

Why Transport Infrastructure Does Not Necessarily Narrow Regional Economic Disparities

Market Access, Agglomeration, and Local Absorptive Conditions

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Abstract

Transport infrastructure lowers spatial frictions and expands market connections, but greater connectivity does not necessarily increase peripheral production or narrow regional income gaps. This article asks under what conditions improved transport access can support sustained peripheral development. It develops an analytical framework through a narrative synthesis of selected theoretical and empirical studies on market access, agglomeration, commuting, and place-based policy. The comparison distinguishes transport modes, geographical scales, and outcome measures rather than pooling heterogeneous estimates. The central argument is that transport improvements expand both peripheral firms' selling opportunities and core firms' competitive reach. Their net local effect depends on scale economies, supplier linkages, skills, land costs, and factor mobility. Local output, incumbent residents' welfare, and interregional disparities therefore require separate evaluation. The framework generates testable propositions concerning pre-existing supplier capacity, firm selection, and commuting-based welfare gains. It also identifies nonrandom route placement, staggered openings, anticipation, and network spillovers as central challenges for causal interpretation. Evidence of local industrial decline can coexist with aggregate gains from lower trade costs; neither outcome alone establishes whether disadvantaged residents benefit. The article contributes an outcome-specific framework for interpreting apparently conflicting evidence and designing evaluations. Policy should identify binding local constraints, distinguish newly created activity from relocation, and assess real household welfare and cross-regional net gains rather than infer success from connectivity or local gross domestic product alone. These propositions remain to be tested with original data.

Keywords: regional economics, transport infrastructure, market access, agglomeration, spatial spillovers, regional disparities

1 Introduction

Transport investment is often expected to expand markets, attract production, and reduce regional inequality. However, easier access is a change in transaction conditions, not an answer to where firms will produce, where workers will find employment, or who will receive the resulting income. The same corridor may expand a core city's service area while allowing peripheral places to host selected production activities.

Krugman's (1991) core-periphery model shows how scale economies and market size interact with transport costs to change industrial concentration. Redding and Turner (2014) emphasize trade, population, and sectoral connections across locations. Allen and Arkolakis (2014) further demonstrate the importance of treating geography and spatial equilibrium jointly. These approaches make the network an essential part of the question.

This article asks when improved transport connections can support sustained peripheral development rather than simply expand links with the core. It is an analytical narrative review, not a systematic review or an original econometric study. It separates evaluation goals, mechanisms, empirical evidence, identification requirements, and policy implications. The studies discussed are selected for their relevance to these mechanisms and evaluation problems. The synthesis compares their settings, transport changes, geographical units, outcomes, and

identification strategies. It does not use a reproducible database search, exhaustive screening, or pooled effect estimation, and therefore cannot establish the frequency or average magnitude of peripheral gains and losses.

2 Evaluation Goals and Spatial Scale

2.1 Local Production and Resident Welfare

Higher local GDP, higher income among incumbent residents, and narrower interregional disparities are separate outcomes. A new plant can increase local production while recruiting workers from elsewhere. Conversely, residents can obtain better jobs through commuting even when their employment is recorded in the core city.

Monte et al. (2018) integrate trade, commuting, and migration and show that commuting links matter for local employment responses. Evaluation should therefore connect workplace and residence. Real income also depends on housing, travel, and living costs; nominal earnings alone do not establish welfare improvement. These are measurement requirements, not welfare changes estimated here.

2.2 Growth and Convergence

Peripheral growth does not necessarily imply convergence. Relative gaps can widen when core regions grow faster. Selective population exit can also raise peripheral GDP per capita without improving the circumstances of the original population. Aggregate output, population, real household income, and distribution should be reported separately.

Spatial scale is equally important. Manufacturing moving from a central district to its suburbs is metropolitan reorganization, not necessarily interregional dispersion. Baum-Snow et al. (2017) study the spatial distribution of activity within Chinese cities; their conclusions should not be directly translated into national regional convergence.

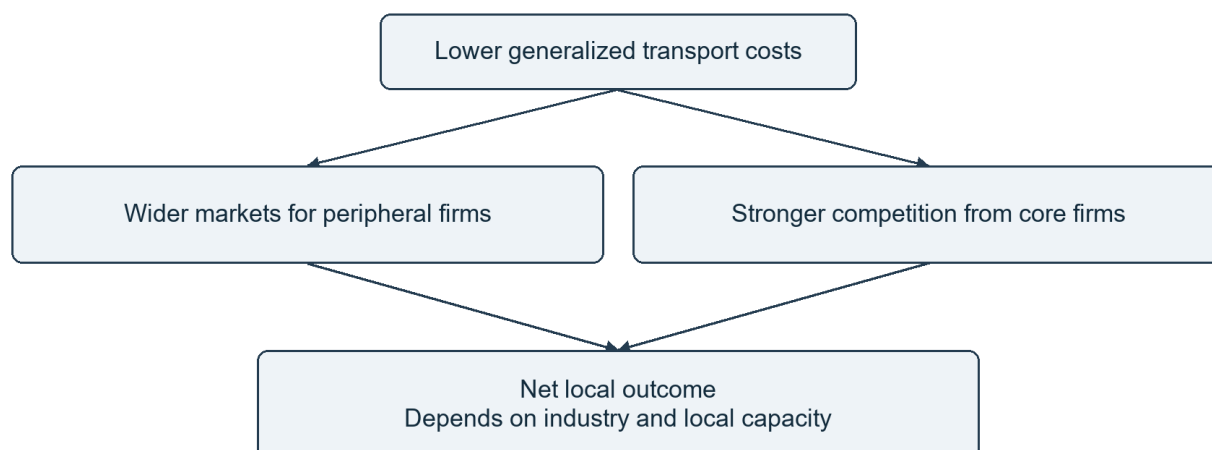
3 Two-Sided Market Effects

3.1 Access Expands Both Opportunity and Competition

Market access describes the ease with which a location reaches external demand and supply. A schematic measure is $MA_i = \sum_j M_j \exp(-\theta c_{ij})$, where M_j represents destination market size, c_{ij} generalized transport costs, and θ a positive distance-decay parameter. This is an illustration, not an estimated structural equation. Real costs may include fares, frequency, reliability, and first- and last-mile travel.

Donaldson and Hornbeck (2016) analyze historical US railroads through market access, showing why network benefits cannot be reduced to whether a county has a station. Redding and Sturm (2008) provide evidence on remoteness through German division and reunification, although that setting does not directly identify a contemporary transport project.

Peripheral firms gain cheaper access to core consumers, but core firms also gain cheaper access to peripheral customers. If the latter have stronger cost advantages or service networks, competitive pressure may arrive before local firms can exploit new opportunities. Net effects require evidence on entry, exit, and expansion. Figure 1 summarizes these two opposing channels.

Figure 1*Two-Sided Market Effects of Transport Improvements*

Note. Lower costs affect both selling opportunities and competitive exposure. Arrows represent mechanisms rather than estimated causal magnitudes.

3.2 Agglomeration Affects the Need to Relocate

Duranton and Puga (2004) distinguish sharing, matching, and learning as microfoundations of agglomeration. Supplier networks, specialized labor, and knowledge interaction can make core production attractive even when remote sales become cheaper. Transport may reduce the cost of serving another location without removing the benefit of producing in the center.

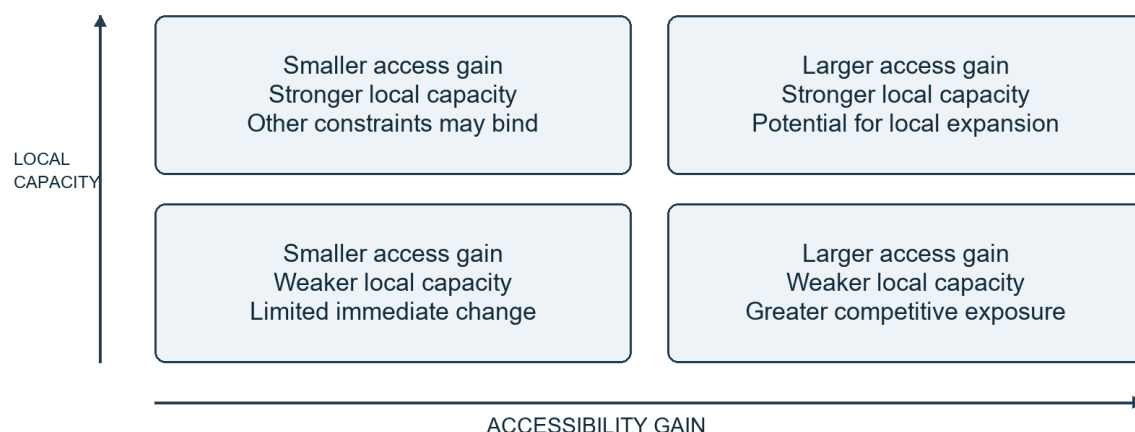
Land, housing, and congestion costs can nevertheless encourage selected activities to relocate. Standardized production may respond differently from services requiring frequent face-to-face interaction. These are conditional implications of sector characteristics, not universal distinctions between manufacturing and services.

4 Local Conditions and Heterogeneous Outcomes

4.1 Making Local Capacity Observable

“Insufficient local capacity” becomes a circular explanation if it is inferred only after a disappointing result. This article separates skills, supplier linkages, logistics reliability, public services, and institutional coordination. Empirical work should select measures relevant to the industry and observe them before the transport change.

Complementarity does not justify expanding every type of investment simultaneously. Faster passenger travel may not solve unreliable freight distribution, and subsidized factories may not solve a shortage of technicians. Policy needs to identify a binding constraint rather than attach a standard package to every corridor. Figure 2 organizes the conditional argument by accessibility gains and pre-existing local capacity.

Figure 2*Accessibility Gains and Local Capacity*

Note. The matrix is an analytical classification without estimated thresholds or assignments of particular regions.

4.2 Testable Propositions

First, among peripheral places with similar accessibility gains, stronger pre-existing supplier linkages should be associated with more persistent entry and employment expansion if local complementarity is an important mechanism. An absent relationship, or one fully explained by simultaneous industrial policy, would weaken that interpretation.

Second, an increase in average productivity caused mainly by low-productivity firms exiting should not be reported entirely as technological progress. Within-firm changes, changing market shares, and entry and exit need separate examination. This is a proposed empirical decomposition, not a result established here.

Third, improved commuting can raise income in peripheral residential areas while jobs grow in the core. Commuter flows, fiscal incidence, and housing costs are needed to establish how much residents gain. These propositions concern production, firm selection, and welfare respectively; one GDP series cannot validate them all.

5 Evidence and Its Limits

Faber (2014) finds lower GDP growth among some nontargeted peripheral counties connected to China's national trunk highway system, with industrial output growth an important component. This illustrates a mechanism through which integration can reinforce established centers. It does not show that every road project harms peripheral development.

Qin (2017) studies the distributional effects of Chinese rail upgrades, documenting adverse outcomes in peripheral counties affected by reductions in conventional train services. Effective service access is not equivalent to the geographical presence of a railway, and upgrades to existing lines should not be conflated with all new high-speed stations.

Donaldson (2018), by contrast, finds reduced trade costs and price gaps and higher real income in colonial India. This is not logically inconsistent with local industrial losses elsewhere: settings, populations, and outcomes differ, and aggregate gains can coexist with spatial redistribution.

Chandra and Thompson (2000) examine rural interstate highways, and Duranton et al. (2014) study roads and trade in the United States. Together they broaden the questions concerning trade and local activity, but their

estimates should not be transferred directly to Chinese passenger rail. Kline and Moretti (2014) address a comprehensive regional development program, whose effects cannot be assigned to transport alone.

6 Causal Identification

6.1 Route Selection and Staggered Openings

Routes often connect places with higher expected growth, while investment promotion can begin before opening. Comparing connected and unconnected places may therefore confound treatment with prior trends and policy selection. Historical routes, engineering costs, or proposed lines can motivate an identification design, but their exclusion restrictions need argument; age alone does not make an instrument exogenous.

Callaway and Sant'Anna (2021) provide a framework for multiple periods and staggered treatment. Sun and Abraham (2021) and Goodman-Bacon (2021) explain why conventional specifications can be difficult to interpret under heterogeneous effects and treatment timing. Event-time estimates should not be presented as causal merely because they include location and year fixed effects.

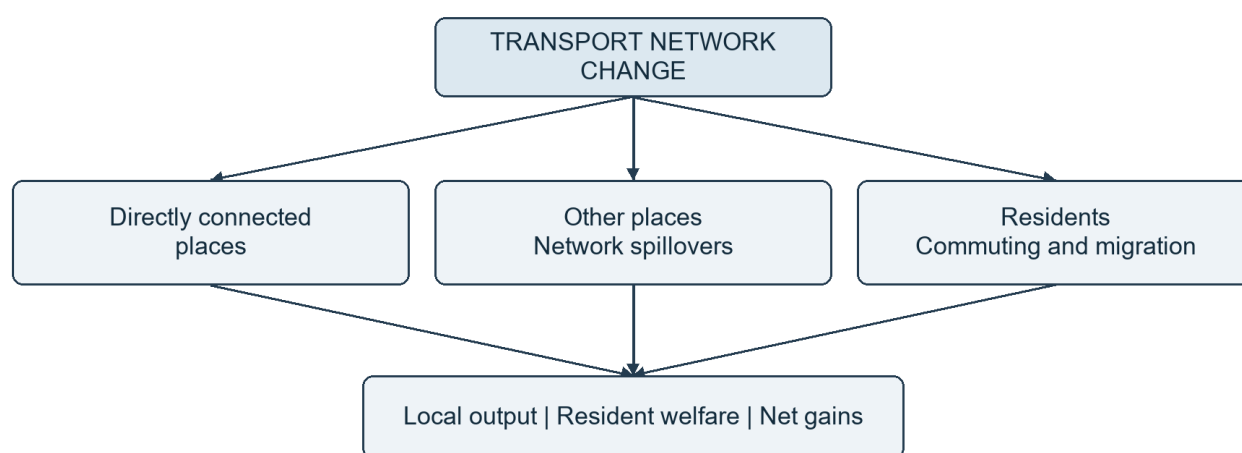
Announcements, construction, and operation should be distinguished, with assumptions about parallel trends and anticipation stated explicitly. Construction spending and operating-period productivity are different mechanisms and may have different timing.

6.2 Spillovers and Reallocation

A place without a new station can benefit through a nearby node or lose demand to it. Unconnected does not mean unaffected. Designs should distinguish direct treatment, network exposure, and changes in relative accessibility, and examine contamination of comparison locations. Figure 3 links these spatial exposures to the outcomes an evaluation must distinguish.

Figure 3

Evaluation Outcomes and Network Spillovers



Note. Directly connected places, other locations, and residents must be considered when distinguishing local changes from net gains.

National net benefits also require separating newly created activity from relocated activity. Jobs moved from an adjacent county cannot all be counted as net national job creation. Redding and Rossi-Hansberg (2017) discuss quantitative spatial models for counterfactual analysis, but results depend on assumptions about trade, migration, and agglomeration and should be checked against independent evidence.

A feasible study would link firm registration and operations, population and commuting, door-to-door travel costs, and household income and expenditure. Administrative boundaries and reporting coverage need harmonization. If these data are unavailable, conclusions should be narrowed rather than substituting night lights or GDP for every dimension of welfare.

7 Policy Implications

Policy must first state its objective. National efficiency requires evaluating network gains against fiscal, maintenance, and environmental costs. Improving disadvantaged residents' circumstances also requires distinguishing incumbent households, migrants, firms, and landowners. These objectives may be compatible but are not automatically identical.

Barca et al. (2012) emphasize territorial conditions, and Neumark and Simpson (2014) review varied evidence on place-based intervention. Neither contribution justifies every local subsidy. Interventions should address explicit constraints, disclose costs, and include review and exit conditions.

Areas with an industrial base but unreliable distribution may benefit from freight connections and supply-chain services. Places with commuting potential may need useful timetables, transfers, and cross-border access to public services. Where production conditions are weak, transport expansion should be compared with education and basic service investment. These are conditional policy implications requiring local demand and cost data.

Employment may concentrate in the core while residential service costs fall on the periphery. A municipality's project account can therefore differ from metropolitan net benefits. Cost sharing and public service coordination should be based on actual commuting and fiscal links rather than duplicated industrial parks.

8 Conclusion

Transport infrastructure lowers spatial frictions without predetermining the direction of economic relocation. It expands both peripheral selling opportunities and external competition, with outcomes conditioned by scale economies, agglomeration, land costs, and local supply conditions.

Local output, incumbent residents' welfare, and interregional disparities must be evaluated separately. A falling industrial share does not establish resident welfare loss, and increasing GDP does not establish improved distribution. Evaluation needs to connect production, work, and residence and distinguish growth from reallocation at an appropriate scale.

Local capacity becomes a useful policy concept only when translated into observable and changeable conditions. Complementary investment should respond to actual constraints, consider maintenance and opportunity costs, and allocate cross-jurisdictional responsibilities.

This article has not tested its propositions using original data or pooled heterogeneous estimates into one effect. Future research should combine network accessibility, firm dynamics, and commuting evidence, using credible identification and spatial counterfactuals to assess one another. That approach can support more defensible judgments than treating connectivity as proof of regional convergence.

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AI Use Declaration

GPT was used for language polishing and translation during preparation of this manuscript. The assistance was limited to language editing and translation.

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