The Freight Landscape

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Overview

- Our interest in explaining freight activities in metropolitan areas
- Freight landscape concept and empirical tests
Our interest

- Understand the dynamics of urban freight in order to develop effective policies to manage it

Challenges

- Limited data
- No “theory of urban freight”
  - Understanding starts with theories

How do we explain....

- Spatial shifts in warehousing/distribution facilities
- Severe passenger freight conflicts in city cores
- And much more.....
Understanding the dynamics of urban freight

- What explains the spatial patterns of urban freight flows?
- How does land price affect spatial structure and economic activity in ways that affect freight flow?
  - Road supply relative to demand decreases => congestion increases
  - Constraints on freight efficiency: lack of loading, parking facilities; large truck restrictions
  - More intense space utilization => more activity per space unit, restrict non-revenue producing use of space
  - Trade-off of inventory for more frequent deliveries

*Suggests a general relationship between development density and urban freight problems*
Concept

Freight Activity Demand

Population & Employment Activity Demand

Density/Land rent

Area of Congestion

Area of Efficiency

Area of Dispersion

Infrastructure Supply

Agricultural land rent

Distance

Center of City

Edge of City
Land value has many effects on behaviors that generate freight flows.
Density is a proxy for land values.
Therefore we should be able to use density to proxy these effects on freight flows.
Delivery costs and density

Example: retail deliveries

- Rural
- Low density suburban
- Medium density suburban
- Inner suburbs
- Commercial centers
- Metro CBD

Delivery costs and density graph:

- Low USC
- High USC
- Density
Freight landscape described

A simple concept:
Development density, the combined density of population and employment
Different combinations of population and employment density represent different land use patterns, freight demands
Freight landscape matrix

A. High Density Convergence
   Commercial and financial districts

B. Employment-based Divergence
   Manufacturing, transportation and warehousing

C. Population-based divergence
   Residential districts

D. Low Density Convergence
   Suburbia
Freight landscape: Los Angeles

Divergent and decentralized
Freight landscape examples LA

LA Downtown

Old industrial zone

Ontario airport industrial zone
Freight landscape: San Francisco

Divergent and decentralized
Freight landscape examples: SF

- San Francisco downtown
- Silicon Valley
- San Jose downtown
- Tech corridor
Somewhat convergent and centralized
Convergent and centralized
What we have learned

- Tests using freight flow data in Los Angeles, San Francisco, and Paris show freight landscape good proxy for freight activity
  - Different types of density combinations associated with different types and volumes of freight activity
  - Therefore we can infer expected freight activity based on spatial development density patterns
What we have learned

- Freight landscape helps us to understand the types of freight challenges different cities face
  - Extreme concentration of central Paris, New York
  - Industrial corridors of Los Angeles

- We have used concept to identify best policy strategies
  - Small vehicles in New York, Paris
  - Better management of heavy trucks in Los Angeles
Thank You