
**The Development
of Road Networks in China
Miscalculations and Inequalities**

Kun-Chin Lin

February 2010



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Abstract

China has some of the densest road networks of any developing country, accounting for the vast majority of paved roads among lower- and middle-income countries. However, statistical data at the national and provincial levels show two puzzling trends. First, growth in the length of highways has tapered off since 2003 despite policy shocks designed to produce the contrary effect. This trend applies to Eastern, Central, and Western China as the three differentiated regions in transport policy. Second, while lower-class roads have been shown to consistently deliver the greatest positive impact in rural areas, Central and Western China continue to emphasize higher-class roads despite their urgent anti-poverty and market networking needs. Focusing on the processes of highway project formulation, approval, and financing, I postulate that fiscal federalist institutions have strongly shaped the motivations of provincial leaders and bureaucrats as the key political entrepreneurs in bargaining over competing priorities and funding options. I argue that three variables – fiscal shortfall, procedural biases, and quality of private capital participation – account for the provincial officials' discriminating against different forms of financing and grades of roads. These variables suggest that inland provinces with fiscal inadequacy and poor quality private capital have perverse incentives to maximize their fiscal base and private rents by focusing resources on higher-class toll roads.

The paper draws on statistical data at the national and provincial levels, Chinese journals and industry-related websites, as well as the author's 2005 fieldwork in Guangxi and results of collaborative research with the Chinese Academy of Social Sciences.¹

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¹ The Chinese-language literature on the political economy of roads and road-building is considerably larger in output but not more diverse in perspectives and applied methodology than English-language publications by the World Bank and Asian Development Bank. Similar to the English-language studies, their common focus is documenting and explaining the mechanisms for the contribution of roads to rural development. More varied, interdisciplinary, and bottom-up perspectives can only be obtained by careful readings of specialized transport journals such as *中国交通报* (China Communications News) and *中国交通* (China Communications), and related industry journals such as *建设机械技术与管理* (Construction Machinery

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Technology and Management Journal), as well as several officially sponsored websites. Provincial and sub-provincial publications also provide a wealth of information, of which I have taken advantage in preparing case studies in this paper. Household surveys and post-project completion evaluations of road projects have been conducted for most major, higher-class road projects, but they are often held by provincial governments and consulting companies as proprietary documents and thus not readily available to the general public.

Introduction

A critical barrier to China's continuing growth is the transportation bottleneck. In particular, highways maintain their importance in regional commerce and human mobility, surpassed only by aviation in total mileage and by railway and waterway in volumes of passenger and cargo traffic. In short distance and low tonnage travels, which represent the near future of transport as private automobile ownership rises rapidly, highways appear to be the preferred and most efficient medium of movement. In addition, highways would seem indispensable as a developmental tool for local officials keen on bringing the benefits of the market economy into remote regions of their jurisdiction. At the same time, highway projects are also breeding grounds for corruption and oppressive taxation, environmental movements, grassroots protests, land use disputes, and violent confrontation between local states and societal groups.

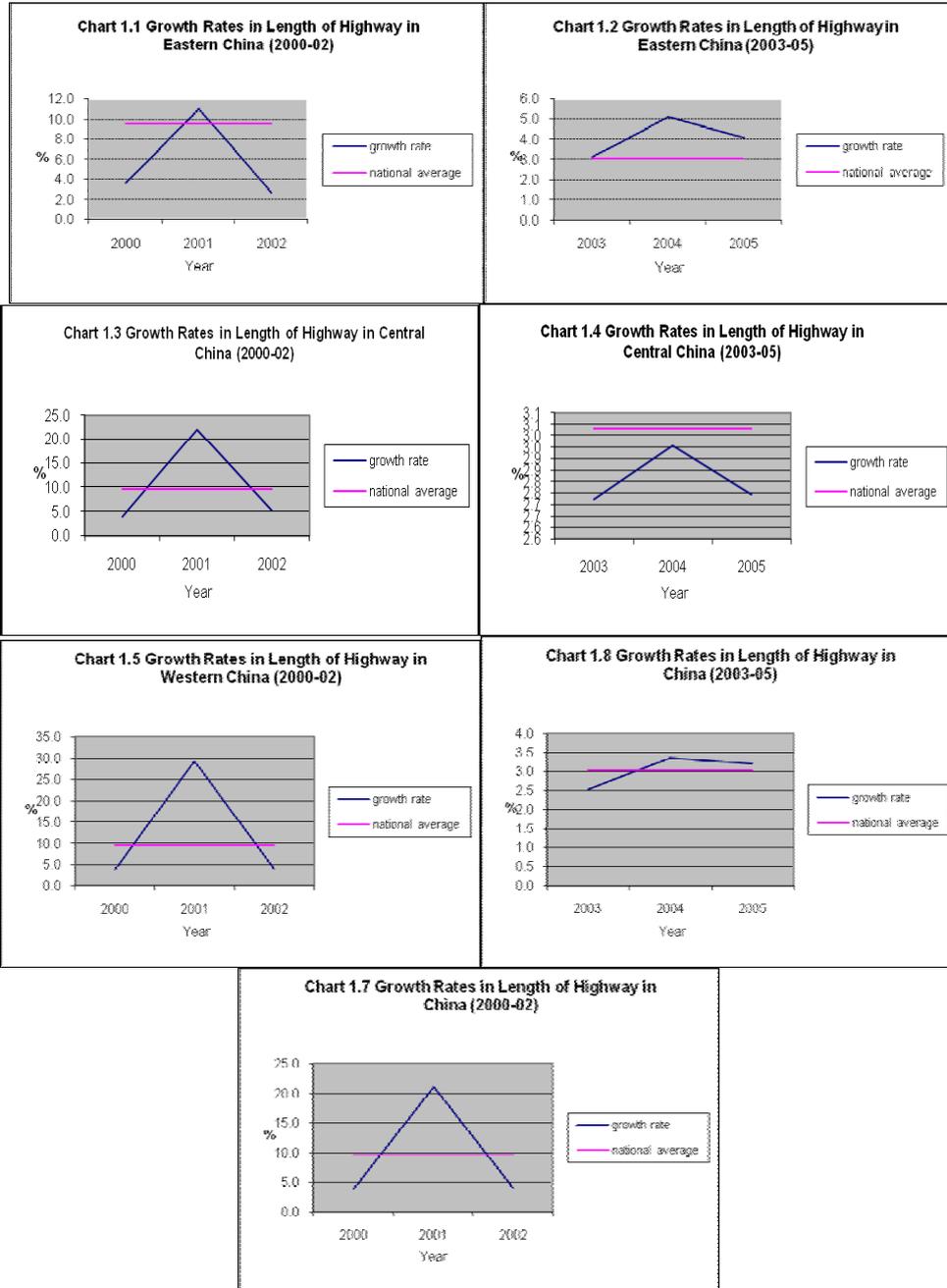
This paper will examine two interesting developments in the political economy of the highway construction boom in China, focusing on the period since the 15th Party Congress. I take the year 2003 as a turning point since the arrival of the new leadership duo of Hu Jintao and Wen Jiabao has brought about a major shift in transport policies, with new priorities in rural infrastructure and an urgency to push local governments to reach deeper for financial resources even as the central government has reduced their means of taxation.²

The first observation is that since 2003 growth rates in total highway length seems to have slowed (see Table 1 in Appendix). Eastern, Central, and Western regions of China all experienced a significant drop in average annual growth of highways. Central and Western regions had posted rates above the national average prior to 2003, but since then have dropped below average. Year-to-year fluctuations have also become muted. Policy inducements had

I wish to thank Helene Le Bail and Valerie Niquet at IFRI for showing an interest in this project, and Chen Shaofeng and Yu Xiao for valuable research assistance and interpretative suggestions. Prof. Li Renqing of CASS and Dr. Tao Ran of CAS have been formidable collaborators in my project on highway politics and rural development. Funding has come from the British Academy, Contemporary China Studies Programme (Oxford), Chinese Academy of Social Sciences, and the National University of Singapore FASS Staff Research Support Scheme.

² This trend is somewhat contrary to Wen Jiabao's overall thrust of slowing down fixed capital investment in other overheating sectors.

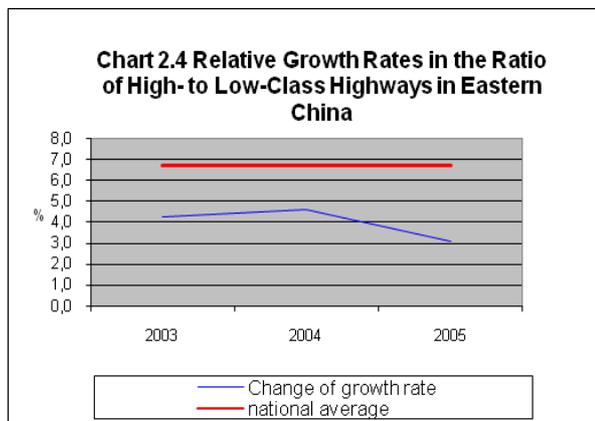
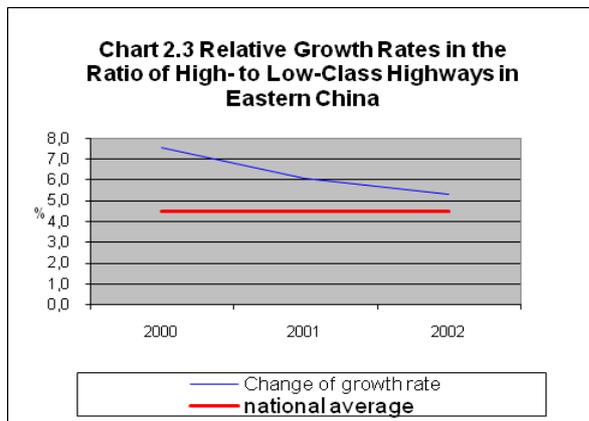
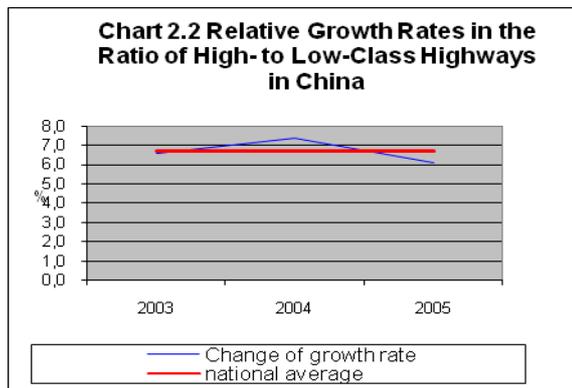
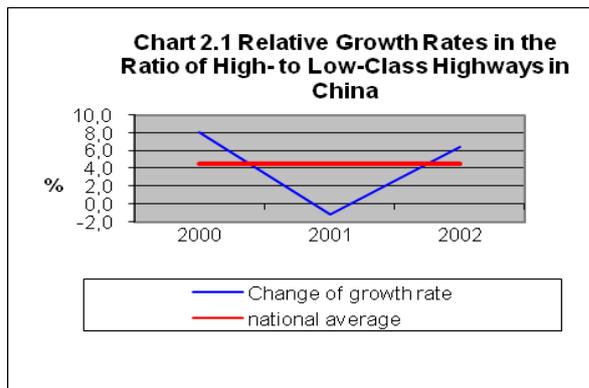
created a major spike in highway constructions in 2001, but only a minor one in 2004. This effect roughly holds across all three regions. It would seem strange that despite greater central political and policy commitments the growth of highways has actually slowed.



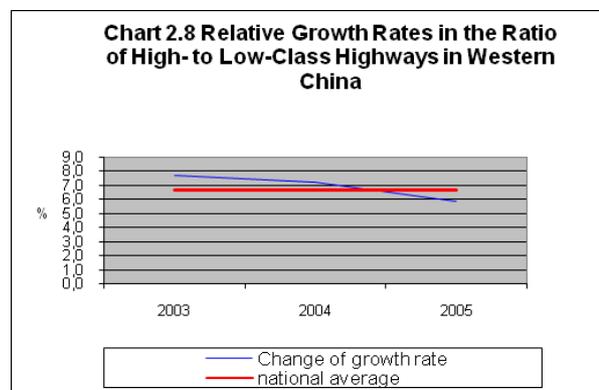
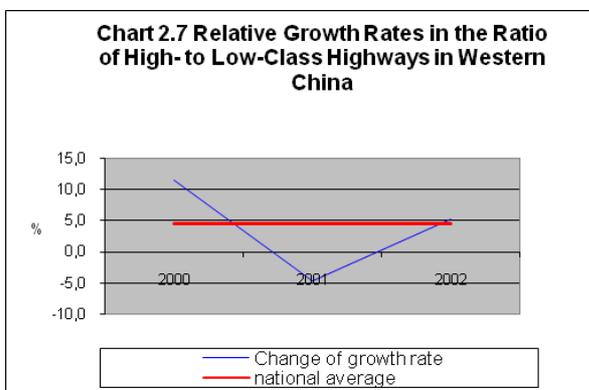
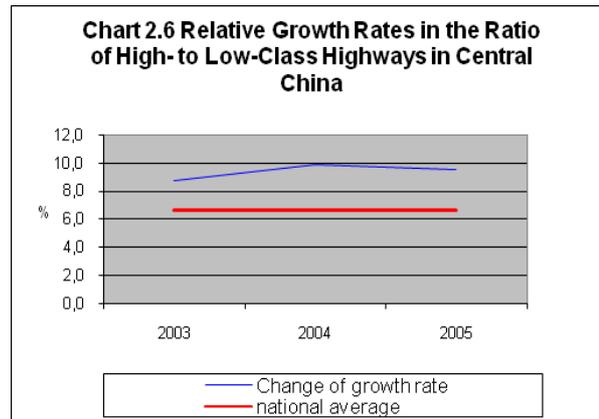
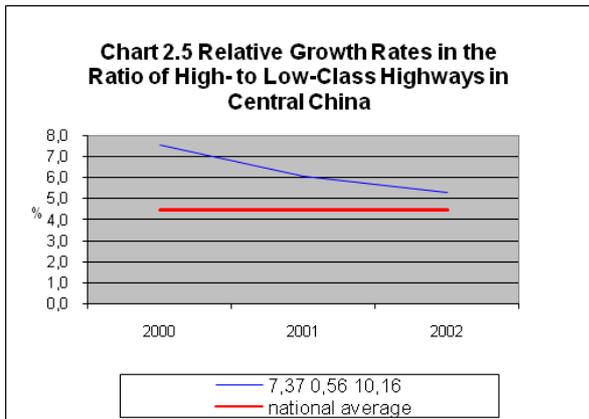
Source: Calculated based on data from: *Year Book of China Transportation & Communications*, Year Book of China Transportation & Communications Press, various years from 1999 to 2006.

The second observation is that, despite an increasing concern with rural development among China's elite since 2001, when Jiang Zemin held an important rural work conference, poorer regions are associated with a consistently faster pace of growth in high-class highways (see Table 2 in Appendix). Only in the West in the year 2001 was there a relative increase in low quality roads. Since 2003,

both Central and Western China have witnessed more rapid developments of high-class roads as compared to low-class roads, at average rates higher than that of the Eastern region. This trend defies economic rationality: Lower-class roads are proven to have higher benefit-cost ratios and positive contributions to rural development and even urban economies than high-class roads.³ Why do we see an entrenched bias against rural roads, given growth and poverty alleviation as policy priorities? Is there a general fiscal logic that discriminates against more effective and efficient rural roads? What are the variations in this logic across different regions of China?



³ Fan S. and C. Chan-Kang (2005), "Road Development, Economic Growth, and Poverty Reduction in China," Research Report 138, International Food Policy Research Institute. Professor Gregory Noble at Tokyo University has pointed out that perhaps it makes economic sense for poorer provinces to take a forward-looking investment strategy of expanding higher-grade roads in anticipation of urbanization and economic development. Personal correspondence, April 26, 2009. This is certainly an intriguing counterpoint, but even if true the neglect of rural roads is hard to justify.



Source: Calculated based on data from: *Year Book of China Transportation & Communications*, Year Book of China Transportation & Communications Press, various years from 1999 to 2006.

In sum, for the growth trends in lengths and by the class of roads, the three regions show convergence in the second period of 2003-5. If the momentum for road-building is seen as the outcome of a decentralized approach that returns a market logic for transport networks, shouldn't we observe increasing variations, not convergence, in road capacity expansion and types of roads based on different production profiles and geographical and structural legacies of regions?

Three conventional perspectives come to mind in examining the above puzzles. First, structural variables such as local or regional geographical and market network characteristics (Comtois 1990, Skinner 1965, 1985, Murphey 1956, Goodman 1997) and long-term political behavioral or political cultural orientations (Jae Ho Chung 2000, 1999 and Vivienne Shue 1988, 1990) may shape the local states' provision of roads. Second, policy shocks such as the impact of the "Great Western Development Strategy" and the post-Asian Financial Crisis fiscal stimulus under Jiang Zemin and Zhu Rongji,

and their successors' "Reinvigorating the Northeast" and "San Nong" campaigns may provide the financial and political stimuli for variations. This perspective calls for an analysis of factionalism during succession.⁴ Lastly, a fiscal federalist approach (Montinola, Qian and Weingast 1995, Qian and Xu 1993) would focus on the central-local co-financing arrangements for highway projects, as well as dynamics of intra-provincial competition to attract investments through better infrastructure.⁵ A quick reflection would suggest that none of the above perspectives provide robust explanations for variations in growth of highways. Structural variables are particularly insensitive to rapid changes at the regional level, while policy shocks or factionalism cannot explain regional and over-time convergence and the fiscal federalist argument would be confounded by convergence toward inefficient forms of rural transport.

There are also considerations for particular characteristics unique to transport development. Some roads are public goods (in particular, rural roads); some roads have clear commercial values. In any case, transport networks are co-productions (Ostrom 1990) of the central and local governments, with direct contributions from peasants either through the taxation, pooled savings, or drafted labor. If so, detailed understanding of the institutional dynamics shaping the distribution of costs and benefits of road projects would elucidate the respective motivations of the major actors. In particular, one should consider whether the prevailing understanding of public works as governed by the post-Mao decentralized administrative framework, tied to the quasi-fiscal federalist (Montinola, Qian and Weingast 1995, Wong 1997) method of financing, would prove adequate in explaining crucial regional and temporal variations. Studies by Kellee Tsai and Lin Shuanglin point to inadequacies in this approach, in neglecting informal finance – in particular the hoarding of off-budget revenues for public goods provision – and downplaying persistent pressures of resource scarcity on the part of the central government, public sector enterprises, and local states.⁶ Both authors point to a research agenda focusing on local government coping strategies given limited independent fundraising options. To this I would add the analysis of conflicting motivations of the central and local officials and their strategic interactions that affect the formation and implementation of road-projects.

⁴ Victor Shih of Northwestern University and I plan to conduct this analysis through quantitative tests in a future paper.

⁵ Chung (1999), Treisman (2006) and Treisman and Cai (2006) have also challenged the logic of decentralization.

⁶ Kellee S. Tsai, "Off Balance: The Unintended Consequences of Fiscal Federalism in China." *Journal of Chinese Political Science*, 9(2), 2004; Shuanglin Lin, "Public infrastructure development in China." *Comparative Economic Studies* 43(2), Summer 2001, pp. 83-109. Also see: Carsten Herrmann-Pillath and Feng Xingyuan, "Competitive Governments, Fiscal Arrangements, and the Provision of Local Public Infrastructure in China: A Theory-driven Study of Gujiao Municipality." *China Information*, 18(3), 2004.

The following sections offer an explanation that examines institutional politics in the formulation, approval, and financing processes of road projects with an overall national framework of quasi-fiscal federalism in public goods provision. I cast my analysis mainly at the provincial level: provincial leaders prove to be key entrepreneurs in putting together highway projects, and provincial level agencies bear the heaviest responsibilities in project management and long-term maintenance of the roads, as well as transport network-driven designs for rural development.⁷ Together these actors and tasks constitute a coherent political-organizational field. Within that field, I suggest that three variables of fiscal shortfall, procedural biases, and quality of private capital participation can account for the motivations of provincial officials in discriminating against different forms of financing and grades of roads.

⁷ Andy Mertha argues that the principal beneficiaries of the recent shift to centralized management are the provinces, not Beijing, as the institutional mechanisms of personnel and budgetary resource allocations are concentrated at the provincial level: "Although this has curbed localism to a degree by transferring power from local governments to the newly centralized bureaucracies, it has also contributed to a situation in which newly strengthened provinces may play a key role in the emergence of a sort of perverse federalism." Andrew C. Mertha, "China's "Soft" Centralization: Shifting Tiao/Kuai Authority Relations," *China Quarterly*, 184, December 2005, pp. 791-810.

Understanding the Road-Building Boom in China, 1998-2006

An overview of the highway boom

The sustained road-building boom represents a considerable achievement by all levels of Chinese government. At the commencement of reform in 1978, the total length of highways within the country was only 890,000 km, with a density of 9.3 km/hundred square km.⁸ Only 91.5% of townships and 65.8% of administrative villages (行政村) were connected by roads.⁹ In the early years of reform, tightly controlled money supply and credit policy had hampered road-building, leading to widespread urban congestions and transport bottlenecks.¹⁰ After more than a decade of construction, the total length of highways came up to 1.028 million km by 1990, among which the county and town roads accounted for 33% and 36% respectively.¹¹ By 1995, the total length of highways reached 1.157 million km, and roads connected 97.1% of townships and 80% of administrative villages.

With the lifting of fiscal and macroeconomic policy constraints, road building took off in the 1990s. From 1995 to 2000, the percentages of townships and administrative villages connected by roads had increased by 1.2% and 9.5% respectively.¹² By 1999, all counties of China were connected by roads.¹³ With a highway density

⁸ The above data are based on: *China Transport*, "The developing trajectory and overall strategies of China's highways," 3/22/2005, available on: http://www.iicc.ac.cn/05traffic_planning/t20050322_17216.htm.

⁹ 交通与发展研究课题网站 "Rural roads' development status, future prospects and countermeasures in China," 12/28/2005, available on:

http://dev.catsic.com/gzdt-show.asp?column_id=80&column_cat_id=11&fileName=gzdt

¹⁰ Demurger (1999), discussed in Fan and Chan-Kang (2005), pp.16-7.

¹¹ *China Transport*, "Highway construction – Total highway mileages in China according to administrative levels," 4/1/01, available on: http://www.iicc.ac.cn/05traffic_overview/t20031122_16732.htm.

¹² *China Transport*, "General situation of infrastructural construction and technical innovation in 2000," 2/26/2000, available on:

http://www.iicc.ac.cn/05traffic_overview/t20040226_16739.htm.

¹³ The above data are based on: *China Transport*, "The developing trajectory and overall strategies of China's highways," 3/22/2005, available on:

of 14.6 km/hundred square km, the total length of highways reached 1.402 million km by 2000. The proportion of high-class roads jumped to 13.5% of total roads in 2000 from only 1.3% in 1978.

The 10th FYP (2001-2005) saw the completion of 24,700 km of highways, which was 1.5 times the combined length of highways constructed under the 7th, 8th, and 9th FYP's.¹⁴ (See Table 3 in Appendix.) The total investments in rural road construction during the 10th FYP amounted to 417.8 billion yuan, which was three times the investment under the 9th FYP.¹⁵ As of 2005, the cumulative length of highways stood at 1.930 million km, of which county and township roads accounted for 25.6% and 50.3% respectively. Highway density rose to 20.1 km/hundred square km, or 2.6 km/hundred square km higher than that at the end of the 9th FYP. The percentages of townships and administrative villages connected by roads reached 99.8% and 94.3% respectively, representing increases of 1.5% and 4.8% over the figures at the 9th FYP.¹⁶

Hu Jintao and Wen Jiabao have worked out an ambitious plan to improve infrastructure construction in rural China. According to the "Developmental Plan for Highway and Waterway in the 11th Five-Year Plan" (公路水路交通“十一五”发展规划纲要), Beijing is interested in not only completing road connections to the remaining townships and administrative villages, but also in improving the quality of the existing and new roads. The Developmental Plan aims to provide 95% of towns and more than 80% of administrative villages in China with paved roads constructed using concrete cement. Beijing expects *all* towns and administrative villages in Eastern China to attain the above, while Central and Western China enjoy lower quotas of 100% concrete roads for townships and 88% for villages, and 90% and 50% respectively to these two regions.¹⁷ The 2005 plan is the first in the reform era to explicitly combine expressways and rural roads under a unified guideline (*zhonghe guihua*) devised by the Ministry of Communications (MoC). Starting in 2006, official road data includes both highways and rural roads¹⁸ (see various tables in Appendix).

http://www.iicc.ac.cn/05traffic_planning/t20050322_17216.htm.

¹⁴ Ministry of Communications, "The Statistic Gazette on the Development of the Transport Sector of Highways and Waterways in 2005," available on:

http://www.moc.gov.cn/06jiaotonggk/fazhanbg/daoluysfzbg/200608/t20060824_72402.html

¹⁵ *Xinhua Agency*, "China has sped up investments on rural road construction in the Tenth Five Year Plan," 2/27/2006, available on: http://www.gov.cn/jrzq/2006-02/27/content_212584.htm.

¹⁶ There were still 75 towns and 38426 administrative villages which with no road connectivity at all at the end of 2005. The above data are based on the Ministry of Communications, "Statistic gazette on the transport sector of highways and waterways in 2005," 5/22/2006, available on: http://www.gov.cn/gzdt/2006-05/22/content_287487.htm.

¹⁷ *Nongmin Ribao*, "新起点新使命新变化——交通部李盛霖谈农村公路建设" 3/11/06.

¹⁸ Rural roads are essentially low-grade roads (Class III and below – see next note) that connect rural administrative units. As local authorities are in charge of these

China's transport policy and documentation have focused on increases in nation-wide aggregate road length, length of high-class highways (defined as expressways and highways above Class II in technical specifications¹⁹), and road density or geographical coverage. Aside from these quantitative targets, the central government has played the key role of the master-planner in the expansion of transport infrastructure. In the 8th FYP (1990-94) the central government set up the major highway framework for the country – called the “five verticals and seven horizontals” (*wu zong qi heng*) – including twelve high quality national trunk lines with a total length of 35 thousand km. The 9th FYP (1995-2000) initiated the construction of “two verticals and two horizontals” and three important trunk line sections, with a total length of 17,000 km. These goals were accomplished by the end of the 10th FYP. Under the 11th FYP (2006-2010), Beijing has put forward the goal to construct 380,000 km of highway, among which 24,000 km of expressway should be built during this period. In particular, the State Council has approved a “Rural Road Construction Plan” which represents the first national infrastructure construction plan for the rural areas. The plan incorporates goals stated in the above-mentioned Developmental Plan.²⁰

Geographically, variations in road building efforts have become more salient across the urban-rural divide and among different regions. Despite increases in connectivity figures, the proportion of classed highways remains low in rural areas. For instance, Class II and above highways accounted for only 13.5% of total rural road mileage. Low-grade roads imply limited transport capacity, poor quality of construction, and higher risks for roadside accidents and breakdowns.²¹ However, as mentioned in the introduction, low-class roads actually offer higher economic returns for both rural and urban China than high-class highways. Seemingly ignorant of the economic benefits, the Chinese government has continued to emphasize higher-class roads in its rural policies. At the 3rd Plenum of 15th CC, Jiang Zemin directed focus on the countryside and the CC passed “Major Decisions on Agriculture and Government Work in Rural Areas,” which then led to the State Council formulating

roads, the central policy documents do not make precise definitions that would facilitate a clear distinction between rural and non-rural roads.

¹⁹ The classification based on technical grounds used by the World Bank measures the width of the road surface and includes Expressways (width 28m), Class I (25.5m), Class II (12m), Class III (8.5m) and Class IV (7m).
http://siteresources.worldbank.org/EXTSARREGTOPTRANSPORT/Resources/579597-1128434742437/1735263-1128434796061/China_Study_Tour_Report_Rev3.pdf?&resourceurlname=China_Study_Tour_Report_Rev3.pdf

²⁰ *Economic Daily*, “China will invest 100 billion yuan to promote rural road construction in the Eleventh Five-Year Plan,” 10/28/2005, available on:
http://www.gov.cn/ztl/2005-10/28/content_85849.htm.

²¹ China Transportation, “General Situation of Highway Construction in 2000,” 2/26/2000, available on:
http://www.iicc.ac.cn/05traffic_overview/t20040226_16737.htm.

long-term road projections (“关于加快农村公路发展的若干意见”) in 2000. The policy stipulated the key quantitative goal of road connections for 96% of all administrative villages by 2005, and improved road quality across the regions. In addition, Eastern China was to have 90% of its roads above Class III by 2005, while Central and Western China would achieve the same by 2010 and 2020 respectively. However, in 2000 the central government had only vague directives for improving local financing capabilities – it asked local officials to “do one’s best” to allocate a set portion of the local budget to road-building.²²

The Hu-Wen administration’s discourse of building a “harmonious society” and in particular the “*san nong*” focus on lifting peasant burdens and improving rural income significantly beefed up the elite commitment to infrastructure expansion. A new survey of roads was commissioned in 2002. Between 2003 and 2005, the new leadership in Beijing spent a total of 50 billion yuan on constructing highways in the countryside, increasing the length of rural paved roads by 176,000 km – just to put it in perspective, that’s a sum nearly equal to the aggregate length of roads constructed in the first fifty-three years of the PRC.²³ A further 17.5 billion yuan was spent on road construction projects in 2006.²⁴ Wen Jiabao’s call for a “new countryside”²⁵ includes plans to invest 100 billion yuan to build rural roads during the 11th Five-Year period.²⁶ The 2007 “No. One Document” jointly issued by the State Council and the Central Committee states that the government will shift investment foci to the countryside, such as speeding up rural highway construction.²⁷

Complementing the shift in policy attention to rural China, Beijing has sought to address growing disparities in infrastructure provision across different regions of China. Increases in highways in Eastern China, both in quantity and in quality, have been greater than those in Central and Western China. Compared with the East, the proportion of high quality highways to total highways in the West was 21 percent less than that of the East in 2000, and the West had twice and three times the unpaved county and township roads and sub-Class IV highways, respectively (see Table 4 in the Appendix). The number of townships and administrative villages with no road connection in the West accounted for 85% and 50% of the national totals respectively.²⁸ These disparities were addressed in the Western China Development strategy (“*xibu da kaifa*”) during the last years of

²² “2001-2010 Waterway and Highway Industrial Policy and Product Development Overview.” Transport Regulation #268 (2001).

²³ *Xinhua Agency*, “China’s Countryside Bidding Farewell to Dirt Roads,” 10/28/2006.

²⁴ *Xinhua Agency*, “China’s rural life still harsh,” 12/26/2006

²⁵ *Idem*.

²⁶ *Economic Daily*, 10/28/2005, *ibid*.

²⁷ See

http://news.xinhuanet.com/politics/2007-01/29/content_5670478.htm

²⁸ *China Transportation*, “General Situation of Highway Construction in 2000,” 2/26/2000, available on:

http://www.iicc.ac.cn/05traffic_overview/t20040226_16737.htm.

Jiang Zemin and Zhu Rongji, entailing massive investments in Western China. Since 2000, increasing shares of highway investments are going to Central and Western China. The other way Beijing has encouraged road building in inland regions is by allowing longer collection periods for toll roads, as stipulated in the *Regulations on Toll Roads* which took effect in 2004.

In May 2006, the State Development and Reform Commission (SDRC) issued an Investment Plan for Rural Highway Renovation Projects. According to this plan, the Central Government would commit 17.5 billion yuan in subsidies, among which the central budget's earmarked funds would reach 3.5 billion yuan, and the remaining 14 billion yuan would stem from central ministerial "special funds" (i.e. the Ministry of Communications). Specifically, in Eastern and Central China, the central government would arrange 9.6 billion yuan for 27,012 projects designed for linking villages and townships. With a total investment of 27.4 billion yuan, the total mileage of these projects would amount to 96 thousand km. In Western China, 996 highway projects are designed to connect townships. With a total mileage of 23.2 thousand km, these projects called for a total investment of 17.6 billion yuan, of which 7.9 billion would be provided for by the central state.²⁹ In 2007, 184 billion yuan were invested in rural roads, and another 205 billion yuan in 2008.

Fiscal federalism and decentralized provision of roads

The broad framework for the provision of highway projects can be characterized as a fiscal federalist one. Far from a static institution, this framework has allowed the terms of decentralization and cost-sharing arrangements to vary over time, mostly in accordance with the central government's interests. In 1958, Beijing transferred the responsibilities for highway construction and management to the local governments, while creating special funds to construct roads mainly for the purpose of national defense. This decentralization placed the fiscal burden of road construction on the localities, leading to persistent under-provision of infrastructure construction and maintenance.³⁰

The government attempted to address the lagging local fiscal incentives in the mid-1980s by liberalizing preexisting constraints on the local states' fundraising. Under the planned economy, road building had been predominantly financed by government appro-

²⁹ SDRC, "Investment Plan for Rural Highway Renovation Projects in 2006," 6/8/2006.

³⁰ World Bank, *Transport in China – An Evaluation of World Bank Assistance*, Report No. 18865, Washington D.C.: World Bank, 1999.

priations, profits from the state-owned enterprises, and local government levies.³¹ In 1984, the State Council gave the green light to local governments to construct toll roads and to seek multi-source funding, including funds from international organizations, domestic banks, and private investors. During the 7th FYP (1985-89), the government further approved various vehicle surcharges, port construction fees and so on. Even more significantly, local transport agencies were given the green light to charge tolls on roads for which they had fundraised. In addition, the government continues the policy of expropriating agricultural land for infrastructure development at low, non-market prices. These new financial incentives and options have contributed to the rapid road growth.³²

The fiscal foundation of roads is chiefly divided among different levels of government. The National Trunk Line (*guodao*) refers to a highway network designed by the national planners. Provincial highways (*shengdao*) connecting provincial capitals and major counties are designed by the provinces in consistency with the national framework. Both of the above are financed wholly or partially through the central budget in co-financing schemes (*peitao*) that may involve provincial fundraising and foreign capital. Finally rural, local (*difang*) roads connecting counties to other counties and to townships and villages are fundraised partly through central transfers and the special Highway Construction Fund (*gonglu jianshe jijin*), which is a subsidy offered by the central government. The amount of subsidization varies by region: in 2005, Eastern China received 2-4 million yuan per kilometer of road, Central and Western China obtained 4-6 million and 6-8 million yuan per kilometer respectively. This subsidy applies to roads that conform to the elaboration of the national and provincial network. Outside of the network, the central government subsidizes 4-6 million yuan per km, which can be applied to construction costs or initial capitalization. Typically, local officials then use the central subsidy and predictions of potential tolls (if applicable) as leverage for bank loans to make up the total capitalization of these rural roads.³³

The Ministry of Communications (MoC – renamed in 2009 the Ministry of Transport³⁴), which is the functional ministry in charge of road matters, draws on two major sources of finance: 1) a vehicle purchase levy (*chegoufei*, about 10% of the total cost of the car), which is intended for use in road construction; and 2) road maintenance fee (*yanglufei*, about 100 yuan per ton of goods, mainly levied on transport companies) collected by local transport authorities

³¹ Fan and Chan-Kang (2005), p. 19.

³² Based on Vice Minister of Communications, “The Infrastructural Development of China’s Highways and Waterways and Investment Policies,” *Guanli Shijie* (Management World), Vol. 2, 1995.

³³ Author’s interview with State Council official, July 2005.

³⁴ For details on the administrative change, see <http://www.caijing.com.cn/2009-03-18/110123414.html>

on behalf of the central ministry. The vehicle purchase levy used in rural transport development amounted to 1.4 billion yuan in 2001, 10.8 billion in 2003, 22.7 billion in 2006, 36.54 billion in 2007, and in 2008 to 22.07 billion.³⁵ Central transport officials anticipated spending an additional 45.4 billion in 2009-2010. Interestingly, these amounts represent only around 40% of the total revenue from this levy, which poses a question as to how the remainder has been spent.³⁶ The road maintenance fee invested in all types of road constructions amounted to 86.089 billion yuan in 2005, of which only 19.69 billion (or 23% of the total) went toward building new rural roads or subsidizing the operation and maintenance of rural roads.³⁷ Impressive as these amounts may be, it was only a small portion of the predicted total investment for 2005 of 488 billion yuan in roads.³⁸ Beijing insists that central government investment “leads,” while other sources dominate the net investment.

Consistent with the past is the provincial government’s primary role in funding provincial highways, with the latest requirement that provinces raise 35 percent of the initial capital from their own revenue streams (including tolls) and selling treasury bonds – the other 65 percent of the cost may come from bank loans.³⁹ While central transfers (ministerial special funds and treasury bonds) rarely exceed 10% of the total funding of major expressway and highway projects, provincial officials cannot afford to disregard lobbying since a host of issues that are more important than the central subsidies are at stake with these central-local co-financing (*peitao*) projects. These issues include approval of future projects, routes of national trunk lines, anti-poverty subsidies, terms of toll roads, credit access, etc. I will address some of these linkages in the next section.

The above stated cost-sharing arrangement does not significantly affect the construction of lower-class rural roads that remain largely the responsibility of local states.⁴⁰ The 1997 Highway Law stipulates that county and lower level roads should be built and maintained (*zijian ziyuan*) by the relevant governments, for which the county or prefecture-city planning agencies could approve without involving higher authorities. As expected, this lowered procedural

³⁵ Data available on:

<http://news.chinavoc.cn/Tax/Files/200707/37779.html>
and http://www.gov.cn/jrzq/2009-04/17/content_1287925.htm

³⁶ See <http://news.chinavoc.cn/Tax/Files/200707/37779.html>

³⁷ In 2004, the equivalent sums were 74.317 billion and 3.199 billion respectively. See

<http://www.hebjinfo.com/UpFiles/Article/专题研究农村公路管养专题资金管理农村公路建设融资的可行性分析.pdf>.

³⁸ Ibid.

³⁹ Fan and Chan-Kang (2005), p. 21. See also

<http://www.hebjinfo.com/UpFiles/Article/专题研究农村公路管养专题资金管理农村公路建设融资的可行性分析.pdf>.

⁴⁰ For an excellent overview of rural roads in Chinese, see

<http://dev.catsic.com/ewebedit/UploadFile/2006327163347541.ppt>

threshold has often led to a cavalier attitude toward project feasibility and post-project studies as well as “campaign-style” (*da hui zhan*) strategies deployed by local cadres seeking to link administrative areas as “political achievements” (*zhengji*), heedless of the actual socioeconomic outcomes and market rationale of these roads. The central rural road fund materialized in the last three years of the 10th FYP, with the central government committing to subsidies at a fixed sum per kilometer. These subsidies differ by region and by the level of government. In the past, the central subsidy was considered a form of aid.⁴¹ In recent years Beijing has required partial repayment on the loans.⁴²

Tables 5.1 and 5.2 break down the basic funding sources for major highway projects including national and provincial level roads. Charts 6 & 7 plot the funding sources for rural, local roads.⁴³ The different shares of central funding for these two types of roads are readily evidenced. Notably, the “others” category for financing rural roads includes estimated monetary equivalence for various pooled labor measures, which is shown to be declining during the period of tax reform. I will offer explanations later.

⁴¹ For example, in 2009 Henan Province will receive from NDRC an additional 0.58 billion yuan for 843 projects (1500 km) covering 1590 villages, based on a standard subsidy of 100 thousand yuan/km. This amount is then supplemented by subsidies from the province and local governments. See http://midchina.xinhuanet.com/2009-04/03/content_16152246.htm. In comparison, the wealthier Fujian Province will receive 0.35 billion yuan for 1020 projects (3500km) covering 950 villages, which will aim to upgrade the road surface to cement. See <http://www.ptfdc.com/html/putianxinwen/20090406/45260.html>

⁴² Author’s interview with State Council official, July 2005.

⁴³ Also see <http://www.lmjx.net/tec/2007/200709/20070924111001.shtml>

Table 5.1 Major Highway Projects

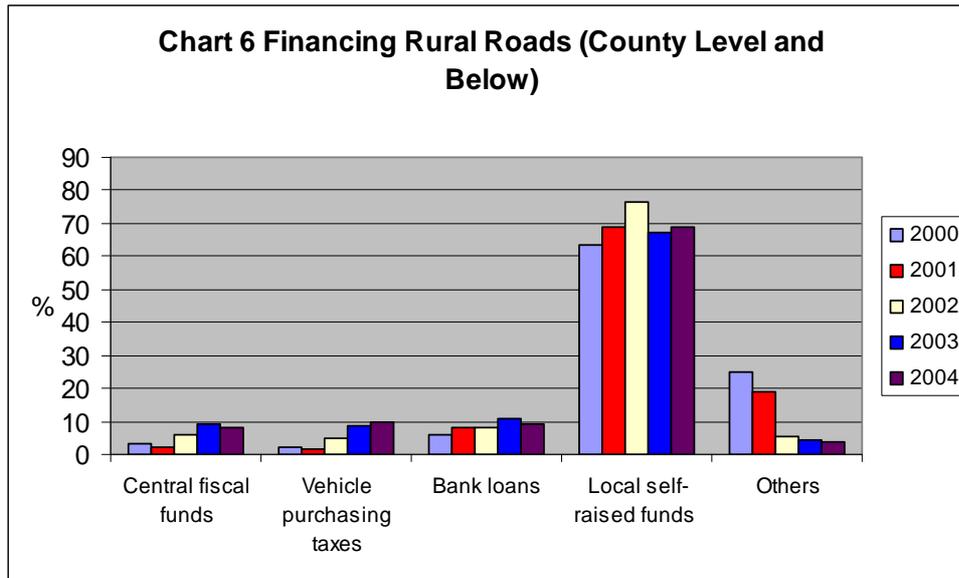
Year	Number of Projects	Total Mileage (km)	Among which Express -way Mileage	Total Investment (billion yuan)	Arranged Plan Investment (billion yuan)	Among which:			
						Central Investment	Self-raised by Province or City	Domestic Loan	Foreign Capital
2002	209	27700	14600	550	120	25.2	25	63	9
2003	219	26100	14700	580	130	24	25	56	8
2004	371	34800	21400	970	190	35.5	33	115.3	6.2
2005	434	41400	25500	1227.3	258.5	34.7	54.3	158.5	11
2006	559	43224	22189	1232.2	299.9	31.2	65.3	197.1	6.2
2007	493	35143	25247	1369.4	338.2	42.909	78.7	209.6	7.1

Source: Calculated based on data from: *Yearbook of China Transportation & Communications*, Yearbook of China Transportation & Communications Press, various years from 2003 to 2008.

Table 5.2 Major Highway Projects by Region

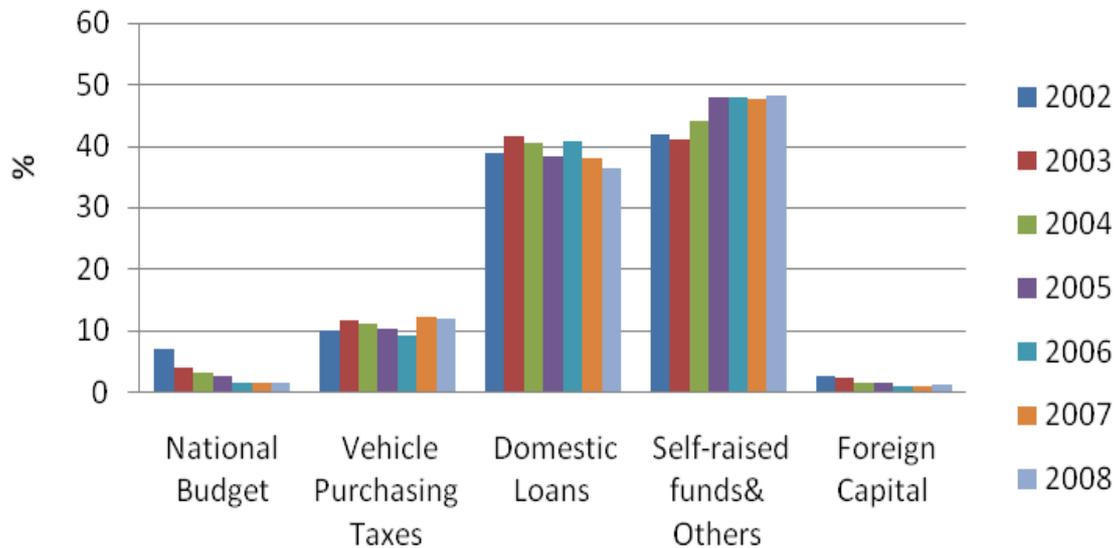
Region	The East			
Year	No. of Projects	Total Mileage (km)	Investment in that year (BInY)	Central Investment (BInY)
2002	59	5400	47.5	6.2
2003	68	6000	48.4	4.2
2004	121	7840	70	6.5
2005	125	9200	99.7	6.1
2006	209	11126	115.7	4.5
2007	162	7402	575.8	8.104
Region	The Central			
Year	No. of Projects	Total Mileage (km)	Investment in that year (BInY)	Central Investment (BInY)
2002	53	7000	37	7.2
2003	53	7493	40	7.1
2004	79	8366	50	8.6
2005	111	9438	64.8	6.6
2006	155	12389	74.7	8.3
2007	149	9856	401.2	10.504
Region	The West			
Year	No. of Projects	Total Mileage (km)	Investment in that year (BInY)	Central Investment (BInY)
2002	97	15300	33	11.7
2003	98	12670	43	12.4
2004	171	18590	70	20
2005	198	22750	89.5	21.5
2006	195	19710	109.4	18.4
2007	182	17885	465.6	24.301

Source: Calculated based on data from: *Yearbook of China Transportation & Communications*, Yearbook of China Transportation & Communications Press, various years from 2003 to 2008.



Source: Data based on Table 2 in 交通科学研究院 "农村公路建设投融资机制研究,"
 交通与发展研究课题网站 2006年2月, p.8,
<http://dev.catsic.com/ewebedit/UploadFile/2006327161554875.doc> and
 交通科学研究院 "农村公路建设投融资机制研究,"
 交通与发展研究课题网站 2006年3月, <http://dev.catsic.com/ewebedit/UploadFile/2006327161623778.ppt>.

Chart 7. Financial Sources for Rural Road Construction (2002-2008)



Note: Data sources and categories different from Chart 6
 Sources: 2002 available on:
www.moc.gov.cn/zhuozhan/tongjixinxi/fenxigongbao/tongjigongbao/200709/t20070926_409258.html
 2003 available on:
www.moc.gov.cn/zizhan/siju/guihuasi/tongjixinxi/niandubaogao/200810/t20081021_529967.html
 2004 available on:
www.iicc.ac.cn/jtzt/jtz/shuju/200808/23684.html
 2005 available on:
http://www.moc.gov.cn/2006/05zhuzhi/zongheghs/guihuasigzdt/t20060518_33155.htm
 2006 available on:
http://www.mot.gov.cn/zizhan/siju/guihuasi/tongjixinxi/niandubaogao/200710/t20071011_431308.html
 2007 available on:
http://www.stats.gov.cn/tjgb/qttjgb/qgqttjgb/t20070430_402402691.htm
 2008 available on:
www.moc.gov.cn/zhuozhan/tongjixinxi/fenxigongbao/tongjigongbao/200904/t20090429_577812.html

Throughout the 1990s and early 2000s Beijing focused on high quality highways linking provincial capitals and coastal cities where an economic boom was taking place. Meanwhile less than 2 billion yuan went into rural road networks annually.⁴⁴ The policy discrimination lasted until 2003, after which the National Development and Reform Commission (NDRC) started to make an explicit effort to prioritize rural roads. As a result, Expressways and Class I and II highways achieved remarkable growth while lower-class roads increased slowly. Between 1980 and 2002, Expressways grew by 44.4% in length per annum, Class I highways by 28.5%, Class II by

⁴⁴ *China Daily*, "Road to Link Remote Villages," 6/19/2006.

14%, Class III by 5.1%, and Class IV by 3.2%. Until 2000, unclassified roads actually reduced in length but since then they have increased somewhat. Interestingly, the average rate of growth of all roads during this time was a mere 2.9%, indicating the relative weight of lower-class roads in the overall infrastructure network.⁴⁵

The 1997 PRC Highway Law formulated a series of criteria and regulations on highways financed by loans that were then repaid by fees and levies on road users, on toll roads with domestic and foreign investments, and on the transfer of residual highway property rights. Given the improved legal groundwork, financing sources for highways have been increasingly diversified (see Table 5.1 and 5.2 above).⁴⁶ For instance, during the “Ninth Five-Year” period, road maintenance fees accounted for 53% of the total funds for road constructions, far lower than in the past. A further 36% came from other domestic sources including vehicle purchase levies, various government transfers, domestic bank loans, and treasury bonds. Beijing started to issue long-term public bonds in reaction to the need for domestic fiscal stimulus in the aftermath of the Asian Financial Crisis. Around 87 billion yuan in bonds were issued between 1998 and 2002, creating a major boost in the construction of rural roads.⁴⁷ That sum represented 13.2% of the entire bond issuance during the same period. However, under Wen Jiabao the State Council has discussed reducing bond support for highways – to about 10% of the total bond issuance – as part of a less inflationary macroeconomic policy with tempered fixed capital investment.⁴⁸ This objective is under discussion, as officials fear the implications for the overall financing of roads; in particular domestic commercial banks may pull back on their lending in view of the reduced bond support. With increasing participation by the World Bank, ADB and foreign investors, foreign loans and foreign direct investment constituted 8% and 3% of total, respectively.

With increased cash flow and pressures for divestiture of formerly state-owned enterprises, provinces have found more actors queuing up for a slice of highway pork. Commercial banks have found highways to be the next best thing to real estate as politically insured, high return investments.⁴⁹ International financial organizations have enthusiastically lent to highway projects consistent with poverty reduction goals, and have been getting deeply involved in micromanaging the environmental, compensatory, resettlement and other social externalities of road projects. More troubling for

⁴⁵ Fan and Chan-Kang (2005), p. 7.

⁴⁶ The Highway Law was revised in 1999 and 2004, leading to reduced fundraising channels for local governments – the details of which will be discussed later.

⁴⁷ Fan and Chan-Kang (2005), p. 19.

⁴⁸ *Jianshe Jixie Jishu yu Guanli*, “Current State and Developmental Goals of Road Constructions in China,” 8/2004.

⁴⁹ Author’s interview of MoC official, July 2005, who claimed that banks don’t even bother to do serious due diligence on the investment risks of highways.

governance is the provincial governments' sponsorship of "recombinant property" (Stark 1996) or "quasi-private" firms (Barbara-Francis 2001) in search of private gains and funding flexibilities. Two typical measures are publicly listed stock companies based on highway projects, and privatized construction firms that were spin-offs from provincial highway bureaus (*gongluju*) or communications department (*jiaotongting*) agencies seeking to bid on parts of highway projects. As will be described later in the case studies, these well-networked firms maintain significant influence over the provinces' allocation of resources and residual property rights, and in the process shape the quality of private participation or market forces in the transport sector.

In sum, under a fiscal federalist framework, the central and local governments take primary responsibilities for different jurisdictions of roads, while sharing the costs of national trunk lines and provincial level roads. This arrangement involves several different kinds of decentralized administrative roles and responsibilities. These roles and responsibilities include central state delegation of ownership and administrative functions to localities, top-down principal-agent relations between the various levels of the administration, and devolved and delegated relationships between the local state as the owner and semi-public and private sector firms working as contractors.⁵⁰ Complications arising from these relationships will be examined in the next sections.

Measurement issues

Given that official statistics categorize roads by *both* technical specifications and administrative levels, and that we have no data to properly assess how these two categories actually cross-tabulate, we have to offer evidence based on two assumptions. The first assumption is that there is significant overlap between these two categories, i.e. higher-class roads tend to be associated with provincial and national trunk line highways, and lower-class roads with county or lower level roads. Secondly, since county and lower level roads receive a set central subsidy per kilometer instead of the more complex cost-sharing schemes for higher level roads, we will loosely assume that the fiscal and procedural differences also apply to lower- vs. higher-class roads. In the following sections, I offer evidence for both categorizations based on data availability.

⁵⁰ For precise definitions of various forms of decentralization, see Robinson and Stiedl (2001).

The Fiscal Foundation of Highway Projects: a focus on provincial-level institutions and processes

Different approaches to understanding regional and temporal variations

This section develops the basic political economic logic of three competing, but not mutually exclusive, hypotheses on how various aspects of the decentralized, co-financing frameworks have affected road provisions. While I will not evaluate their relative persuasion, these hypotheses will be shown to differ in their ability to account for the puzzling trends of reduced growth in highway construction and regional variations over time. After stating the hypotheses, I will present case studies that support their respective arguments.

Hypothesis 1, “*fiscal shortfall*”: When the central government designed the initial blueprint for a national transport infrastructure network in 1998, it had intended to preserve the decentralization framework for road provisions from the 1980s. However, since 1999, the localities have suffered unexpected setbacks in their fundraising ability as traditional revenue sources have dried up and new ones have not been forthcoming. Hence, an absolute decline in the localities’ ability to provide funding, especially for low-class rural roads, has caused a decline in the growth rate of provision. The chief regional variation stems from eastern, coastal China’s better fiscal situation, which enables its provinces to meet Beijing’s demand for increasing rural roads since 2003.

Hypothesis 2, “*procedural biases*”: The provincial governments are not as impoverished as they would like to claim in order to extract more central resources. Instead, provincial officials weigh the relative benefit of different grades of roads as institutionalized in the procedures for road projects, leading to political strategies that discriminate against low-class rural roads. Thus it’s a question of political choice and prioritization of rent-seeking options. The key regional variation lies in inter-provincial differences in the

bureaucratic politics of highway projects, which shape the officials' specific interpretations of opportunities afforded by the general decentralized framework.

Hypothesis 3, “*quality of private capital participation*”: Given the absolute or relative shortage of funds for certain types of roads, an adequate provision could be achieved only through inviting private investments in the process of bidding for road projects in parts or in their entirety. Failures in securing reliable private investments have resulted in variations in road construction. This is essentially a market-rational argument, with complications emerging from state-society struggles over the terms of cooperation. In comparison to the earlier hypotheses, this one privileges “bottom-up” procedural dynamics and interest group pressures that have affected provincial preferences for road-building and types of roads. Over-eagerness on the part of provincial officials in securing profit-driven private investment would undermine provisions of roads with public good characteristics.

Evidence in favor of the “Fiscal Shortfall” hypothesis

An absolute decline in the localities' ability to provide funding could explain diminishing growth rates in length of highways over time as well as the slow addition of sub-Class III rural roads relative to higher-class expressways and highways. Reports in provincial journals from 2000 to 2005 suggest that the main culprits for the decline in local fiscal capacity are the changing tax base, the fiscal pressures of “fee-to-tax” and agriculture tax reforms, and increasing incidents of local societal resistance to coercive collective actions directed by cadres. The complex causes for these changes will not be discussed here, only their effects on local fundraising.

Throughout the 1980s and 1990s, the main source of funding for road projects at the provincial and lower levels was road maintenance fees (*yanglufei*) levied by all levels of the local government. By definition, road maintenance fees are exacted not for the purpose of building new roads but for maintaining existing ones. Vehicles affected by these fees include farm tractors, passenger vehicles and freight carriers. In rural areas, farm tractors provided the bulk of taxation. Local highway authorities collect these fees on behalf of the Ministry of Communications (MoC), and since 1996 they have come under local state management. In short, the fees first go into the local treasury, and part of the sum would be submitted to the MoC, while the localities also directly tap into this fund for their expenditures. Prior to 2006, state economic planners *did not know* the exact sums of the road maintenance fees submitted to the central authorities and those kept by localities. Instead, the MoC kept the cash flow as a black-boxed internal operation. In 2006, under

pressure from various governmental sources, the MoC released the 2003 data on the usage of road maintenance fees. Apparently, 45% of that fund went into maintenance and upgrading of roads, while 15.5% was allocated for the construction of new roads and another 15% specifically supported the construction and maintenance of rural roads. The remaining 24.5% mostly paid for overhead costs.⁵¹

Over time, road maintenance fees have dried up due to the changing nature of traffic and tax evasion by tractor owners.⁵² Even more importantly, transport authorities blamed a diminishing law-abidingness among drivers. In fact, “in certain regions, resistance has evolved from the individual acts of disobedience in the past to collective action in resisting, gang beating, and taunting and scolding fee collectors.”⁵³ In light of these unpleasant circumstances, tax collectors had visibly lost motivation to do their jobs.

Reinforcing the trend of tax evasion is the fee-to-tax reform. While widespread implementation of this major reform and dramatic tax cancellations were not achieved until 2003, policy pressures to reduce local fees and levies had mounted in prior years.⁵⁴ In fact, the 1999 revision of the Highway Law officially banned further collection of road maintenance fees – “drivers no longer need to pay highway maintenance fees, and highway agencies should not ask for such fees from drivers or collect fees in arrear.”⁵⁵ In Quzhou city of Zhejiang province, localities have lamented that policy pressures of “reducing peasant burdens” (*jianfu*) and “rationalizing taxation” (*guifan*) have led to cancellations of taxes on bus routes and yearly reductions of tax collections on small vehicles. Given the stable amount of provincial allocation of road subsidies to counties and townships – at about 30 million yuan per year for Quzhou city–localities face widening budgetary gaps.

In addition to undercutting the local tax base, fee-to-tax reform has given license to social resistance on a whole host of extractive policies and participation in public works. This is rather ironic given

⁵¹ *Zhongguo Jiaotong Bao*, 11/24/06, posted on the official MoC website: www.moc.gov.cn/06jiaotongbaoxw/lishixw/06nian11y/200611/t20061124_125372.html. Since these fees are supposed to be eliminated upon the implementation of the national fuel tax in 2009, it may be impossible to find data for the other years.

⁵² *Renda Yanjiu*, Vols. 98 and 99, 2000, p. 22. Gansu province reported a 12% decline – from 544.3 to 522.7 million yuan – in the collection of road maintenance fees in the first three quarters of 1999 as compared to the same period in 1998. The reasons given included declining traffic of farm tractors from the effects of a drought that year, for which the Gansu official was unable to offset in the near future due to limited alternative traffic sources. The decline was particularly precipitous in the first quarter, when *yanlufei* collection dropped by 45.2% over that of the same period last year. Through campaign-style efforts by provincial cadres, the total tax collection for 1999 was saved from a disaster. In the end, there was only a 50 million yuan drop from the 1998 collection.

⁵³ *Idem*.

⁵⁴ *Jiaotong Caihui*, “农村税费改革对我国县乡公路建设和养护资金的影响” Vol. 187, No. 2, 2003.

⁵⁵ *Jiancha Ribao*, “Yanlufei has been illegally collected in the past six years,” 8/24/2006.

that the chief intention of the reform was precisely to reduce such behavior. Resistance often started when local officials actively resisted reform and continued with illegal taxation. In Gansu the fee-to-tax reform was blamed for “reduced drivers’ psychological inclination for voluntary compliance” with tax and toll collectors.⁵⁶ In Liaoning province, fee-to-tax reform has led to the dismantling of road-building related programs such as compulsory pooling of labor (*nongmin yiwugong*), conscripted labor-for-tax payment, and village-level collective fundraising schemes. As a result, financing options for constructing and maintaining rural roads have narrowed, as local states became more dependent on traditional means of road maintenance fees and provincial government transfers.⁵⁷ This outcome represents a reversal of the financial diversification strategy pursued under the decentralized framework in the 1980s-90s. Compulsory labor and village-level collective fundraising also contributed to the lion’s share of road financing in Quzhou city, Zhejiang. The former method contributed over half of the total investment, while the latter is estimated to amount to the monetary equivalent of 400-500 million yuan over the 9th FYP. However, starting in 2000, these fundraising measures have lost impetus. Between 1999 and 2000, collective fundraising dropped from 64.5 million to 48.4 million yuan.⁵⁸

Given the fiscal shortfalls, poorer provinces have increasingly accrued debt to meet the central government’s expectations on transport infrastructure expansion.⁵⁹ In the face of a dwindling local revenue base and constant central transfers (only about 1/4 of the total capital needed, and never over 30%), Gansu has become increasingly indebted through bank loans and international organizations and foreign private lenders, incurring about 7 billion yuan in loans as of 2000.⁶⁰ Henan province accumulated 32 billion yuan in debt just for provincial highways, generating an interest payment of 2.5 billion per year in 2006. The entire sum of toll collection for the year was only 2 billion yuan, making repayment impossible. As a result, 87 toll stations in Henan have been handed over to creditor banks.⁶¹ Nationwide, about 17 provinces are running net deficits on their roads, usurping resources estimated at about one-third of the total central transfers for road projects.⁶²

Predictably, the emerging fiscal shortfalls from a changing tax base, policy pressures, and societal resistance to tax collection tend

⁵⁶ *Renda Yanjiu*, Vols. 98 and 99, 2000, p. 22.

⁵⁷ *Liaoning Jiaotong Keji*, Vol. 4, 2005.

⁵⁸ *Journal of Zhejiang Vocational and Technical Institute of Transportation*, “加快县乡公路建设的途径与措施” Vol. 13, No. 13, Sept. 2002.

⁵⁹ *Fazhan*, Vol. 7, 2002, p.5

⁶⁰ *Renda Yanjiu*, Vols. 98 and 99, 2000, p. 22.

⁶¹ *Zhongguo Jinji Zhoukan*, “Henan’s Total Toll Collection Cannot Pay off Loan Interests, Problems of Over-Investment Exposed,” 9/11/2006.

⁶² *Zhongguo Qingnian Bao*, “世行报告称中国高速公路通行费和国际相比偏高” 2/13/2007, available on: <http://news.tom.com/2007-02-13/OI27/84574022.html>

to hit predominantly agricultural, less developed areas the hardest. In particular, problems with local fundraising directly affect low-grade rural roads, but need not cause problems with Expressways and higher-grade roads at the national and provincial levels, which are mainly co-financed by national and provincial governments. Thus one may expect better-financed Eastern, coastal provinces to initially oversupply high-class roads and undersupply rural local roads, but if pressured by Beijing these provinces can improve on the latter. On the other hand, Central and Western China attempt to meet central demand for quantity and quality, but would become increasingly unable to provide non-profitable rural roads out of their own pockets. As a result, we would expect Central and Western provinces to increasingly lobby Beijing for central transfers even for roads entrusted to local states.

Lastly, the contentious fuel tax reform should make a dramatic impact similar to that of the fee-to-tax reform, once it gains widespread implementation. First proposed in 1994, debated, rejected, and then accepted in a modified form by the National People's Congress in 1999, the fuel tax intends to replace various levies including the road maintenance fees with a single petroleum tax levied at point of purchase. But the fuel tax has been postponed due to concerted local government resistance on the grounds of undermining their ability to fundraise for roads under their jurisdictions. Localities continue to levy road maintenance fees and the central government has been forced to make exceptions for this reality. In 2000, a State Council document on traffic and vehicle taxation reform stipulated that before the implementation of the fuel tax, localities could continue to levy various road maintenance fees. Five years later, the State Council urged localities to use road maintenance fees for the stated purpose of road maintenance.⁶³ Only after that aim has been met can the remaining money be allocated for other usage such as building new roads. In the past half-year, MoC officials have reiterated that "facing a huge shortfall in public financing of roads, we have no choice but to accept the continuation of toll roads."⁶⁴ Clearly, this is a fiscal battle the central state does not appear to be winning.

It is not difficult to understand the local government resistance to the fuel tax. It poses a major threat to the localities' repayment of investments in transport infrastructure and to local employment. An interview with anonymous Chinese officials reveals that during the 2000 fuel tax debate, localities across the nation raised the challenge of re-employing some 270,000 road tax collectors. Curiously, before the fuel tax measure was put on the table, localities had reported only

⁶³ *Zhongguo Jiaotong Bao*, 11/24/06, posted on the official MoC website: www.moc.gov.cn/06jiaotongbaoxw/lishixw/06nian11y/200611/t20061124_125372.html

⁶⁴ "交通部有关负责人:公路收费政策不会动摇" 11/17/2007, available on: <http://business.sohu.com/20061117/n246450615.shtml>

120,000 such employees. More importantly, localities resented the recentralization of tax collection with the fuel tax, through gas stations and the national oil corporations. The localities would effectively lose control over this revenue stream. For the same reason, officials in the MoC have also opposed this reform since they too will lose an undefined but predictably huge tax base in road maintenance fees.⁶⁵ Moreover, without this revenue source, localities would find it even more difficult to obtain credits from commercial banks and foreign sources.

Evidence in favor of the “Procedural Bias” hypothesis

While the earlier section portrays a zero-sum fiscal game between central and local governments in fundraising for roads, with the latter losing out due to obsolescing tax bases and mechanisms, one could argue that absolute constraints are not as important to provincial officials as relative ones. An important indicator for this argument is that the relative share of central provisions in the total investment in rural roads has declined over time, while the share of resources fundraised by local states has grown steadily in the 2000s. At the same time, we see a persistent preoccupation with investing in higher-grade roads even as lower-grade roads provide far greater economic and developmental returns.

Specifically, the project formulation, approval and financing procedures for road projects assign differential costs and benefits to different grades of roads, leading to political strategies that discriminate against low-grade rural roads. The case studies below show three sources of procedural bias: 1) bureaucratic fragmentation within the provincial government, leading to divided vested interests in high-class and low-class roads; 2) higher and immediate commercial returns for high-class roads, in particular in the form of tolls which can then be used to fund other road projects; and 3) tangible political benefits for investing in higher-class roads.

The chief bias in the bureaucratic politics of highways stems from the increasing fragmentation, overlapping jurisdiction, and functional interdependence of various agencies within the provincial Communications Department (*jiaotongting*) as road projects gained complexity and fiscal importance. The Guangxi Communications Department governed over several subordinate agencies including: the Highway Bureau (*gongluju*), the Infrastructure Construction Bureau (*jijianju*), the Foreign Capital Division (*waizichu*), and the Design Institute (*shejiyuan*), etc. Broadly speaking, the Highway

⁶⁵ *Zhongguo Qingnian Bao*, 2/4/05, available on:
http://news.xinhuanet.com/auto/2005-02/04/content_2545298.htm

Bureau is responsible for lower-class rural roads, while the Communications Department as a whole deals with higher-class national and provincial highways and co-financed projects with domestic banks and foreign investors. On a day-to-day basis, the Highway Bureau operates with relative autonomy from the rest of the Communications Department. It is responsible for an extremely important accounting function: the bureau compiles the internal highway yearbook (*nianbao*) that documents the best available information on new and revamped county and township roads.⁶⁶ The central government allocates subsidies for these roads according to numbers in the yearbook. As a result, the Highway Bureau often finds itself tempted to over-report the length or the costs of road construction in order to obtain more money, which can then be allocated to other road projects.⁶⁷ This behavior is practically out of the reach of provincial and national officials – the best they could do is to send investigation teams from time to time.

The Communications Department delegates the tasks of actual construction and subcontracting oversight to the Infrastructure Construction Bureau, while the Design Institute and Foreign Capital Division perform specialized pre-project and post-project tasks. Provinces differ in this division of labor, resulting in differences in interest group alignment and sensitivity to the politics of various grades of roads and related financing options.⁶⁸ Provinces also differ in their approach in delegating authority to these agencies and to lower level governments and in coordinating the relationship between horizontal and vertical lines of command (*tiaokuai*). For example, Liaoning province emphasizes the horizontal dimension (*yi kuai wei zhu*), which means that the province is willing to let each level of the government come up with its own plans and financial resources.⁶⁹ As a result, road constructions were speedy and local officials' motivation visibly heightened.

At the same time the provincial officials were faced with messiness in accountability, duplicate constructions, and frequent inflation of costs of projects. In another example, Jiangxi province embarked on a major decentralization effort in 2001 with the arrival of a new provincial party secretary and governor, both hailing from previous posts in coastal areas. The provincial government delegated personnel, financing, and material management of roads to city and district levels. As a result, there was a dramatic spike in highway construction activities in that year but since then provincial officials have expressed anxieties about coordination, financial solvency, quality control, and personnel management.

⁶⁶ Even village roads are reported in the yearbook. Village roads are not counted in the openly published national road statistics.

⁶⁷ Author's interview with State Council official, July 28, 2005.

⁶⁸ Further fieldwork will provide details on other provinces.

⁶⁹ *Liaoning Jiaotong Keji*, "论辽宁省农村公路发展对策" Vol. 4, 2005.

The Jiangxi provincial Communications Department sought to transform itself from an all-inclusive owner and contractor to fulfilling more macro-management and regulatory roles.⁷⁰

Different grades of roads offer different incentives for provincial officials.⁷¹ The biggest moneymakers are the toll highways that help provinces recoup their investments and allow localities to sponge cash off the passing traffic. As a fundraising strategy, “using roads to pay for roads (*yi lu yang lu*)” has had no clear limits until 2004. In principle, tolls should stop or be scaled back after the debt has been paid on that particular highway project, but provinces continue to charge high tolls to pay for new projects and less profitable roads. Since the money is all mixed up in the provincial budget, cross-project allocation easily transpires. In particular, provincial officials have shown enthusiasm in Class II highways. These highways have lower capitalization compared to Expressways and Class I highways, thus reducing the financial risk to the provincial authorities. Moreover, Class II highways tend to connect active cities and market centers, creating excellent opportunities for tolls. Furthermore, Class II is the lowest class for which the central planners and transport policies show a marked preference as a means of improving the “quality” of roads in China.⁷² By the end of 2008, 95% of Expressways, 60.77% of Class I highways, and 44% of Class II highways nation-wide are toll roads. However, in impoverished Hunan Province, 94.25% of Class II highways charge tolls.⁷³ This suggests an interaction effect between provincial fiscal shortage and procedural biases.

However, Class II highways have under performed fiscally. According to the MoC, the debts of Class II roads financed by government loans have piled up to 500 billion yuan to date. In Hunan Province alone, total governmental and private debts relating to Class II highway constructions amounted to nearly 30 billion yuan, of which 60% can be attributed to the provincial government.⁷⁴ To solve this fiscal burden, Beijing has proposed arranging transfers from the fuel tax to offset 50% of the debt, and committing provincial and municipal governments to absorb another 50% within a ten-year period.⁷⁵

⁷⁰ *Zhongguo Gongluwan*, “Paying Attention to Institutional Reform in Jiangxi Road Management,” available on: <http://www.jxlib.gov.cn/xxzx/jdsj/jxjj/jxjj03.htm>

⁷¹ Highways also generate sizable employment opportunities at local levels in construction, administrative, and related businesses. For a fascinating detailed account of the employment and income impacts of highway activities on Henan province from 1996 to 2001, see *Hangye Guanli*, “Multiplier Effects on the Henan Economy of Highways,” (2003) Vol. 3. For an earlier national level analysis, see *Zhongguo Jiaotong Bao*, “公路投资对国民经济的拉动作用有多大” 6/6/1998.

⁷² See http://news.xinhuanet.com/politics/2009-05/05/content_11316346.htm

⁷³ See <http://unn.people.com.cn/GB/14778/21707/9216467.html>

⁷⁴ This figure is likely to underestimate the extent of damage, as most provinces are still in midst of doing debt audits. See

http://news.csonline.com.cn/hn/200904/t20090430_940258.htm

⁷⁵ *Ibid.*

It is possible that within the next couple of years that one would see a crash in the sub-national governments' financial expectations for Class II roads. With the implementation of the national fuel tax in 2009, tolls on Class II roads built by the local government on loans will be eventually phased out, while charges on Class I roads and Expressways will remain. The terms of phasing out remain unclear, but will likely follow regional patterns. The 2004 Revision on the Highway Law had set out general guidelines for the termination of tolls on debt-financed public highways for the three regions of China. Tolls for roads in Eastern China cannot exceed 15 years, while for Central and Western China the limits are 20 and 25 years respectively.⁷⁶ The timeline is compressed for the elimination of Class II road tolls – 3-5 years for Eastern provinces, 5-10 years for Central Provinces, and indefinite for Western Provinces – reflecting Beijing's acknowledgement of this type of highway as a local rent-seeking vehicle.⁷⁷ Meanwhile, the central government decided to allocate only 26 billion yuan from fuel tax revenue to compensate local government for the loss caused by the cancellation of toll collection stations on Class II roads in 2009.⁷⁸ New regulatory incentives will alter the discount value for rent-seeking potentials on different types of roads.

The political bargaining game is far from over. This most recent timeline mentioned above is a compromise between Beijing and local interests – in 2006-2007, Beijing had declared that all Class II highways in Eastern China should cease charging tolls immediately, and Class II highways in Central and Western China that are in the process of repair and upgrading or contain unfinished projects should also cease their tolls. That is, only brand new Class II highways in less developed regions of China would be allowed to charge tolls.⁷⁹ Beijing has also issued several warnings against failing standards of maintenance and excessive charges as local officials turn to end-game strategies.⁸⁰ Of course, each province would react as it sees feasible – Guangdong issued a statement declaring its intention to get rid of tolls by 2019!⁸¹ There is no guarantee that the political momentum accompanying the implementation of a fuel tax could carry over to canceling tolls as crucial revenue streams of provincial and local governments.

⁷⁶ *Zhongguo Qingnian Bao*, “世行报告称中国高速公路通行费和国际相比偏高” 2/13/2007, available on: <http://news.tom.com/2007-02-13/OI27/84574022.html>

⁷⁷ See <http://politics.people.com.cn/GB/30178/9023008.htm>

⁷⁸ See <http://news.sina.com.cn/c/2009-03-25/105317479085.shtml>

⁷⁹ “交通部新闻发言人：收费公路政策暂时不会变” 2/2/2007, available on:

<http://finance.people.com.cn/GB/71364/5357450.html>

⁸⁰ “必须完善公路投融资体制” 5/13/05.

⁸¹ *Xinxi Ribao*, “广东2019年将全部撤销政府还贷公路收费站” 2/7/07, available on: <http://politics.people.com.cn/GB/14562/5375576.html> Author's interviews in Beijing July 2005 reveal that Anhui and Shandong provinces have continued with prolonged toll collections – in Anhui's case, up to 2009.

Evidence in favor of the “Quality of Private Capital Participation” hypothesis

Faced with absolute fiscal constraints and difficult tradeoffs among different policy objectives, local governments have turned to private capital participation to build roads that would otherwise rely on public funds. In making these choices, provincial officials respond to procedural dynamics at the provincial level and below and to “bottom-up” interest group pressures.⁸² There are basically two kinds of private capital – the aforementioned village-level collective fundraising and pooling of labor, and Build-Operate-Transfer (BOT) projects. This section looks at BOT experience in Guangxi province and elsewhere as a window on how provincial officials are actively creating private interests as well as being co-opted by them.⁸³

BOT is a form of delegation in project financing, wherein a private company receives a contract from the provincial government to finance, design, construct, and operate a highway for a specified period, after which ownership is transferred back to the province. During that period the private company has residual rights to charge tolls to enable a speedy recovery of its investment and to pay for operating and maintenance expenses in the project. Not popular in Western countries until recently, the Chinese provinces have embraced BOT as an appealing alternative to lengthy procedures in public sector financing of highways. BOT road projects started in 1992 and gathered momentum rapidly. In recent years, about 50-60% of new projects are BOTs, raising alarms in Beijing on management issues. Naturally, BOT projects only concern roads with reasonable commercial potentials, not those of public goods nature.

In comparison to entirely publicly financed projects, BOT projects go through relatively lax approval procedures and supervisions. The private company that won the bid for a BOT road project would obtain a maximum of thirty years in ownership and residual property rights. The BOT firm submits a feasibility report to the provincial Communications Department, which would then forward it to NDRC for review and approval. Beijing also conducts an audit to see if the responsible legal party has enough capital to put up the required 35% of the entire project cost for the initial capitalization.

⁸² There is some evidence that areas with meaningful political competition and accountability through local elections have improved governance over public projects. Xiaobo Zhang, Shenggen Fan, Linxiu Zhang, and Jikun Huang, “Local Governance and Public Goods Provision in Rural China” *EPTD Discussion Paper* No. 93, 2002. Based on a village survey in Jiangsu Province in 2000, the above authors find that elected officials tend to tax constituents less and provide them with higher levels of public services.

⁸³ Unless indicated otherwise, all data below derive from the author’s interviews of officials in Beijing and Guangxi in June-July 2005.

Generally, BOT projects receive no government subsidies or direct equity participation, hence the rate of return on investment is set at a higher level of about 17% to reflect the greater risk.

The problem with BOT projects is essentially one of local political entanglements and unreliable actors emerging from the problematic legacy of reforms in separating the government from enterprises and divesting state-owned enterprises.⁸⁴ About 60% of all BOT projects were ruined as of 2005. In Guangxi, BOT companies show significant networking relations with the provincial Communications Department, although no official would disclose the specifics in interviews.⁸⁵ The relationship shows in the institutionalization of the exchange relations – for example, the Infrastructure Construction Bureau has received payments for project designs before the “winner” of the open bidding process was declared. Upon winning the bid, the BOT company deposits 240,000 yuan and signs an agreement with the Communications Department. After that point, the firm is pretty much off on its own, enjoying the autonomy deriving from its independent fundraising role.

The financial background of most of these BOT companies is troubling. Deceptions abound, as BOT firms commission feasibility studies from consulting (*zixun*) companies that are paid to upwardly revise costs, which help to justify additional loans. This behavior is sustainable only because of rampant collusion and corruption in the construction industry. BOT entrepreneurs typically roped in a reputable government work unit (*shiye* or *qiye*) in a nominal business partnership. However, when problems arise the leading cadres of the work unit are understandably reluctant to help bail out the project. At the same time, the original entrepreneurs or their backstage bosses (*muhou laoban*) could not care less about the firm’s loss of money. In fact, it is common practice for BOT funds to be diverted to speculators on real estate and private consumption. In the end, domestic commercial banks and vulnerable private investors (including shareholders for publicly-listed BOT firms) shoulder the liabilities in default and bankruptcy. The road project languishes, falls into public hands, or comes to an end. In effect, the risk is transferred to the general public.

Case studies of other roads and regions show alternative images of public-private relations in road projects from the collusive one offered above. In Quanzhou Fujian, decisions on public roads aim to rent-seek off private efforts. While local authorities welcome foreign capital as “political achievements” (*zhengji*), they see private

⁸⁴ Since 1997, seventeen director-level provincial Communications Department officials have been convicted of corruption, including the provinces of Beijing, Henan, Hunan, Sichuan, Guangxi, Guangdong, Guizhou, Xinjiang, Anhui, Jiangsu, Heilongjiang and Yunnan. *Xinhua*, “Name list of 17 corrupted provincial transportation officials in China since 1997,” 3/31/2005.

⁸⁵ They did reveal that only a handful of companies bid on these road projects, and all of them were former SOEs or affiliates.

resources as competitors. As a result, after inviting private capital participation, transport officials then impose various fines and detours, and even build alternative routes to undermine the profitability of private roads.⁸⁶

⁸⁶ *Zhonghe Yunshu*, "Studies on Problems in Privatization of Highway Infrastructure," 10/2004.

Conclusion

This paper has shown that institutional and procedural incentives embedded in the decentralized framework of road provision, leading to problems of under-provision of rural roads in 1999-2003, have partly led to Beijing's effort to recentralize highway planning and narrow down financial options for local fundraising after 2003. This is by no means an easy and inevitable decision indicative of a stronger center. While the central state prefers to place the responsibility of financing roads on provincial and local governments, the current fiscal capacities of impoverished local governments and the bargaining dynamics between the national ministries and provincial governments have created pressures on the central government to subsidize road projects for political reasons. In this context, the central state's continuing tight restrictions on independent local state fundraising – especially against the backdrop of the belt-tightening impact of agricultural tax cuts – can only intensify the redistributive aspects of expensive road projects as localities seek to transfer profits made from commercially viable roads to failed projects and roads with public good characteristics. This suboptimal political outcome has led to heavy resistance against tax reforms, persistent patterns of inefficient use of money, and contentious state-society relations.

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Appendix: Tables

Table 1.1. Growth rates in length of highway by region (%)

	2000	2001	2002	2003	2004	2005	2006	2007
Eastern China	3.57	10.99	2.65	3.12	5.08	4.07	–	2.80
Central China	3.97	22.11	5.14	2.72	2.96	2.74	–	2.27
Western China	3.78	29.19	3.90	1.89	2.39	2.94	–	6.06
China	3.77	21.05	3.96	2.53	3.36	3.20	3.34	3.67

Table 1.2. Growths rates in length of high-grade highway by region (%)

	2000	2001	2002	2003	2004	2005	2006	2007
Eastern China	10.27	16.60	7.07	6.62	8.93	6.53	–	7.02
Central China	11.22	22.70	15.40	11.07	12.46	11.66	–	7.34
Western China	16.21	23.84	9.08	9.77	9.69	8.82	–	9.71
China	11.69	19.93	10.14	8.74	10.29	8.78	–	7.67

Source: Calculated based on data from: *Year Book of China Transportation & Communications*, Year Book of China Transportation & Communications Press, various years from 1999 to 2007.

Table 2. Growth rates in the ratio of high- to Low-class highways by region

	2000	2001	2002	2003	2004	2005	2006	2007
Eastern China	8.20	6.49	5.59	4.46	4.84	3.18	–	4.94
Central China	7.96	0.56	11.31	9.60	10.99	10.57	–	5.50
Western China	12.96	-4.47	5.44	8.39	7.85	6.26	–	3.73
China	8.80	-1.09	6.94	7.10	7.99	6.51	–	4.39

Source: Calculated based on data from: *Year Book of China Transportation & Communications*, Year Book of China Transportation & Communications Press, various years from 1999 to 2007.

Note: Starting in 2006, the length of added rural roads is included in the calculation.

Table 3. Length of highway

Year	Length of highway (1,000km)
1952	127
1957	255
1962	464
1965	515
1970	637
1975	784
1978	890
1979	876
1980	883
1981	898
1982	907
1983	915
1984	927
1985	942
1986	963
1987	982
1988	1000
1989	1014
1990	1028
1991	1041
1992	1057
1993	1084
1994	1118
1995	1157
1996	1186
1997	1226
1998	1279
1999	1352
2000	1403
2001	1698
2002	1765
2003	1890

2004	1871
2005	1931 (or 3345.2 including rural roads)
2006	3457.0 (includes rural roads, ibid for following years)
2007	3583.7
2008	3730.2

Source: *Year Book of China Transportation & Communications*, Year Book of China Transportation & Communications Press, various years.

Table 4. Length and technical grades of highway by region

Year	Region	Total Length of Highways	Express-way and Class I to IV Highway	Express-way	First Class	Second Class	Highway Below Class IV	Express-way and Class I to II highway	Class III to IV Highway and Highway Below Class IV	Ratio of high to low quality highways (%)
1999	East China	427,880	395,856	6,193	13,782	64,262	32,024	84,237	343,643	24.51
2000		443,134	412,542	9,073	15,093	68,725	30,592	92,891	350,243	26.52
2001		491,845	434,267	10,056	18,246	80,007	57,578	108,309	383,536	28.24
2002		504,856	448,162	12,634	19,583	83,751	56,694	115,968	388,888	29.82
2003		520,621	465,644	14,690	21,116	87,841	54,977	123,647	396,974	31.15
2004		547,060	496,998	15,988	23,596	95,103	50,064	134,687	412,373	32.66
2005		569,312	522,326	18,497	25,417	99,570	51,618	143,484	425,828	33.70
2006		993,491	738,075	20,279	29,980	108,665	140,814	158,924	834,571	19.04
2007		1,021,315	894,561	22,524	32,631	114,920	126,753	170,075	851,238	19.98
1999	Central China	454,985	390,761	2,883	2,349	47,793	64,224	53,025	401,960	13.19
2000		473,036	412,370	3,564	2,951	52,462	60,666	58,977	414,059	14.24
2001		577,639	470,664	5,014	3,960	63,393	106,975	72,367	505,272	14.32
2002		607,315	486,263	6,995	4,777	71,742	121,052	83,514	523,801	15.94
2003		623,829	506,463	8,315	5,324	79,123	117,366	92,762	531,067	17.47
2004		642,316	531,530	10,151	6,169	88,003	110,786	104,323	537,993	19.39
2005		659,921	556,328	12,977	8,429	95,080	103,593	116,486	543,435	21.44
2006		1,331,308	869,953	14,593	9,713	98,837	461,354	123,143	1,208,164	10.19
2007		1,361,591	966,935	18,144	11,244	102,798	394,654	132,186	1,229,401	10.75

Year	Region	Total Length of Highways	Express-way and Class I to IV Highway	Express-way	First Class	Second Class	Highway Below Class IV	Express-way and Class I to II highway	Class III to IV Highway and Highway Below Class IV	Ratio of high to low quality highways (%)
1999	West China	468,826	370,119	2,529	1,585	27,902	98,707	32,016	436,810	7.33
2000		486,528	391,101	3,677	2,044	31,485	95,427	37,206	449,322	8.28
2001		628,528	431,113	4,367	3,008	38,702	197,415	46,077	582,451	7.91
2002		653,051	448,501	5,501	3,108	41,650	204,550	50,259	602,792	8.34
2003		665,378	466,631	6,740	3,463	44,965	198,747	55,168	610,210	9.04
2004		681,282	487,297	8,147	3,757	48,612	193,985	60,516	620,766	9.75
2005		701,310	513,138	9,529	4,537	51,790	188,174	65,856	635,454	10.36
2006		1,132,202	560,238	10,463	5,597	55,176	571,961	71,236	1,060,964	6.71
2007		1,200,809	673,886	13,243	6,217	58,695	526,925	78,155	1,122,655	6.96
1999	National Total	1,351,691	1,156,736	11,605	17,716	139,957	194,955	169,278	1,182,413	14.32
2000	National Total	1,402,698	1,216,013	16,314	20,088	152,672	186,685	189,074	1,213,624	15.58
2001	National Total	1,698,012	1,336,044	19,437	25,214	182,102	361,968	226,753	1,471,259	15.41
2002	National Total	1,765,222	1,382,926	25,130	27,468	197,143	382,296	249,741	1,515,481	16.48
2003	National Total	1,809,828	1,438,738	29,745	29,903	211,929	371,090	271,577	1,538,251	17.65
2004	National Total	1,870,661	1,515,826	34,288	33,522	231,715	354,835	299,525	1,571,136	19.06
2005	National Total	1,930,543	1,591,791	41,005	38,381	246,442	338,752	325,828	1,604,715	20.30
2006	National Total	3,456,999	2,828,727	45,339	45,289	262,678	117,4128	353,306	3,103,695	11.38
2007	National Total	3,583,715	2,535,383	53,913	50,093	276,413	104,8332	380,419	3,203,296	11.88

Source: *Year Book of China Transportation & Communications*, Year Book of China Transportation & Communications Press, various years from 1999 to 2008
 Note: From 2006, the length of added rural roads is included in the calculation.