An Economic Assessment of China’s Transport Tax Reform

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China introduced the transport tax reform in 2009. One of the major policy reform was abolishing tolls on a certain type of urban roads. This paper studies the effects of the reform on road investment and welfare using the difference-in-differences methods.

Research questions
The transport tax reform in China in 2009 is of interest for three reasons. First, it has not been studied in transport economics literature or from the perspective of policy evaluation. Second, transport sector is huge in China—China spent 20,045 million US dollars on toll road investment from 1990 to 2006 and more than doubled its road density from 14.6 kilometre per 100 square kilometre in 2000 to 40.2 kilometre per 100 square kilometre in 2009 (ADB, 2012). Third, this reform is the Chinese government’s attempt to rectify problems from its very decentralized transport pricing and investment policies. An important element of the reform was to recentralize transport pricing. Studying the welfare effect of this reform will provide insights on the best degree of decentralization.

Historically, the investment and pricing of all regional roads was left to the regions. They could finance the maintenance and construction through tolls. This gave rise to inefficient pricing and investment decisions. In reaction to this, the central government reformed the transport pricing system in 2009. It abolished tolling on some of the roads in urban provinces and increased the national fuel tax. Part of the fuel tax revenues were distributed to the provinces. In this paper I answer the following research questions:

- Did the regional governments construct more toll roads and less untolled roads as a result of the reform?
- What are the forces at play?
- What are the welfare effects of the reform?

Methodology
To answer the research questions, I use an analytical model, empirical methods and a numerical illustration.

First, the analytical model shows the effects of abolishing tolls on one type of roads on the investment of different types of roads. The regional governments are assumed to be profit-maximizing Stackelberg leaders who take into account individuals’ demand for trips. The two types of roads in the model are neither pure substitutes nor pure complements in terms of accessibility and it is the joint supply of both roads that will determine the effect and the total number of trips. So the link between letting one type of roads toll and the overall toll revenues in principle can go either way. This model enables us to identify the major forces driving the results.

Second, I make use of a dataset which contains the road length in kilometre of different classes of roads in China by province and by year. In this panel dataset, there are 31 provinces and 15 years from 1999 to
2013. Since tolls have only been abolished in a subset of provinces (urban provinces) for a certain type of roads in the reform, I adopt the difference-in-differences methods using rural provinces as the control group and also length of another type of roads as the control group subsequently. As sensitivity study, I allow for varying treatment effects over time and select a different subset of treatment provinces because some provinces implemented the reform at different speed.

Third, I construct a numerical example to illustrate the welfare effect of the reform. The values of parameters correspond to the observed values such as toll levels, oil consumption tax levels, driving speed of different types of roads, and annualized construction costs in China. The parameters of the utility function are computed such that the road lengths after reform match with the findings in the empirical section.

**Results**

Results show that the concern that the provincial governments may react to the abolishment of tolls on one type of road by constructing more higher-class toll roads to increase profits regardless of demand, is actually unfounded. The reform also brings welfare gains.

1. The length of the medium-size roads (class 2, untolled) does rather increase (+16%) than decrease with the reform. The length of larger roads (class 1, toll) decreases (-41%) on the other hand.
2. The numerical illustration shows that the reform improved welfare significantly (+19%). The major source of this welfare gain is the increase in number of trips taken. This complements the findings of Duranton and Turner (2011): although road investment does not reduce congestion, it attracts additional trips and brings welfare gains.

**Literature**


Fung, Chau Man, and Stef Proost. "Can We Decentralize Transport Taxes and Infrastructure Supply?". *Economics of Transportation, forthcoming*.