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A New Era for Public Transport Development in China

by D. Tilly Chang

The urbanization and motorization which fueled China's economic growth since the mid-1980s brought unprecedented demand for land, road space, and other urban infrastructure and services. As China's cities were being positioned as the new engines of growth, transport development between and within urban areas received high national priority. Government resources at state, provincial, and local levels focused on increasing infrastructure capacity and on expressways in particular, while industrial policy nurtured the nascent automotive industry. Some early policy and investment support was directed at public transport; however, these efforts were not deep enough to address structural weaknesses in management and operations. Thus, transit development lagged behind the growing demand for, and supply of, private modes of transport as China's economy boomed. As a result, traditional public transport services—mainly large buses—suffered significant ridership losses in the late 1980s and early 1990s.

This article surveys China's public transport experience over the past decade and a half, as China's environmental, energy, and economic development objectives have come into sharper focus. While the earlier industrial policy commitment to the "household car" has not been abandoned, there is growing recognition in cities that, even if private vehicle ownership is encouraged, this must be accompanied by prudent policies curtailing auto use. Moreover, the need to develop suitable alternatives to private auto travel motivates re-

newed interest in raising the efficiency, quality, and quantity of public transport services in urban areas.

POLICY EVOLUTION

In the mid-1980s, the government of China established a policy that public transport should be the dominant mode of urban passenger transport in urban areas.¹ The policy emphasized development of public transport systems and containment of the growth of privately-owned vehicles. For large cities, this included support for the gradual development of rail transit. The need for continuation of such a policy is reflected in the words of one Chinese scholar: "Rapid rail transit with large capacities (including metro) must be put into our agenda for development and constructed with careful planning to meet the needs of large traffic flows."²

Due to the large capital investment and foreign exchange required, however, authorities at the State Planning Commission responsible for macro-economic investment were cautious about approving rail transit projects in all but the largest cities. Today, metros only operate in four cities: Beijing (43.5 km), Tianjin (7.4 km), Shanghai (16.1 km), and most recently in Guangzhou where the 18.5 kilometer Line 1 was open for full service in 1999. Light rail or trams built pre-liberalization (e.g., before economic reforms were initiated in 1978) operate in Changchun, Dalian, and Anshan. For most cities, however, regular gasoline and diesel-engine buses and mini-buses and electric trolley-buses remain the domi-

nant form of public transport in China.

Among its top priorities, the Chinese government investment in the transport sector was heavily targeted toward development of the nation's trunk highway system and other transport infrastructure. In urban areas, construction programs supported Master Plans which typically called for development of Beijing-style urban "ring roads." Public transit programs provided investment in vehicles to open new routes. For example, from 1985 to 1995, standard bus equivalent operating units nearly doubled and total route length increased eighty-nine percent. However, due to a variety of factors, this investment was met with disappointing results, as public transport ridership grew by only nine percent over the same period.³

As Figure 1 shows (next page), though route length and vehicles increased and vehicle load factors decreased slightly (implying service improvements), passenger density fell between 1985-1995 in China, in part reflecting broader service coverage but also anemic ridership growth.⁴ Meanwhile, the growth of premium modes such as taxis and mini-buses exploded and traditional bus transit mode share steadily lost ground, with absolute ridership losses occurring in some cities.

TRENDS AFFECTING PUBLIC TRANSPORT

Several factors contributed to the gradual decline of China's traditional, state-owned public transport companies starting around the mid-1980s. Primary among them was the rising demand for private passenger transport and premium public transport modes, made possible by rapid economic growth and wealth creation following economic liberalization. By

the end of “the Eighth- Five Year Plan” (1991-1995), China’s minibus and taxi industries had grown from insignificant numbers to fleets of approximately 100,000 minibuses and 585,000 taxis.⁵ During this time, central government authorities were also eager to develop the domestic automotive industry as a means to exploit the forward and backward economic linkages of motorization. In 1994, the central government promulgated industrial policy establishing the automotive industry as a “pillar industry.” Moreover, officials at the State Planning Commission began to promote the notion of the “household car.”⁶

Although China is in the early stages of motorization (see Figure 2), the growth of motor vehicle ownership and use has the potential to create massive problems in urban areas.⁷ Nation wide, passenger vehicle growth rates averaged eighteen percent per annum between 1985-1995. By 1995, motor vehicle ownership had reached ten vehicles per 1000 population, every two of which was a passenger car. The national average of two vehicles per thousand belies the high concentration of car ownership in urban areas. Of the 600 or so cities in China, thirty-four cities account for fifty percent of the national ownership of motor vehicles.⁸

Prior to motorization, buses carried about a third of all trips in most cities, with bicycles and walking comprising the balance. With more vehicles on the road, poor traffic management, and little protection from congestion in the form of priority treatments, bus speeds fell. Inadequate service coverage, low route efficiency, vehicle breakdowns, and poor passenger facilities worsened service levels and added to travel times. As a result, traditional bus services became very unattractive. For cities with a population of one mil-

Figure 1. China Public Transport Trends

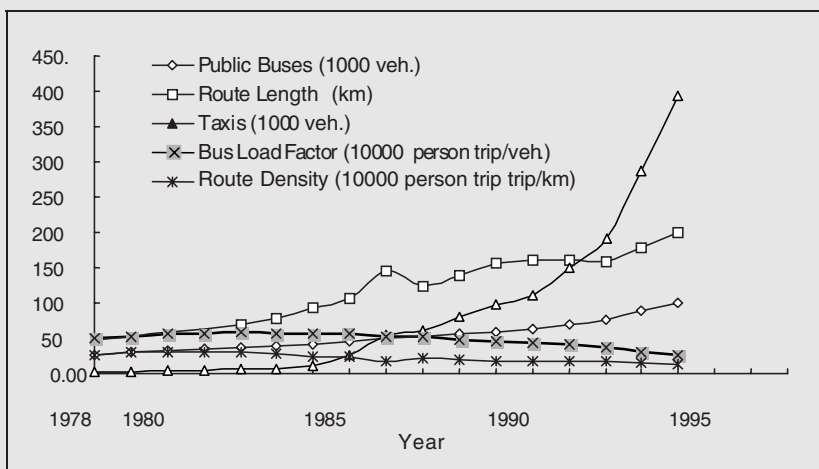
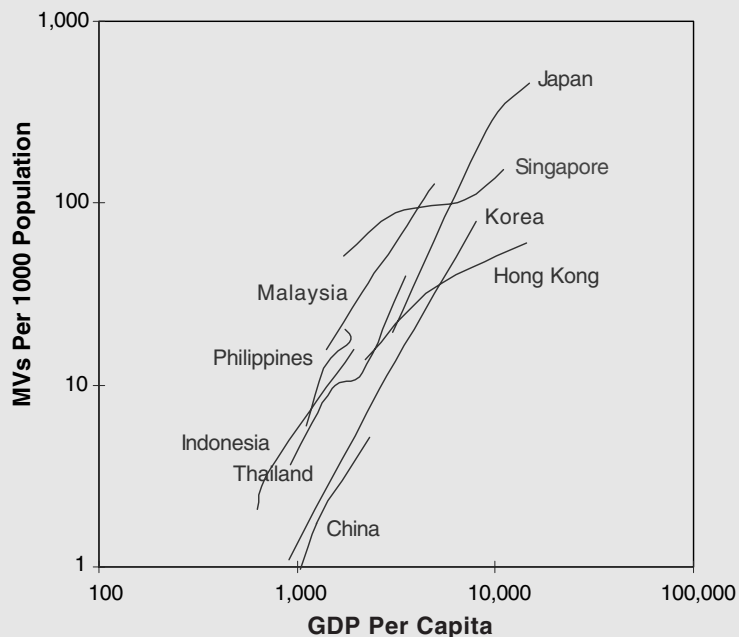


Figure 2. Motorization In Asia (1960-1990)



lion or greater, it is estimated that public transport journey times averaged almost twice (fifty minutes) the average for all other modes (twenty to thirty minutes) in 1995.⁹

Unsurprisingly, bus riders left for other modes. Those able to afford and willing to pay for premium modes chose motorcycles, minibuses, and taxis; while others shifted back to bicycles—especially lower-income passengers—as bicycles began to offer

competitive door-to-door journey times compared with old, slow buses, which required too many transfers, long waits, and inconvenient stop locations.

Thus, despite stated government policy support for public transport backed by some investment in vehicles and services, the effectiveness of increased capacity in public transport was eroded by a decrease in public transport efficiency and quality of

services, relative to other modes. Table 3 shows the mode shifts over time for Shanghai (urban population 12 million) and Shijiazhuang, the capital city of Hebei Province (urban population 1.5 million) over this period.¹⁰ Note that transit appears to lose mode share to bicycles and autos in Shanghai, and to other motorized modes in Shijiazhuang.

Ridership loss created a revenue crisis for many public transport operators who were already experiencing cost shocks as price controls for certain inputs were lifted with the transition to a market economy. Constrained by employment policies protecting labor, management tended to look to lower fuel quality or deferred maintenance for cost savings. These measures, at times instituted in combination with fare increases, caused many transit enterprises to enter the classic “vicious cycle” whereby loss of ridership and revenue fed on themselves, leading to the steady decline of public transport.

PUBLIC TRANSPORT ENTERPRISE REFORM

During the early 1990s, China was tackling hyperinflation in the

economy and managed to achieve a “soft-landing” following the imposition of economic austerity measures. These measures included restriction of government investment only to those projects warranting the highest priority. As a result, in late 1995, China’s State Council issued orders to shut down subway and light rail projects in Qingdao, Nanjing, Shenyang, and Tianjin, as well as put on hold the applications from seventeen other cities.¹¹

Policy attention in the public transport sector therefore concentrated on reform of public transport enterprises. This policy shift was consistent with general state-owned enterprise (SOE) reform, but was mainly instituted as a matter of fiscal and transport policy. China’s municipal coffers were hemorrhaging from the provision of large and growing operating subsidies to transit. By 1994, operating losses in urban public transport totaled Y1.0 billion (1 Yuan = U.S. \$8.50 in 1994) and total government assistance to public transport reached Y2.9 billion nationally.¹²

As with reform of SOEs in other sectors, corporatization emerged as a major strategy to commercialize bus operations, manage subsidy relation-

ships with government, and attract private investment. In parallel, under the principle of “comprehensive planning, unified management, and coordinated development” (*zonghe jihua, tongyi guanli, xietiao fazhan*), fair and reasonable competition was declared beneficial to the development of public transport. As a result, supply of municipal transport services was liberalized to expose bus companies to competition from other modes, primarily mini-buses and taxis.¹³ However, lack of experience with economic regulation would hamper realization of a “level playing field” within public transport and among urban transport modes in general.

Various reform models exist in China, ranging from less to more aggressive deregulation of the public transport sector.¹⁴ The most common arrangement is the “three-tiered contract responsibility system,” (*sanji zeren xitong*) which sets performance targets for each layer of the organization (company, sub-company, and vehicle team). In Shanghai, there has been deregulation of the municipal bus company with the result that operating companies are much more independent and actually compete for operating concessions as they come

Figure 3. Transit Mode Share Loss in Shanghai and Shijiazhuang

	Shanghai	Shanghai	Shijiazhuang	Shijiazhuang
Year	1986	1995	1986	1998
Non-motorized	73%	78%	92%	88%
Walk	41%	33%	34%	34%
Bicycle	31%	45%	58%	54%
Motorized	27%	22%	8%	13%
Auto/Motorcycles	3%	7%	2%	5%
Taxi				2%
Company Car			1%	2%
Transit	24%	15%	5%	3%
Other				2%
Total	100%	100%	100%	101%

up for tender. In addition, in Shanghai and Guangzhou, the public transport companies exhibit diversified ownership arrangements. For example, in Shanghai the Pudong Bus Company—one of the thirteen new companies established after deregulation—is a joint-stock company. Five joint-venture companies have been operating in Guangzhou since 1994.

Municipalities are also engaging various forms of concessioning in an effort to manage subsidies and expand services with minimum public finance. Examples include “joint-operations” arrangements, as found in Shijiazhuang (Hebei Province) in which the municipal public transport company (PTC) contracts with former staff to lease and operate its vehicles on a three-year net-cost basis. Also, in Shenyang (Liaoning Province), the PTC contracts with owner-operators and transport enterprises for public transport services to supplement its own services. In the Liaoning cities of Anshan and Fushun, these strategies are employed in combination with negotiated concessions for scheduled, route-based premium bus services involving private Hong Kong-based operators. Route-based concessions are also being implemented in Beijing and Shenzhen. Finally, as mentioned above, Shanghai has been the most aggressive in terms of deregulating the public transport industry and establishing competitive tender of operating rights for new routes and services.

These reforms are already yielding benefits to municipalities in terms of reducing public operating subsidies and to public transport users in the form of more and better public transport choices. The promise of reform is the redirection of public investment to public transport infrastructure such as passenger terminals, bus priority measures, and fixed rail transit, with the goal of increasing the

number of attractive choices for users. The private sector can participate in this arena as well, and not only in the fixed-rail market. For example,

tate various policy-based user charges. It remains to be seen how this tax is to be implemented, especially in urban areas.¹⁵ Bus transit is at the fore-

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Beijing Public Transport Company is actively studying joint development of bus terminals in the city center area with the private sector.

A NEW ERA FOR PUBLIC TRANSPORT

China has twenty cities with a population exceeding five million, creating a huge demand for efficient transport networks. In recognition of the need to manage this demand well, many medium-sized and large cities are leading in the adoption and implementation of urban transport policies favoring public transport. Examples include the auction of motorcycle and car licenses in Shanghai, minibus controls in Beijing and Shenzhen, and the establishment of bus priority measures in Kunming, Shenyang, and Beijing.

National policy emphasizing sustainable development is also causing public transport to be viewed not only as an important strategy for efficient urban transport but also for environmental protection. Broader efforts to target mobile-source air pollution in China include: the removal of lead from fuel; conversion to cleaner fuels (pilots are on-going in ten cities); and—though not directly passed to meet environmental objectives—a recent amendment to the national Highway Law authorizing the levy of a motor fuel tax which could facili-

front of current pilots in natural gas, as companies experiment with dual-mode and natural gas (CNG)-powered engines. Electric-powered trolley buses are already in operation, and central government agencies, such as the State Science and Technology Commission, are sponsoring research and development of electric fuel-cell powered vehicles.¹⁶

Very recently, China lifted the moratorium on rail projects and began approving more subway projects to support urban infrastructure construction. In March 1999, China's State Council approved the first phase of the Shenzhen metro project and revived the Nanjing light rail project begun earlier. Approvals for work to begin on subway systems in Chongqing, and to resume studies in Qingdao and Shenyang quickly followed. Several other cities have already submitted applications to the State Development Planning Commission for new rail lines. The length of the proposed subway lines totals 430 kilometers, with investment estimated at 140 billion yuan (U.S. \$16.8 billion).¹⁷ However, prerequisites for approval—including demonstration of adequate financing—will likely temper the pace of additional new projects going forward in the near future.


Despite these new and encouraging developments, China faces a number of challenges if public trans-

port, and mass transit in particular, is to play a significant role in cities on a sustainable basis. Chief among these is the fragmented nature of policy and institutional capacity in the urban transport sector. Responsibility for policymaking, planning, and finance of urban transport (and especially public transport) is highly decentralized to the cities, where institutions mirror the stove-pipe structure found in central government. Within most cities in China there are several agencies with an interest in urban transport planning and operation. The most significant agency is the urban construction commission that is responsible for construction and maintenance of transportation infrastructure. Organized beneath

this commission are usually found the public utilities commission—responsible for public transport provision and regulation—and the transport department—responsible for motor vehicle licensing, including long-distance buses. Municipal planning bureaus are responsible for Master Plans; the public security department work encompasses traffic management and enforcement, and the environment bureau regulates and monitors vehicle emission controls. Lastly, regulating user charges such as bus and taxi fares falls under the jurisdiction of the municipal price bureaus.

This fragmentation of authority limits the ability of local governments to effectively promote a high degree of coordination among policies, plan-

ning, finance, and traffic management activities. For example, at the operational level, implementation of bus priority measures on a wide-scale requires better technical coordination among public transport operators, city engineering design units, and traffic police. Also, while institutional mechanisms for the coordination of urban land use and transportation development exist through the “master planning” process, the relationship between these two systems is not well understood. Consequently, while cities are improving their ability to do route and service planning, coverage is not keeping pace with city development. This reflects several factors having to do with the need to coordinate better land-use and transpor-



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Environmental Degradation and Population Displacement


Introduction: Linking Environmental Degradation and Population Displacement

The United Nations High Commissioner for Refugees (UNHCR) in the 1990s first identified environmental degradation as a cause of displacement. This work led to the concept of environmental degradation as a cause of displacement. The clear distinction between environmental degradation and population displacement was a result of articles appearing in a number of articles suggesting a link between environmental degradation and population displacement, and a recognition that the numbers of displaced persons internationally were much larger than included by the one million refugee figure.

However, population displacement due to environmental degradation is not a novel phenomenon. Historically, people have had to leave their land because of drought, flood, or other environmental factors and could not sustain their livelihoods. The physical environment was a major factor in the migration of people. The physical environment was a major factor in the migration of people. The physical environment was a major factor in the migration of people.

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VOLUME 11

Water and Human Security

Introduction

As human populations and economies grow, the amount of freshwater in the world is being consumed. The total quantity of water in the world is finite, but most is salt water. The amount economically available for human use is only 0.007% of the total, or about 1,500 km³, which is about 200 m³ per person—a 2% drop since 1979 (United Nations, 1997). This increasing scarcity is made more complex because almost half the globe's land surface has within international watersheds—that is, that land which contributes to the world's 301 transboundary watersheds (Figure 1). The scarcity of water in arid and semi-arid environments leads to intense political pressures, often referred to as “water stress.” Furthermore, water ignores political boundaries, erodes institutional constraints, and eludes legal generalizations. The most recent legal document on international waters, the 1997 Convention on the Non-navigational Uses of International Watercourses is vague and inconsistently constructed, and international agencies historically were limited to developing a

“It’s thought by pain, men know not water’s worth.”
Aristotle

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tation planning, (de)-regulation of peri-urban transport services, and relative inexperience with complex user charge and cross-subsidy arrangements that can be critical to financing arrangements for new infrastructure and services.

Indeed, financing is perhaps the most difficult aspect of public transport development for city officials. Although rail transit is popular and becoming a reality in some larger cities, bus transit will remain the mainstay of the public transport system for most Chinese cities. In both cases, if the public transport system is not well managed and structured, capital and ongoing costs can potentially bleed a city of resources. Viable fares and an appropriate regulatory framework for private participation are essential to the provision of sustainable finance for the sector. Fortunately, the decentralized nature of urban management is breeding innovation—especially among the more affluent and sophisticated coastal cities as mentioned above—which is being modeled in other cities. Through these incremental initiatives, it can be observed that public transport reform is liberalizing the provision of transit services across China, albeit slowly. These efforts, together with the promotion of increased competition and the capacity to regulate it, are the challenges of the coming era.

CONCLUSION

It will take time for China to navigate the all-too-common pitfalls of motorization and urban development. Facing a number of strategic choices, China is confronting dilemmas that have plagued many countries before it, though with the added complexities of its huge population and the transition to a market economy. Yet, as reforms take hold

and efficient urban transport increasingly is increasingly recognized as critical to sustaining the productivity and quality of life in urban areas, support for public transport is growing. Advances in enterprise reform, decentralization, and finance suggest that China's public transport sector is on the precipice of a new era.

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ENDNOTES

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