. 10. After the infrastructure project was completed at time t, induced benefits include not only the initial development gains $\triangle P_1$, but also the development gains due to agglomeration economies $\triangle P_2$, which means the benefit induced by the concentration of enterprises. When a city government sells land-use rights, a development gain element is included in the transaction price P_1. Because this price is estimated on the basis of the utility level of the site at the selling time t_0, $\triangle P_1$ and $\triangle P_3$ (a part of $\triangle P_2$) might be repaid. However, the lack of a land valuation system in China means that $\triangle P_1$, $\triangle P_3$ cannot be estimated accurately and levied efficiently. Moreover, since there is no fixed asset tax in China, the further gains ($\triangle P_2$–$\triangle P_3$) cannot be captured. This caused the inefficiency of the financing sources from the land market.

3.6. Developers-pay

Unlike other countries, land developers in China are in a multiple payment system; they have to pay both as developers and as beneficiaries. Therefore, in China, the urban residential developers have to pay twice. In addition, they also have a duty to construct the transport infrastructure in the vicinity of their developing region. This causes high house prices for citizens wishing to improve their residential situation in urban areas. The citizens have to go to outer suburbs to find cheaper houses and this may increase demand for transportation. In the U.S., there are some arguments on impact fees as cited by Johnson (1990) that (a) impact fees are not an appropriate funding approach for all types of infrastructure improvements some — improvements benefit the entire community and as a result should not be paid for by new residents alone; (b) impact fees can raise housing costs and thereby exacerbate the problems associated with providing decent,

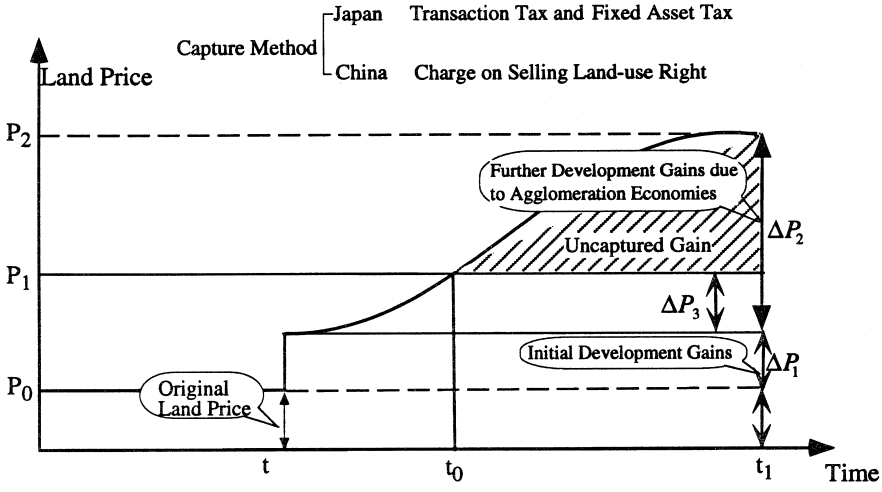

Fig. 10. Mechanism of development gain recovery in China's land market.

affordable housing for all; and (c) if a community wishes to encourage low-cost housing, it may reduce or waive impact fees for those projects, as Loveland does. In the case of Los Angeles metro rail project, a number of exemptions to assessment were also defined; one of them is land and improvement in use for residential purpose (except hotels and motels) (Stopher, 1993). Such an exemption system for residential developers should be considered in addition to the increasing taxation as a benefit capturing system.

3.7. Integrated development

Integrated development of land use and transport infrastructure is being applied in all three countries. In China, since the government owns urban land, it is easier to acquire and develop land near transport infrastructure in order to internalize the development gains. Therefore, implementation of this method is much simpler in China than in the U.S. and Japan.

4. POSSIBLE SOLUTIONS FOR THE EXISTING PROBLEMS

China has many unique economic and social aspects, so that it is not possible to directly adapt systems implemented in other countries. However, comparison with those systems can indicate potential solutions. In the following discussion, some recommendations for improving the system for financing transport infrastructure are suggested based on the above comparison.

First, the government should clarify to citizens and enterprises the rationality and importance of a benefit repayment system. Without their understanding, it would prove difficult to gain the support of the people, an important building block when introducing unfamiliar systems. This can be done through presenting some foreign examples to show how they would benefit from such systems. Also, the government should abandon ambiguous regulations such as unnecessary tax exemptions which can threaten the vitality of the system.

Second, the introduction of a gasoline tax as an earmarked tax can be one of the most effective methods for mobilizing funds for road transport improvement. An oil tax already exists but it adds to general revenues and is not directly linked to road investment. Since consumption of gasoline does reflect the demand for road infrastructure, the advantage of a gasoline tax in China would clearly be that it would link demand to supply.

Third, in order to boost revenues from the land market, a land valuation system has to be established and land taxation should be reformed, particularly to introduce fixed asset tax. While such a reform may imply higher tax rates, the government should not increase the tax burden on urban residential developers to avoid possible sub-urbanization. In general, models for estimating the effects of transport improvement on land value and the effects of taxation are essential.

Another possible method for the self-financing transport project in China could be integrated development. Two types of integrated development are possible. Under the first system, a relevant sector of the government could develop the land while the related transport infrastructure is being improved. The consequent increase in land value can then compensate for the cost. However, it is usually not easy for the government to secure the required large initial investment due to the shortage of resources. Therefore, under the second method, an independent company which consists of a transport infrastructure constructor and a land developer can be established. In this case, securing initial funds should be the responsibility of this company. This method could be easily implemented in China because of the state ownership of land. Regardless of which of the two methods is used, integrated development can be one of the most promising methods for financing intra-city transport infrastructure.

5. CONCLUSION

In this study, we have examined the system for financing transport infrastructure in China and compared it with the systems implemented in the U.S. and Japan. We found that after 'reform and open', the former investment system dominated by the central government was replaced by a new method with diversified financing sources. Within this new system, taxes/fees are levied based on the beneficiaries-pay principle which had not been studied in China before. We can also see that, because of the reform of the system for financing transport infrastructure, expenditure on capital construction of transport infrastructure during the period 1981–1985 rose rapidly. However, after

1985, the amount of this investment stabilized and even decreased. As a result, the transport infrastructure supply sustained by the new system cannot keep pace with the growing demand. This mismatch indicated a problem with the new system which needs to be resolved.

In the U.S. and Japan, road supply has kept up with its demand, and has been especially successful in Japan with its very fast economic and motorization growth following World War II. Comparing systems in all three countries, we found several good aspects in the Chinese system. For instance, instead of general funds only, both general and special funds are used, and China can easily make good use of its state-owned land to carry out integrated development to cover development costs with land development gains. On the other hand, there appear to be many shortcomings in the system which have to be dealt with. For example, the scope and rates of some levies imposed on users, enterprises, and the households contradict the basic principle of the beneficiary-pay system. Also, an inefficient allocation of revenue seems to be another problem to be addressed. In the land market, the lack of an authorized land valuation system and fixed asset tax is another inefficiency in the system.

To establish an effective system for financing transport infrastructure, the above-mentioned issues have to be addressed. The development of models for quantifying benefits induced by new infrastructure projects is another important step for addressing system inefficiencies. Without such models, there would be no clear guidelines for setting the scopes and rates of levies. From now on in China, developing this kind of model will be an essential task.

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