

Unequal Returns to China's Intercity Road Network*

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Abstract

We estimate the returns to infrastructure investments for each city-to-city link in China's road network. Using real-time GPS data from over half a million trucks, we first identify congested and uncongested links based on whether speed decreases with traffic density. We then estimate the elasticity of traffic flows to the capacity of a link conditional on its congestion status. We incorporate congestion heterogeneity into a trade model with optimal route choices developed by [Allen and Arkolakis \(2019\)](#). Our structural estimation shows that the model can replicate the main features of traffic flow, speed and congestion in the data. The benefit of expanding the capacity of a link is inferred from the estimated model. The cost of the expansion is estimated from construction costs based on physical topography and market value of acquired land. We find that about 64% of China's intercity links are uncongested and associated with negative returns. The returns are much higher for congested links and the dispersion is generally large. While we focus on marginal local improvements in individual link capacity and do not quantify aggregate misallocation of the entire network, the large dispersion in returns across links suggests there could be misallocation of road infrastructure investment in China. To facilitate comparison, we also analyze real-time traffic flow data for highways in England. In sharp contrast to China, almost all intercity links in England are found to be congested.

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