



The politics of infrastructure investment: The role of product market competition[☆]



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ABSTRACT

In spatial competition, public infrastructure plays a crucial role in determining product market outcomes. In our model, consideration of infrastructure's impact on the product market drives the preferences of consumers in their dual role as voter/taxpayers. The spatial heterogeneity of consumers produces conflicting political interests and in many cases inefficient outcomes. However across both exogenous and endogenous market environments product market competition consistently leads to higher levels of publicly funded infrastructure than monopoly/collusion. Furthermore, competition's boost to the popular support for infrastructure investment is often excessive while monopoly leads to underinvestment.

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1. Introduction

One of the original interpretations of transportation costs in the spatial competition framework is as a reflection of transport infrastructure:

"These particular merchants would do well, instead of organising improvement clubs and booster associations to better the roads, to make transportation as difficult as possible." (Hotelling, 1929, p. 50)

Implicit in this quote is a recognition of the pro-competitive nature of the transport infrastructure in the model. Since the transport costs determine participation, substitutability and hence competition in a market, one can interpret infrastructure quite broadly as being physical (e.g. roads and telecommunications) as well as institutional (e.g. trade liberalization, contract enforcement, anti-trust regulation and banking sector reforms).

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Although the spatial competition literature shows the impact of infrastructure on individual welfare, it typically treats the level of infrastructure/transport costs as exogenous. See, for example, Eaton and Lipsey (1978), Salop (1979), Eaton and Wooders (1985), Anderson et al. (1992), Gabszewicz and Thisse (1992), Anderson et al. (1997), Meagher and Zauner (2004) among others. In this paper we develop a political economy framework which shows how individual voter preferences can be used to determine the public provision of infrastructure in Salop's "circular city" spatial market.

In our approach, citizens play a dual role as both consumers and voters/taxpayers; as a result, their endogenous infrastructure preferences depend intimately on the details of competitive conditions in the product market. Infrastructure investment has two effects in the product market: it directly lowers costs to consumers and it indirectly affects market power. These market-based effects of infrastructure investments on consumers are heterogeneous because consumer locations are heterogeneous. The tax-based effects on citizens are unambiguously negative because taxes must increase in order to pay for the investment (we preclude the bundling of redistribution policies with the infrastructure funding).

We take a representative political economy approach to the public choice of infrastructure investment. That is, democratic processes are assumed to drive policy choice on infrastructure. The impact of politics is analyzed through two related political paradigms—(i) median voter preferences/Condorcet winner which arise from vote or popular support maximizing behaviour²; and (ii) what appears to be a new set-based approach to representative democracy where we identify the *Majority Support Set* (the set of proposals preferred to the status quo by the majority). The Majority Support Set is a coarser, but more robust predictor than the Condorcet Winner, allowing for the private interests of policy makers to distort outcomes away from the median voter's preference.³

Almost by definition, infrastructure improves the performance of individual markets and hence, in aggregate, the performance of an economy. Empirical studies are typically not at the level of the individual consumers and firms considered in our model; nonetheless, macro empirical estimates indicate that the effects of infrastructure can be large. Aschauer (1989) showed that public capital (roads, utility networks, etc.) had a strong role in determining productivity. Fernald (1999) found that the construction of the interstate road network had a large one-off impact on growth. Röller and Waverman (2001) and Czernich et al. (2011) report similar results for telecommunication investment.

These empirical models, though sophisticated in their treatment, are too macroscopic to identify the winners and losers (if any) from infrastructure. Individual level effects are better identified in micro-econometric studies focusing on particular infrastructure projects (Straub, 2008). See for example Gibson and Rozelle (2003) and Fan et al. (2005) on poverty reduction due to improved roads, or Duflo and Pande (2007) on the distributional consequences of dam construction.

The discussion above leaves us with a clear indication of the importance of infrastructure, but no deep understanding of the processes determining the level of infrastructure. The socially optimal level of investment arising from solving a planner's problem might provide a benchmark, but realistically, political mechanisms determine such investments, as reflected in the following quote from Bud Shuster, the former chair of U.S. House Committee on Transportation and Infrastructure (taken from Knight, 2002):

"Angels in heaven don't decide where highways will be built. This is a political process."

In line with the theoretical move to augment the traditional social planner approach with a more realistic political economy approach (see, for example, Persson and Tabellini, 2000; Winer and Hettich, 2008), a recent empirical literature has demonstrated the importance of the political dimensions of public infrastructure expenditure. See for example, Castells and Sole-Olle (2005), Cadot et al. (2006) and Knight (2004) on transportation projects.⁴

Analyzing the politics of infrastructure, we find that when market structure is exogenous, product market competition boosts popular support for infrastructure—often excessively so—while monopoly/collusion leads to underinvestment. An infrastructure trap—a situation in which no investment in infrastructure is made despite the existence of social welfare enhancing investment—is common under monopoly/collusion. A robust positive implication of the above findings is that product market competition consistently leads to higher levels of publicly funded infrastructure than monopoly/collusion.

Transportation infrastructure plays an important role in the land use and core-periphery models of economic geography (see, for example, the excellent overviews in Fujita et al. (1999) and Fujita and Thisse, 2002). Although this large literature also uses spatial techniques, and occasionally political economy, it is most definitely not a branch of oligopoly theory and hence is mute on the competitive aspects of infrastructure which we investigate here.

While spatial models are used extensively in the empirical industrial organization literature (Brevoort and Hannan, 2006; Mazzeo, 2006; Smith, 2004) the underlying infrastructure provision, as well as the institutional details determining the provision, are treated as exogenous. On the other hand, the public economics literature, despite its richness in tax and voting structures, has typically not analyzed spatial markets. By embedding the political choice of infrastructure in spatial oligopoly models we provide an explicit link between market environment and infrastructure.

In the subsequent sections, in all scenarios, there exist strictly positive investment levels that increase aggregate surplus. This suggests that the results arise for political economy reasons rather than from the existence of fixed costs or increasing

² Of course the Condorcet Winner and the Median Voter Theorem arise directly in pairwise voting process in a representative democracy.

³ The private interests might reflect ideology, lobbying, career concerns, or corruption; or they might be more benign reflecting a concern for the welfare of society or of disadvantaged groups within it.

⁴ Section 8.7 discusses the approaches used in the existing empirical literature and considers how they might be augmented by our results.

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