The Freight Landscape

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Overview

❏ Our interest in explaining freight activities in metropolitan areas

❏ Freight landscape concept and empirical tests
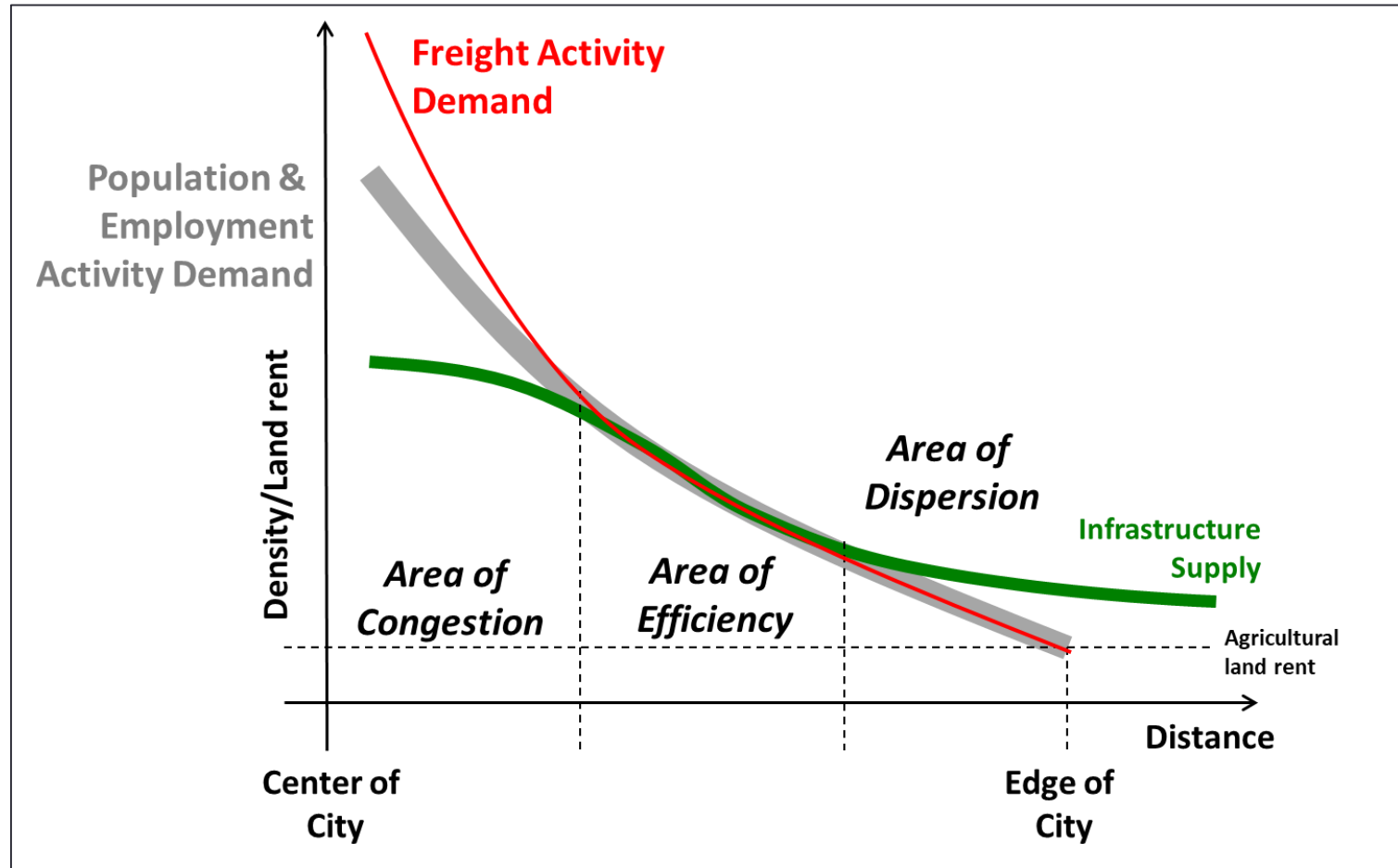
Our interest

- ❑ 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

Freight Activity Demand

Population & Employment Activity Demand

Density/Land rent

Area of Congestion

Area of Efficiency

Area of Dispersion

Infrastructure Supply

Agricultural land rent
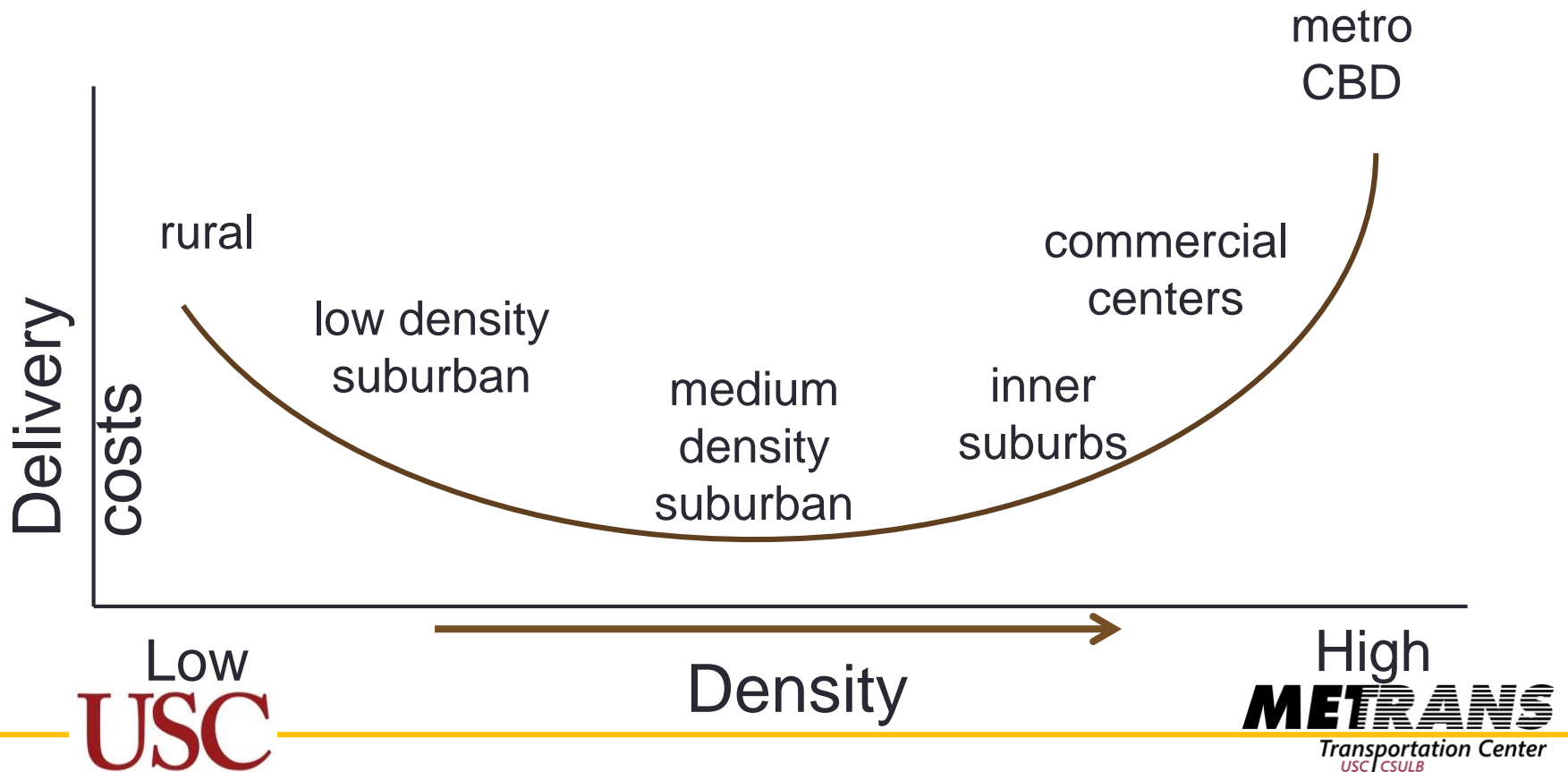
Distance

Center of City

Edge of City

The freight landscape premise

❑ 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

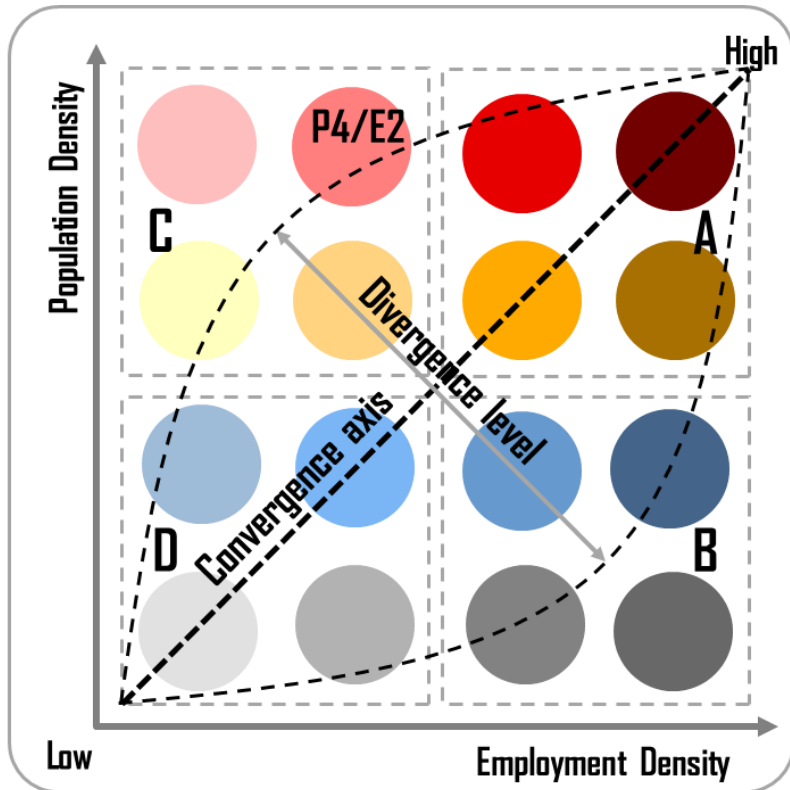# Delivery costs and density

Example: retail deliveries

Freight landscape described

A simple concept:

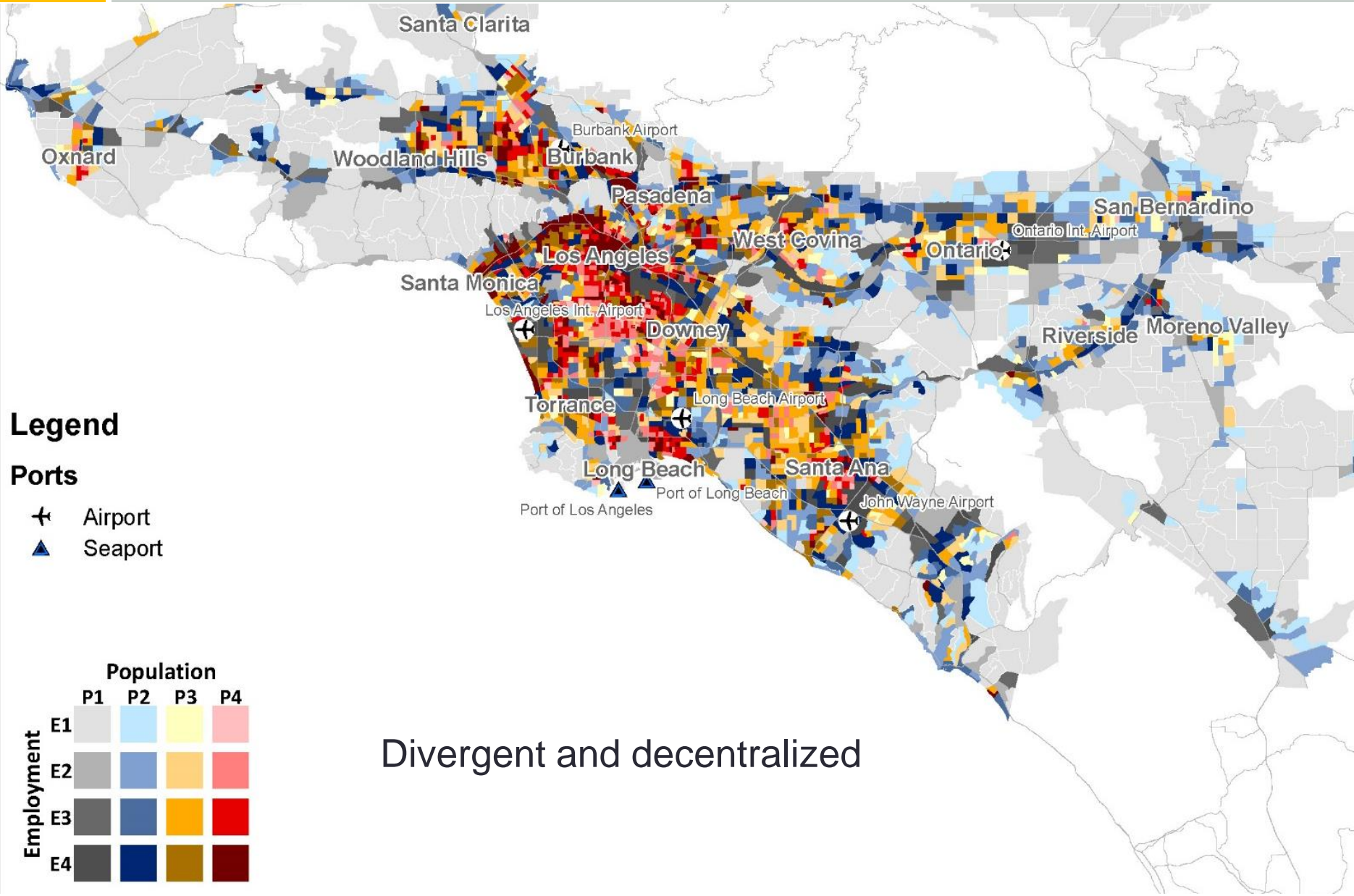Development density, the combined density of population and employment

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

Legend

Ports
- ✈ Airport
- ▲ Seaport

Population
P1 P2 P3 P4

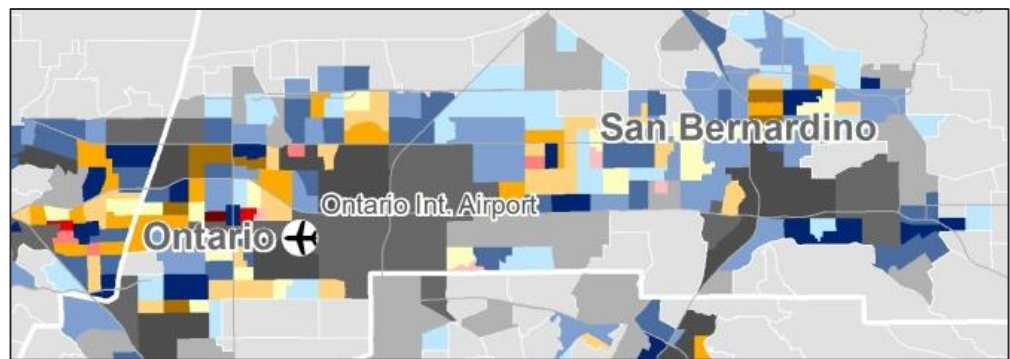Employment
E1 E2 E3 E4
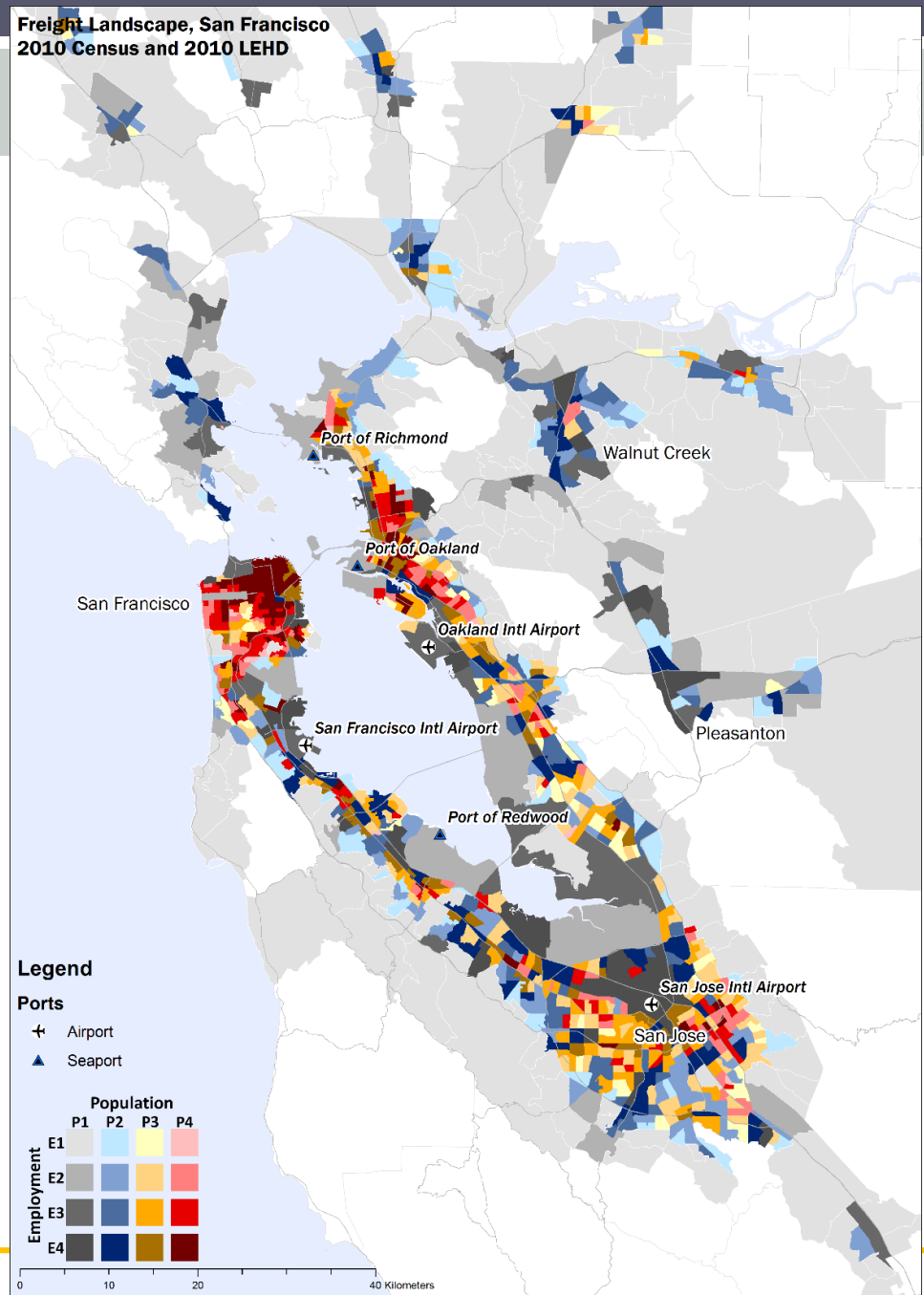
Divergent and decentralized

LA Downtown

Old industrial zone

Ontario airport industrial zone

Freight landscape: San Francisco

Divergent and decentralized

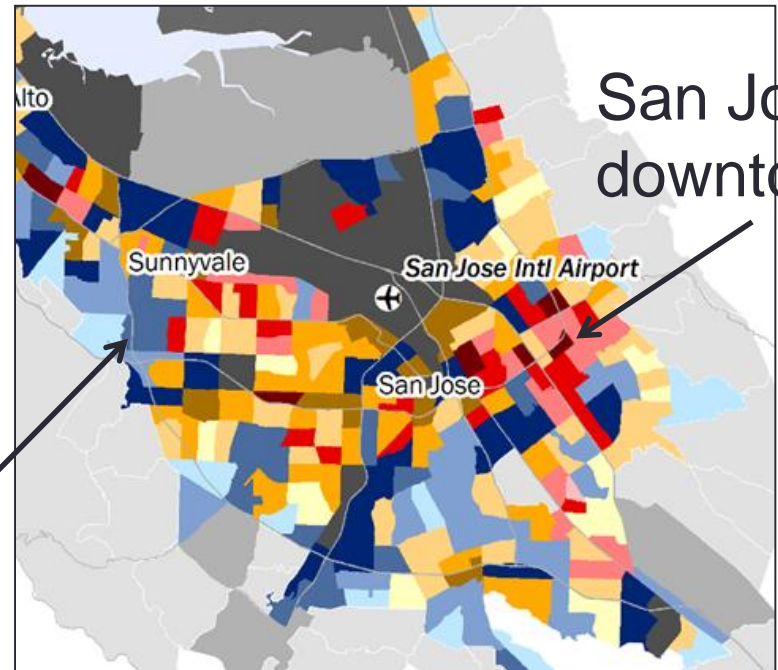Freight Landscape, San Francisco
2010 Census and 2010 LEHD

Port of Richmond

Walnut Creek

Port of Oakland

San Francisco

Oakland Intl Airport

San Francisco Intl Airport

Pleasanton

Port of Redwood

San Jose Intl Airport

San Jose

Legend

Ports

✛ Airport

▲ Seaport

Population

	P1	P2	P3	P4
E1				
E2				
E3				
E4				

Employment

0   10   20   40 Kilometers

USC

San Francisco downtown
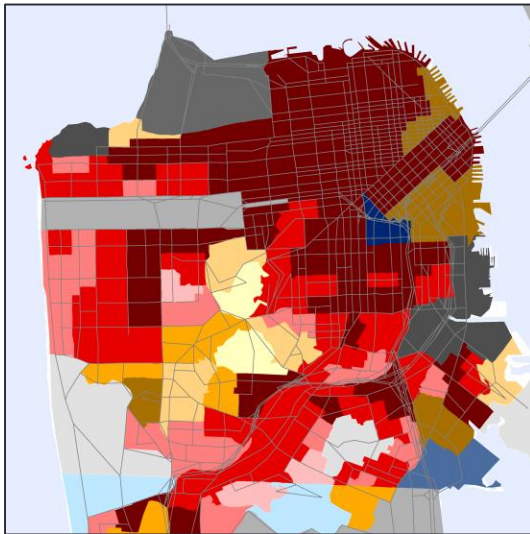
Silicon Valley

San Jose downtown

Tech corridor

Somewhat convergent and centralized

Convergent and centralized

USC
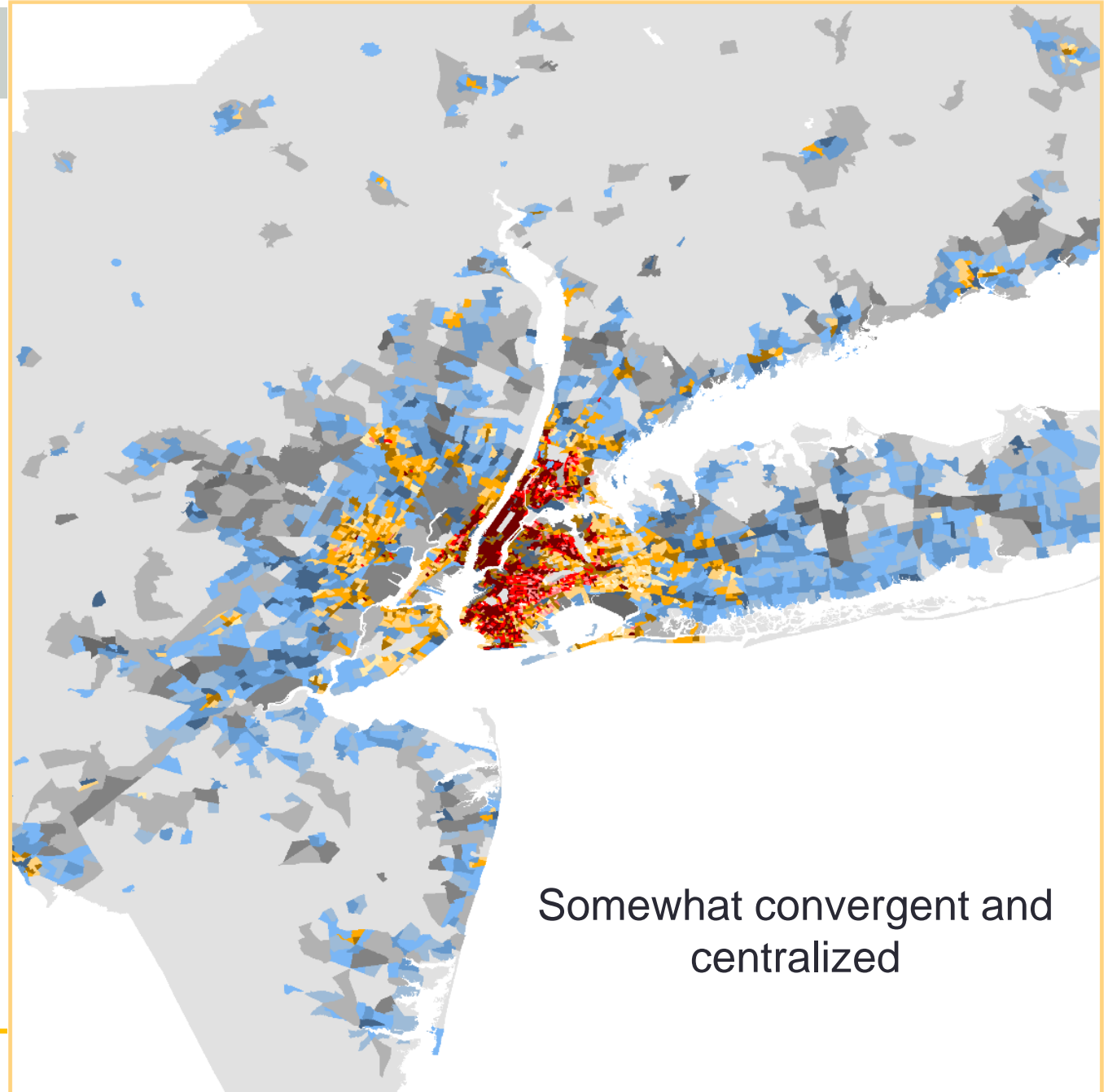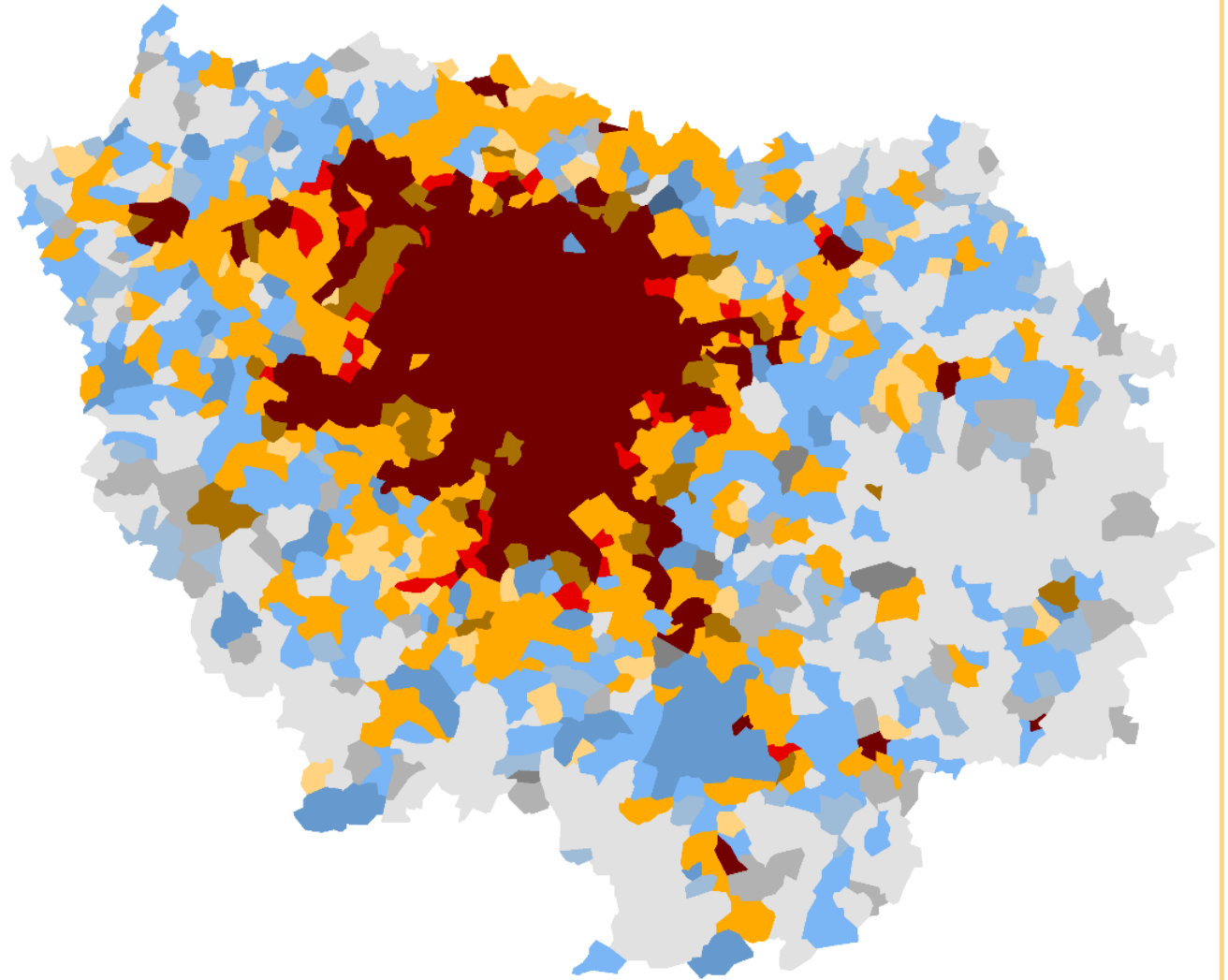
What we have learned

❑ 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

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Thank You