Ease vs. Noise: On the Conflicting Effects of Transportation Infrastructure

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Abstract

The decision on where to locate transportation infrastructure is often a matter of great public dispute. Typically, positive and negative externalities arise simultaneously, exhibiting varying effects on localities in the surrounding area of the infrastructure. Given the difficulties in assessing these effects separately, previous work usually examines aggregate (net) effects of infrastructure provision, typically measured by property prices or land values. However, this approach is likely to produce biased results if the partially offsetting externality is not properly controlled for. In this paper, we aim to disentangle the various effects of infrastructure provision, analyzing a unique micro-level data set of land values at the individual plot level for the city of Berlin, Germany, from 1890 to 1914. Specifically, we argue that the inauguration of the city's first metro line in 1902 provides a perfect quasi-experimental setting to analyze this issue.

Dividing our sample of up to 48,436 observations into residentially and commercially used properties, we apply a multi-step differences-in-differences approach to examine the conflicting effects of infrastructure provision. Our key results are derived from a fully-fledged panel analysis which makes use of the full variation of plot-level land values in our data. The results indicate an (unbiased) accessibility benefit of 23.7 (4.2) percent on commercial (residential) properties in the immediate vicinity of a station relative to localities of an additional km of distance. The corresponding disamenity effects of infrastructure, which are derived by using contemporary noise data, indicate a decline in land values of 0.5 (0.3) percent per additional db of noise. The corresponding structural parameters imply a decline of utility for households of 1.3 percent per km of distance to a station and a decline in firm productivity of 1.6 percent per km. The costs of noise add up to 0.16 percent and 0.34 percent for each 10 db increase in noise pressure.

Confirming intuition, our results strongly indicate that estimated net effects of infrastructure externalities may be significantly biased if both amenities and disamenities are not controlled for simultaneously.

(joint with Gabriel Ahlfeldt and Nicolai Wendland)