



Transportation Accessibility and Industrial Land Use

Implications for Economic Development

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Introduction

- Decision-makers care more about the broader implications of transportation investments than the direct benefits
 - E.g., jobs, development, increased tax revenue, etc.
- Industrial land use affects regional economic dynamics and plays an important role in economic development
 - Higher paying jobs; supports other regional economic activities
 - Industrial activities are transportation intensive and drivers of freight movements
- Study considers the economic development implications of improved transportation accessibility
 - Industrial land use serves as a proxy for the economic benefits of transportation investments instead of more conventional measures

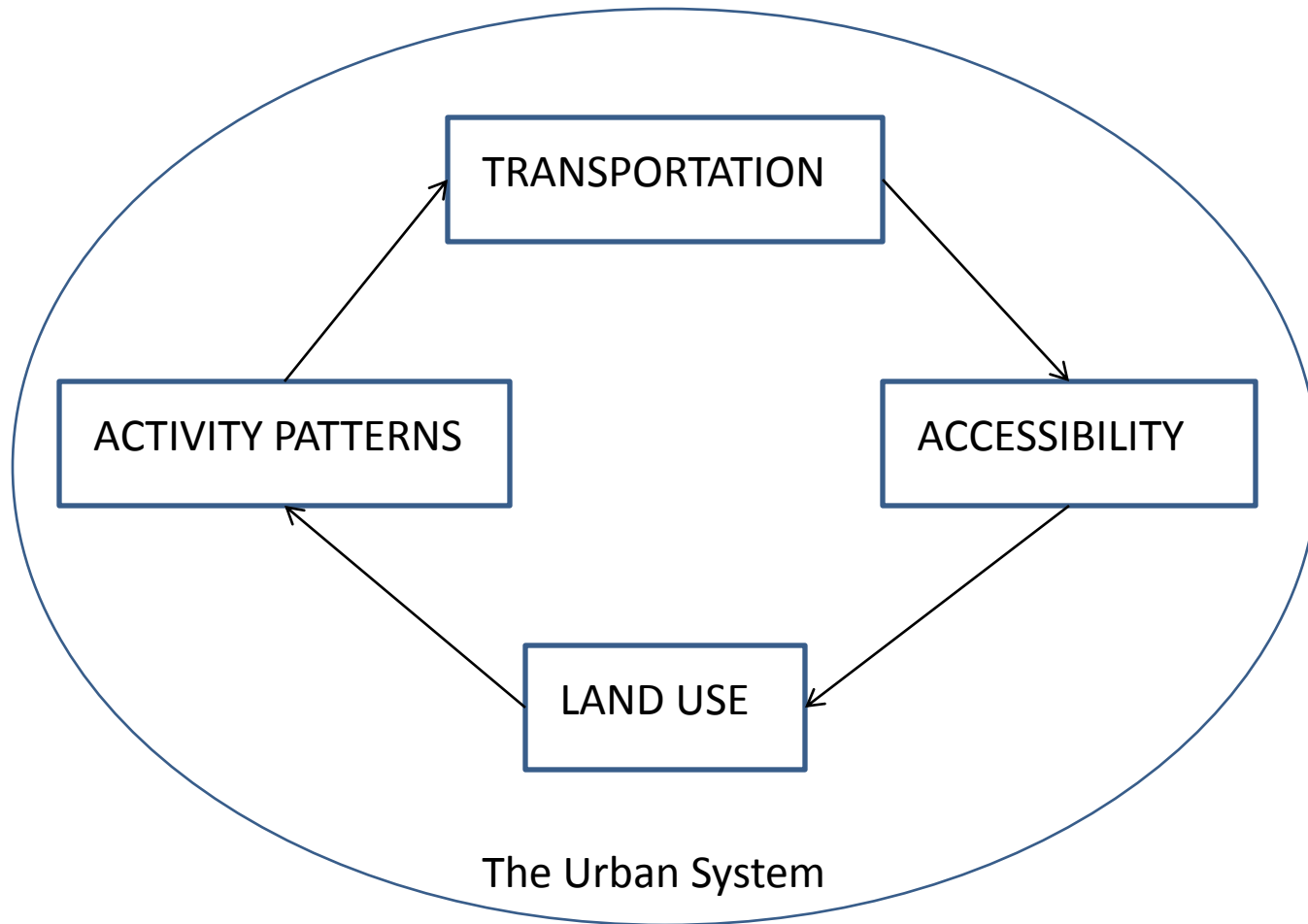
Industrial Land Consumption as a Proxy for Economic Development

- Why use industrial land consumption to gauge the effects of transportation investment?
 - Amount of land consumed is an important planning and revenue consideration
 - Zoning, industrial land use studies
 - Property tax revenue
 - Captures factors that may be overlooked when using employment and number of firms as proxies
 - Firms can increase production without increasing employees

Agenda

- Background
 - Transportation-Land Use
 - Transportation-Economic Development
- Spatial Econometric Analysis of Industrial Land Use and Economic Development
 - Study Area and Data
 - Model Results
- Economic Development Implications
 - Industrial Land Use Studies
 - Potential Policy and Strategy

Transportation-Land Use Relationship



Transportation-Land Use Relationship (2)

- Interdependency expressed over long periods of time
- *Prior studies*: Simulation and empirical study most common methodological approaches
 - Integrated urban planning models allow activities (jobs and residences) to respond to changes in transportation system
 - Empirical studies use “quasi-experimental designs” as substitutes for standard research designs

Transportation-Economic Development Relationship

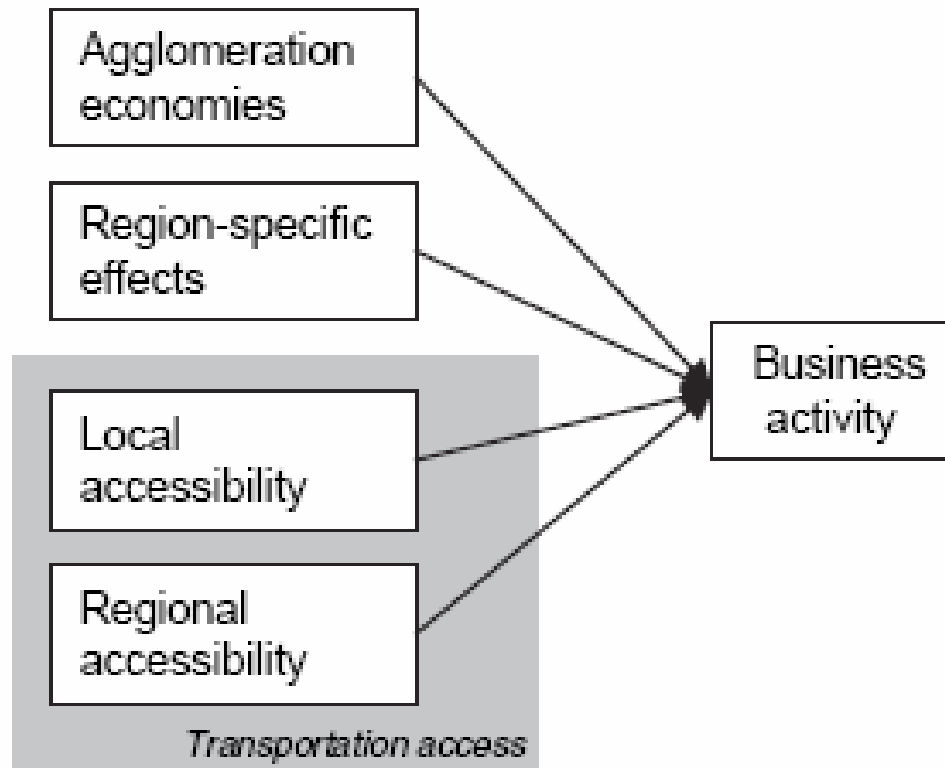


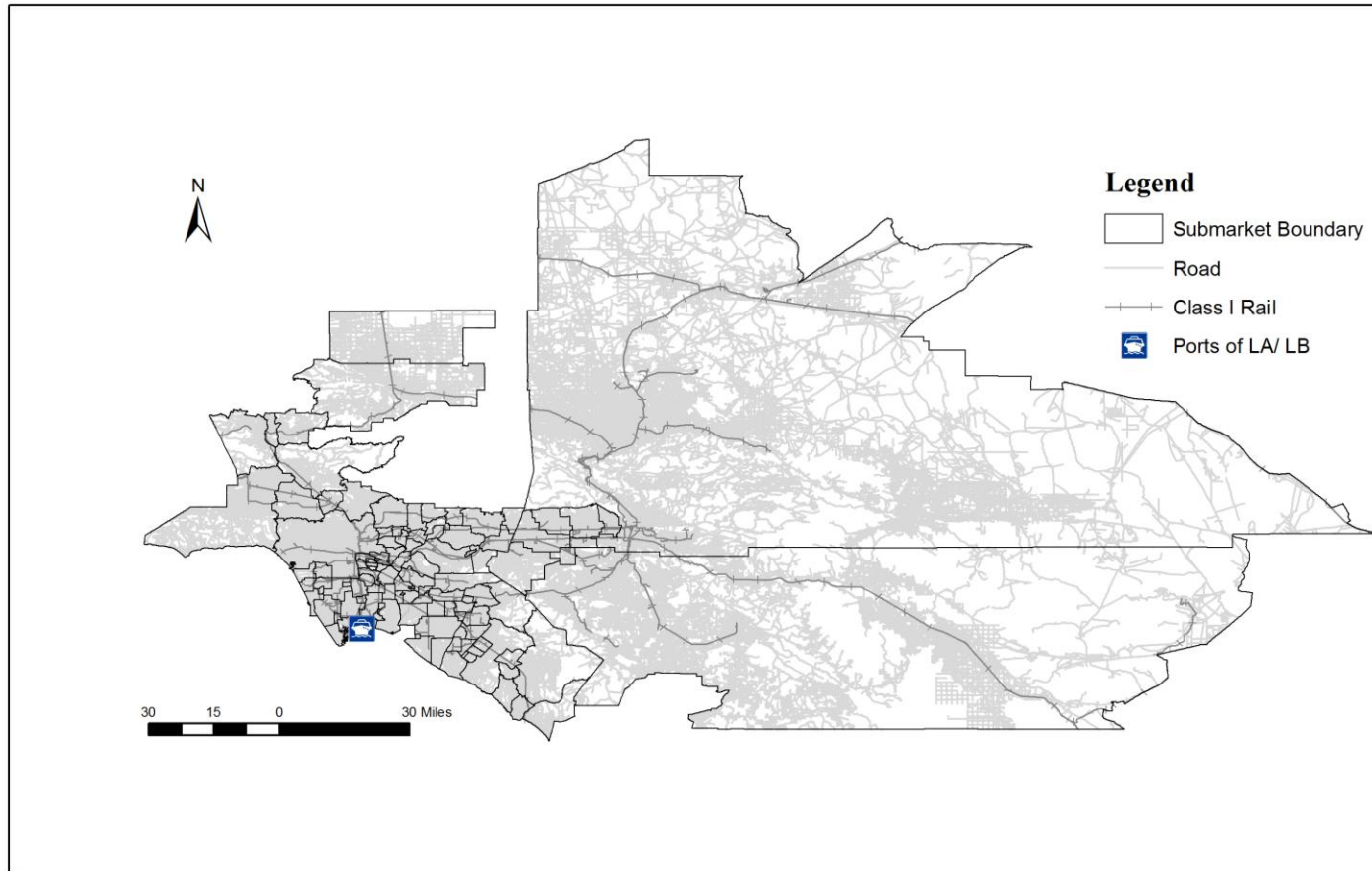
Figure 1 in Targa, F. et al. Economic Activity and Transportation Access.: An Econometric Analysis of Business Spatial Patterns, Transportation Research Record, No. 1932, 2005.

Transportation-Economic Development Relationship (2)

- Likewise interdependent
- *Prior studies*: empirical studies the most common methodological approach
 - Most consider highway investment only
 - Common measures of economic development
 - Economic productivity and overall economic effects
 - Jobs created and firms located/relocated

A Spatial Econometric Analysis of Industrial Land Use and Economic Development

Study Area: Greater Los Angeles, CA



The four-county region is divided into 108 submarkets.

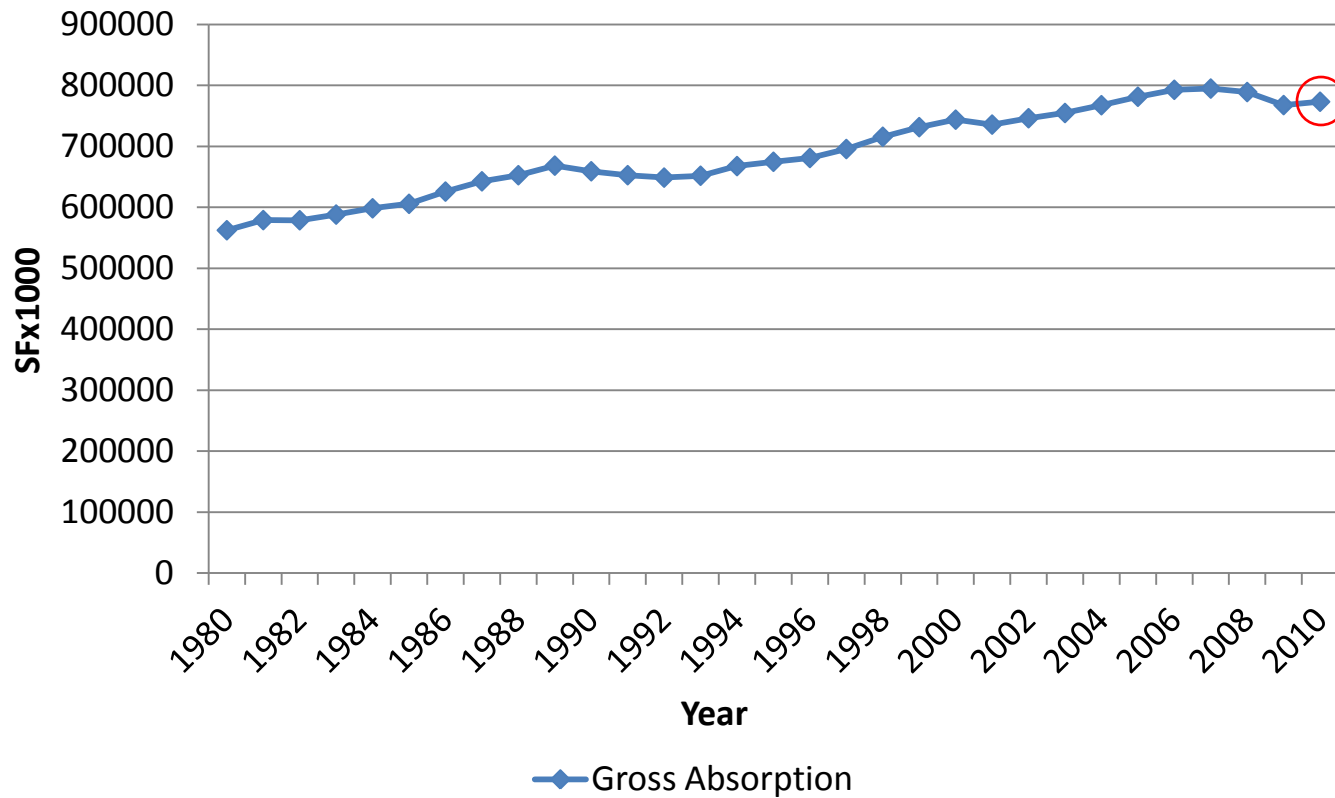
Data Sources

Data	Description	Source
Real estate	Gross absorption / Occupancy	CB Richard Ellis
Demographics	Population estimates	2010 U.S. Census
Transportation Infrastructure	Amount of streets, highways, and rail	2010 U.S. Census TIGER / Line Shapefiles
Road Distance / Travel Time	Distances and normal travel times between submarkets	Mapquest

Primary Variables

Variable	Definition	Mean	Std. Dev.
Gross Abs. Intensity	Total occupied industrial space (square miles) / Total submarket area (square miles)	3.426e-05	5.195e-05
Population Density	Persons per square mile	6,683	4,576
Rail Accessibility	Miles of Class I rail per square mile	0.609	0.6937
Port Accessibility	Over-the-road miles to the ports of LA/ LB	32.37	21.49

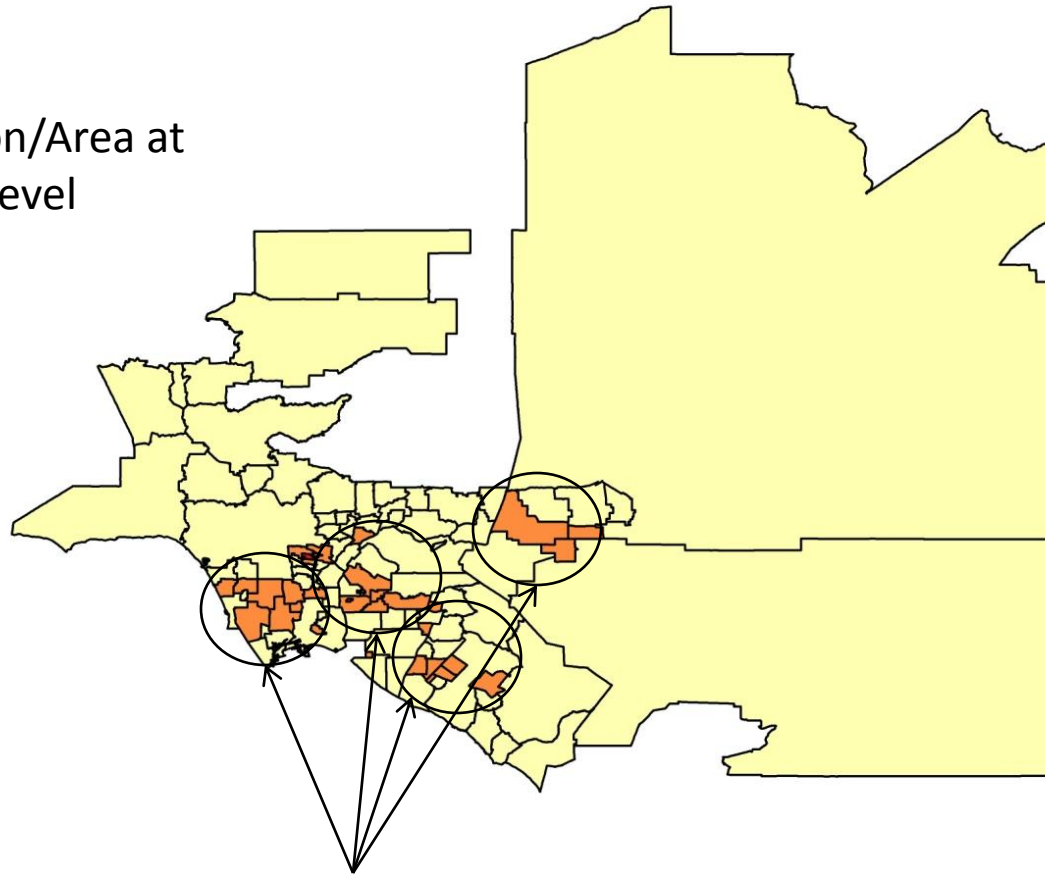
Gross Absorption over Time for Greater Los Angeles, CA



Potential Agglomeration Effects

Gross Absorption/Area at the submarket level

- Low-Low
- High-Low
- Low-High
- High-High



Clusters of industrially intense submarkets

Model and Results

$$Y_i = \beta_0 + \rho W y + \beta_1 * \text{Population Density} + \beta_2 * \frac{\text{Miles of Class I Rail}}{\text{Square Miles}} + \beta_3$$

$$* \text{Distance to Ports of LA/LB}^{-1} + \beta_4 * \text{Distance to Ports of LA/LB}^{-2} + \varepsilon$$

Variable	Coefficient	t-statistic
ρ	1.681	2.284
Intercept	-1.223	-1.01
Population Density	-0.0006	-4.745
Class I Rail	3.270	5.311
Distance to LA/LB ⁻¹	200.1	4.243
Distance to LA/LB ⁻²	-1182	-4.176
R-Squared	0.4261	

Results: Potential Effects on Land Use

For a given a submarket:

- 1% increase in *Population density* =



-26,273 average decrease in square feet; or -\$173,000 in lost rent per year

- 1% increase in *Rail accessibility* =



+533,178 average increase in square feet; or +\$3.52 million gained in rent per year

- A 1% increase in *Port accessibility* =



+52,351 average increase in square feet; or \$345,516 gained in rent per year

Consistency with Firm Location Studies

- Results are consistent with firm location/relocation studies
- Generally, firms value:
 - Accessibility to markets and infrastructure
 - Proximity to other firms
 - Affordability
 - Sufficient site characteristics
 - Economic considerations: labor, local tax policy, etc.

Economic Development Implications

Industrial Land Use (ILU) Studies

- ILU Studies
 - Primary vehicle to inform industrial land policy and economic development strategies
 - Market- or Planning-based
 - *Market-based*: Strategies to increase demand
 - *Planning-based*: Strategies to preserve land
- Several regions have conducted ILU studies
 - Chicago, IL; Los Angeles, CA; Denver, CO; and Boston, MA among others



Implications for ILU Studies

- Issues with ILU studies
 - Disconnect from formal industrial location theory and history
 - Role of transportation not always highlighted
 - Opportunity to engage the policy and economic development community
- Analysis supports both approaches and provides connection to formal theory
 - *Market-based*: Insight into the effects of increased accessibility
 - *Planning-based*: Identifies clusters of industrial activity

Implications for Economic Development Policy and Strategy

- Potential ILU Policy and Strategy Recommendations
 1. Discourage residential development in industrial corridors
 - Population density negatively affects consumption
 - Conversion to residences may make areas less desirable to remaining industries
 - i.e., Hours-of-operation restrictions, neighborhood complaints, etc.
 2. Prioritize transportation investment in industrial corridors
 - Rail and Port accessibility positively affects consumption
 - Investments in infrastructure likely to encourage industrial land consumption
 3. Reconsider which industrial areas warrant subsidies
- Common recommendations, but offered with more empirical justification and connected to industrial location theory

Thank you