The Freight Landscape: Using Secondary Data Sources to Describe Metropolitan Freight Flows

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Project motivation:

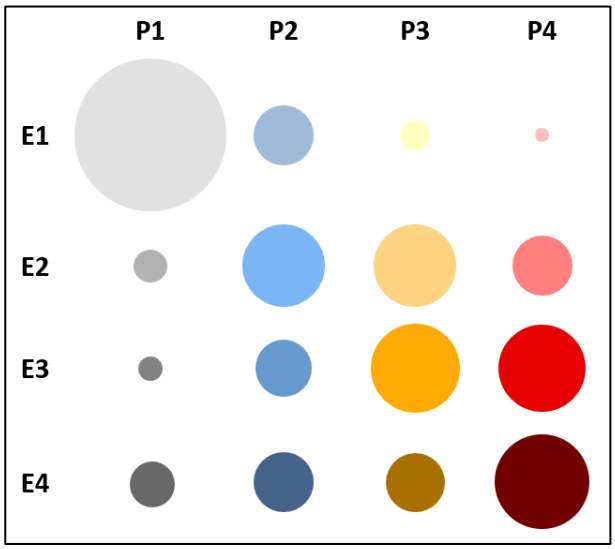
- Little known about freight movements at the intra-metropolitan level
- Lack of comprehensive, consistent data on freight flows within metropolitan areas
- No "theory of urban freight"
- Difficulty in comparing freight flows across metropolitan areas

Conceptual Framework--Freight Landscape: Freight flows depend on the spatial organization of freight supply and demand, and on the transportation facilities within the metropolitan area.

Population and employment distribution: Quartile statistics.

- Sixteen quartile density group combinations created by combining four population quartile groups with four employment quartile groups
- Development density matrix generated showing the number of spatial units that meet the criteria of each category
- Four metropolitan areas in California have similar distribution of development densities with P1/E1 as the largest category and P4/E4 as the second largest one.
- Los Angeles is the only case where the largest share for each column is on the diagonal, suggesting more correlation of population and employment

Los Angeles CSA



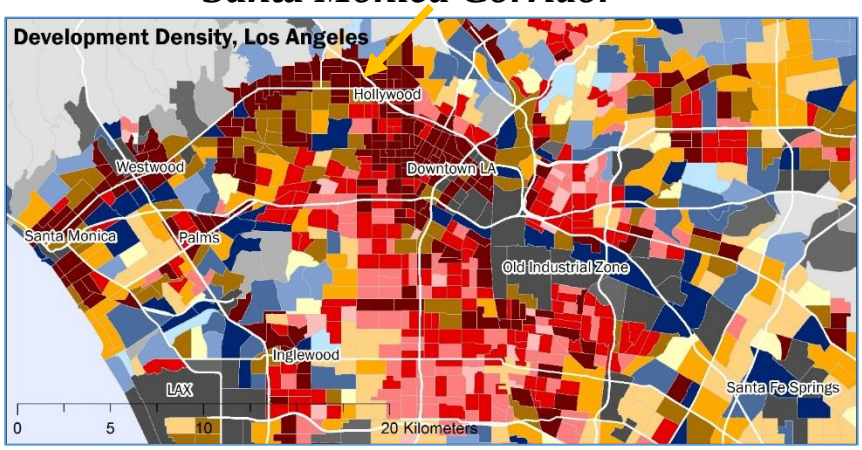
▲ Bubble graph showing the share of tracts or TAZs in each category of population and employment (Los Angeles, for instance)

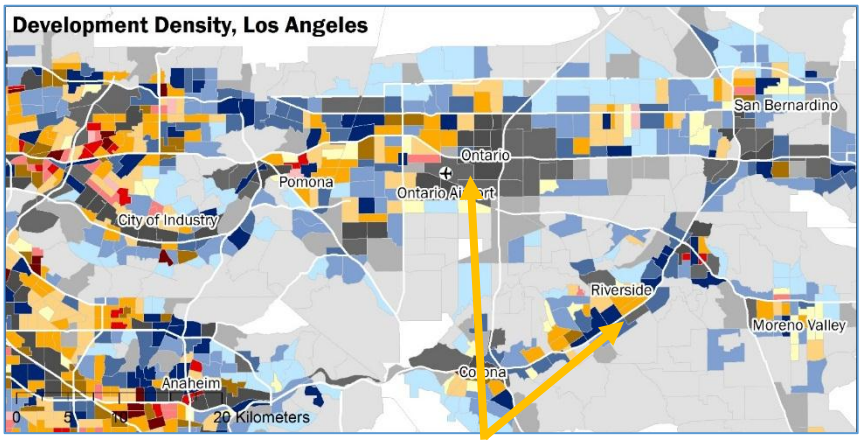
Data:

- Population characteristics: 2010 US Census
- Employment characteristics: 2010 Longitudinal Employer-Household Dynamics
- Transport system data and the output from 2008 baseline regional transportation model: Southern California Associations of Government (SCAG) and Metropolitan Transportation Commission (MTC).

▼ Population and employment distribution in density quartile combinations in Los Angeles and San Francisco regions

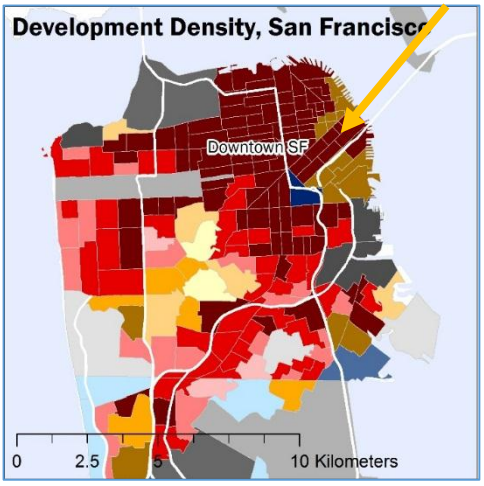
Downtown LA-Hollywood-Westwood-Santa Monica Corridor

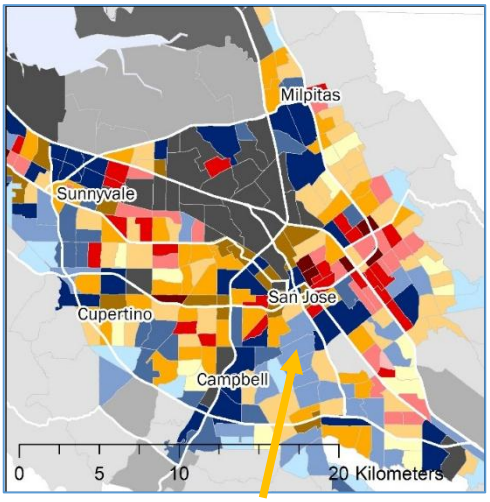




Employment-dominant zones

Downtown San Francisco





Downtown San Jose

Models: We use network model data for both the Los Angeles region and San Francisco region, and estimate two sets of models, one using simple categories of combined population and employment density, and the other using separate measures of population and employment characteristics.

Results:

- Consistent results across two metropolitan area cases
- Reasonable level of explanatory power
- Differences between total vehicles and trucks as expected
- Coefficient for the spatial lagged term is highly significant.

Model 1

- Transport supply variable coefficients have expected signs
- General relationship of density seems to hold
- Simple population/employment combinations perform surprisingly well

Model 2

- Similar to model 1 for transport variables
- Population and employment characteristics are generally significant and with expected signs