Cities and product variety: evidence from restaurants

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Urban Land Institute Award Ceremony
March 22, 2016

Quality of Life in Cities

Classic models argue a trade-off: higher productivity (wages), lower quality of life through congestion (traffic, crime, pollution)

Later models added city amenities: weather, architecture, natural beauty, availability of consumer goods

Glaeser, Kolko, and Saiz, "Consumer city," (JoEG 2001): high amenity cities have faster population growth

Critical amenity: "first, and most obviously, is the presence of a rich variety of services and consumer goods"

But, can we show that variety is higher in cities? And if so, why?

Cities and Product Variety

This paper:

Investigates these ideas with a new dataset on 127,000 restaurants in 726 US cities

Uses restaurants as a measure of city's consumption variety; local, non-tradable, easily categorized, important

Provides evidence that bigger, denser cities do indeed have greater variety

Shows interesting patterns in distribution of variety across cities

Argues for causal link between city structure and variety: population and population density directly increase product variety

Simple sketch of theory

Cities concentrate demand, providing a sufficient market for less-preferred varieties

Specifically, for industries characterized by significant transportation costs, heterogeneous tastes, and a fixed cost of production, the ability of cities to aggregate niche groups of consumers in a small space will lead to greater variety.

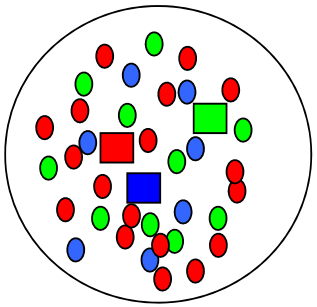
Two basic forces:

- Scale: greater populations support greater variety
- Transportation cost: dispersed consumers lower demand for any firm

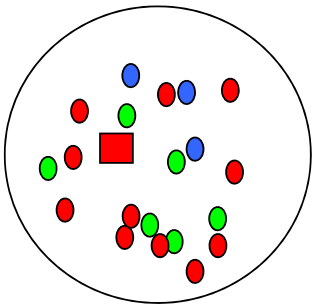
Both population, and population density *separately*, affect demand

Main argument: illustrative figure

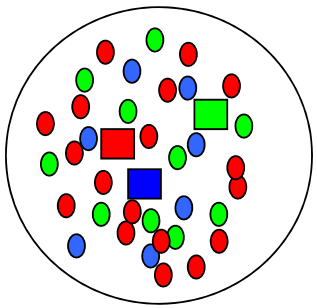
Population=N, 3 Firm Types



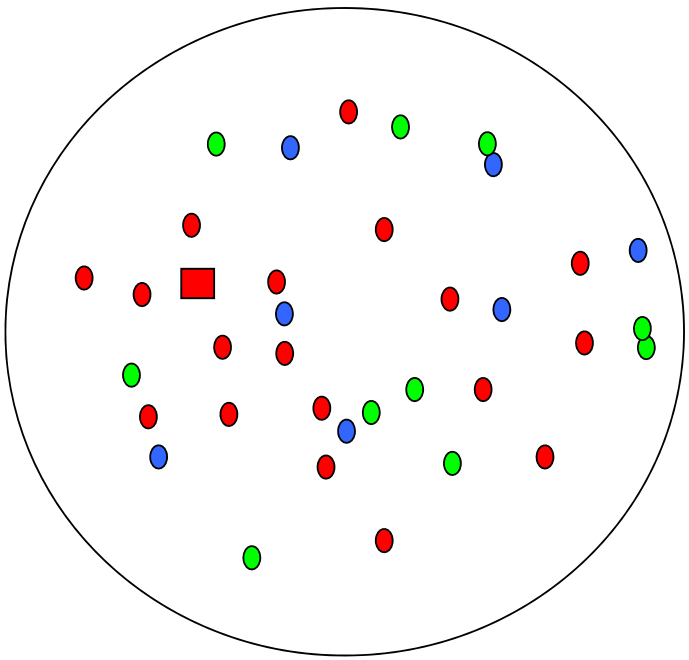
Population=N/2, 1 Firm Type



Population=N, 3 Firm Types



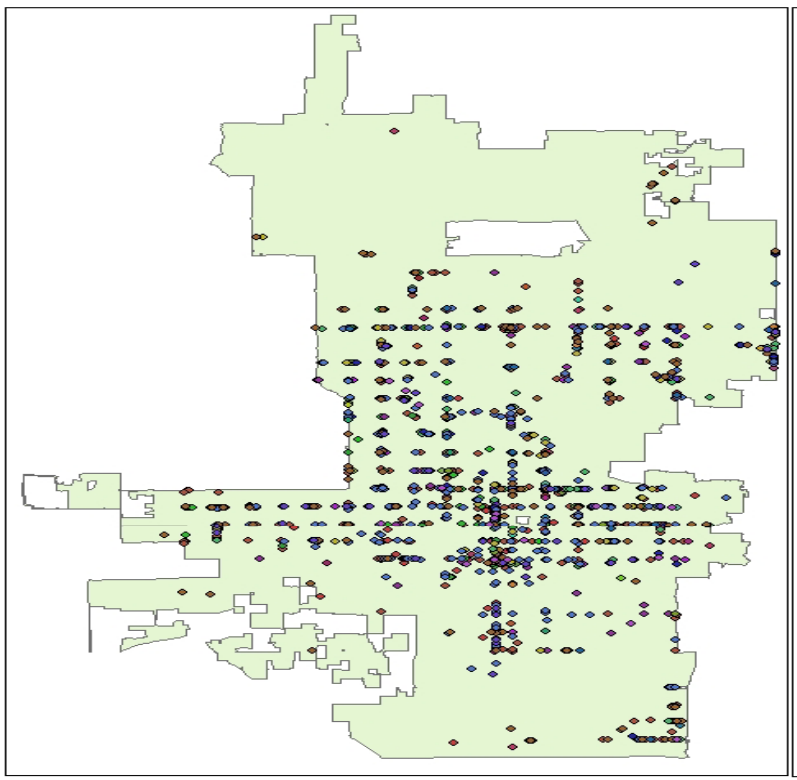
Population=N, 1 Firm Type

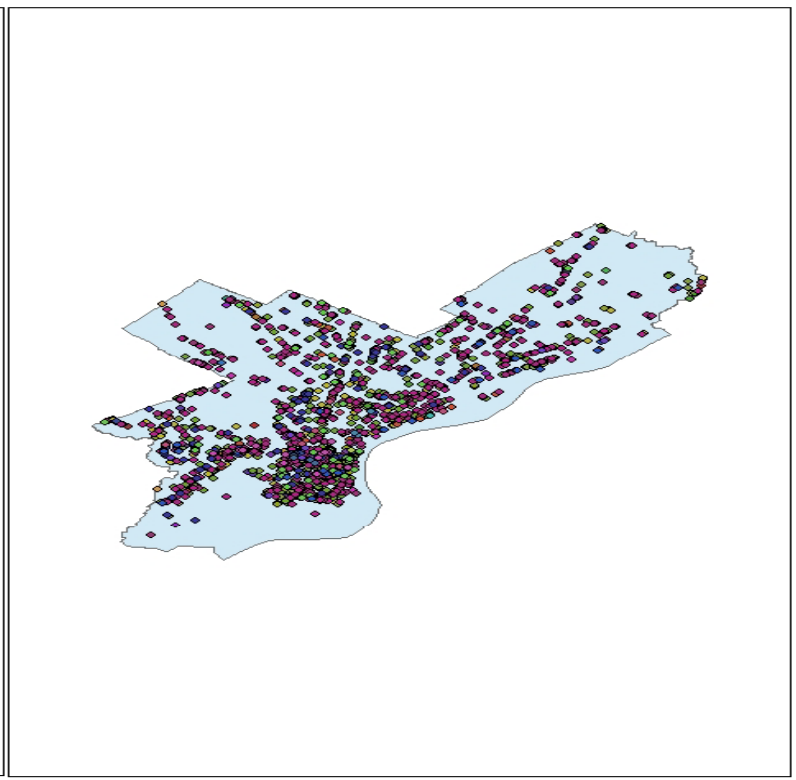


Main argument: Phoenix vs Philly

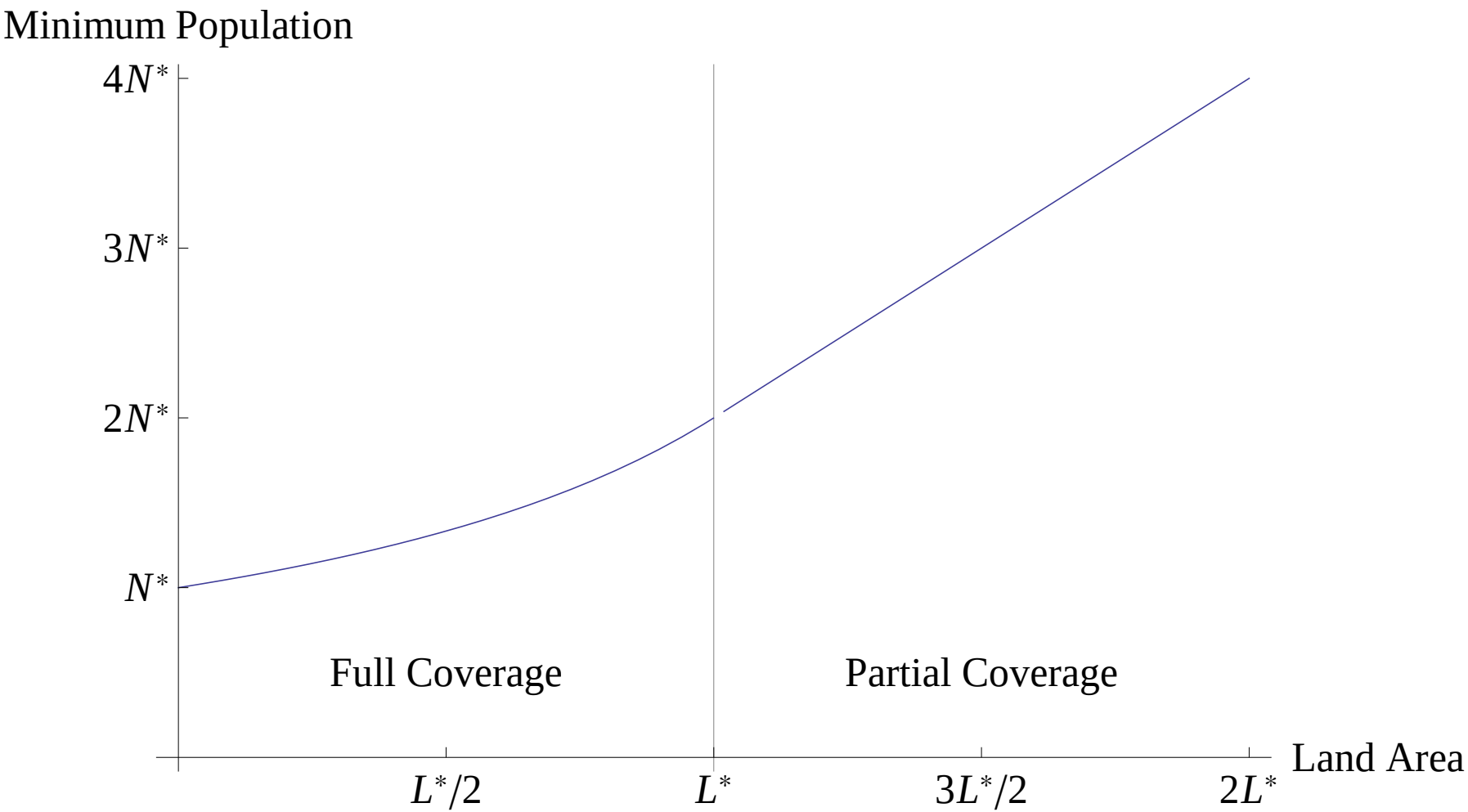
Phoenix, AZ
Pop: 1.3m
Land: 475 sq mi
Income: $41k
% Coll Educ: 32%
Ethnic HHI: .67
Count Restaurants: 1,865
Count Cuisines: 49

Philadelphia, PA
Pop: 1.5m
Land: 135 sq mi
Income: $31k
% Coll Educ: 24%
Ethnic HHI: .83
Count Restaurants: 2,555
Count Cuisines: 59

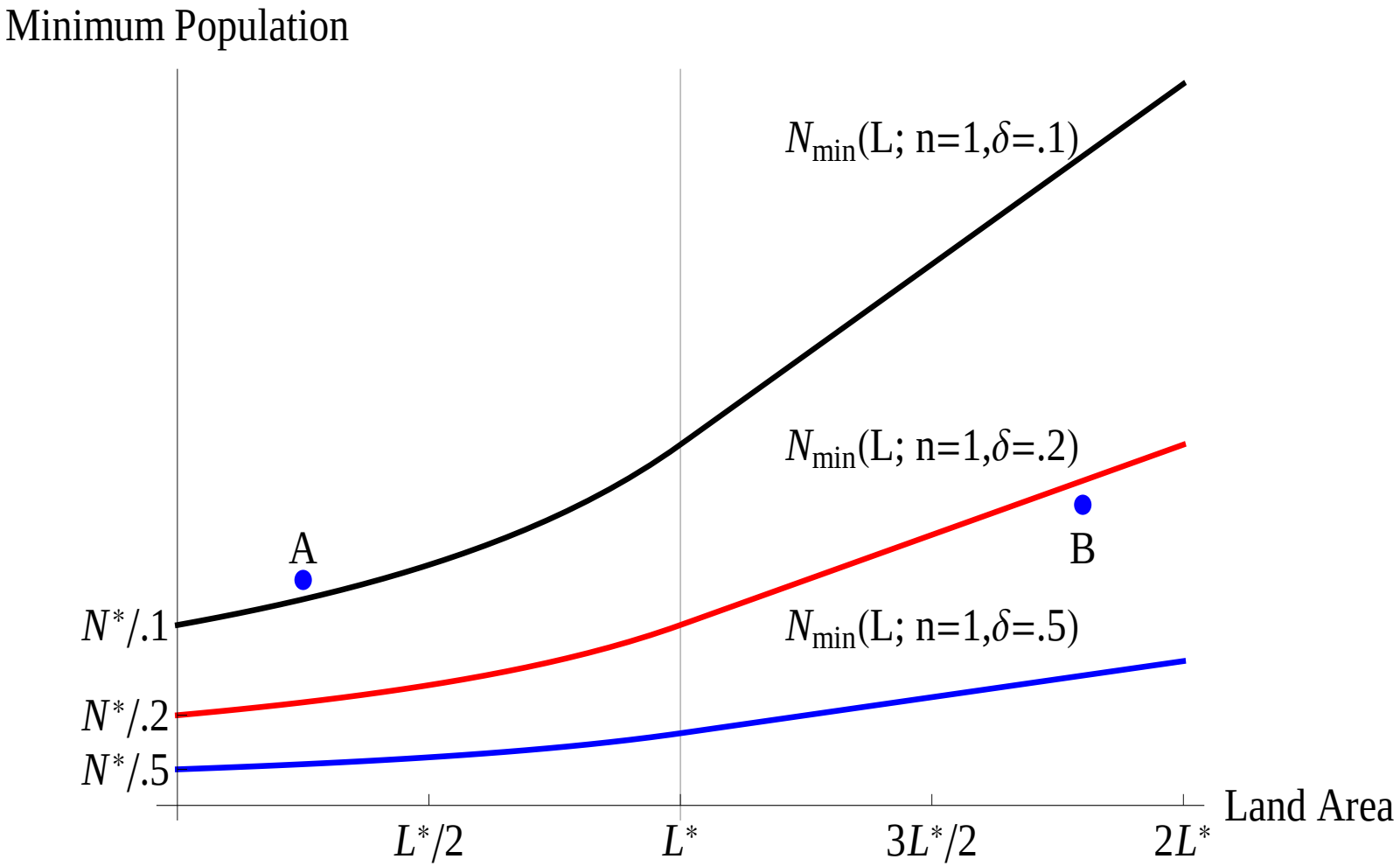




Entry frontier in land-population space



Multiple types in land-population space



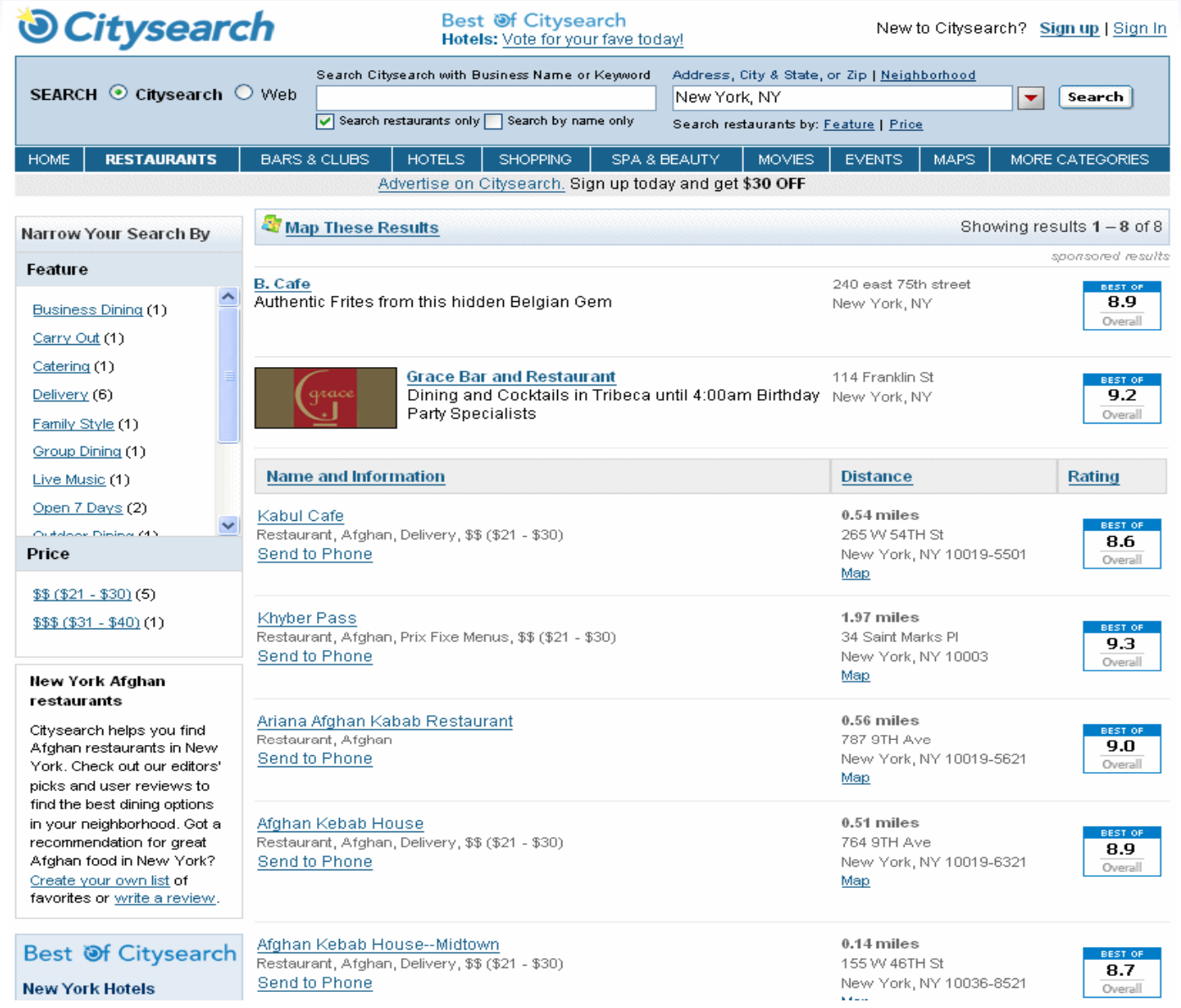
Testable implications of model

1. Holding land constant, more populous markets will have more types
2. Holding population constant, smaller geographic markets will have more types
3. There will be a hierarchical relationship between the number of types and the composition of those types
4. This hierarchy will be associated with thresholds in population and land; rarer types will be found in bigger, denser markets

Description of data

Collected data from website citysearch.com using software and custom programming in Spring 2007 and Summer 2008

- Restaurants collected for metro areas of 88 of 100 largest US cities, over 300,000 restaurants
- Each restaurant assigned a unique cuisine type (ex: restaurant cannot be pizza and Italian)
- Detailed address information allowed precise placement on map, assigned every restaurant to Census Place
- Matched count of restaurants in every Census Place to count from Economic Census 2007. Kept Census Places with .7$<$match ratio$<$1.1, leaving 726 places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$$$ ($31 - $40) (1)
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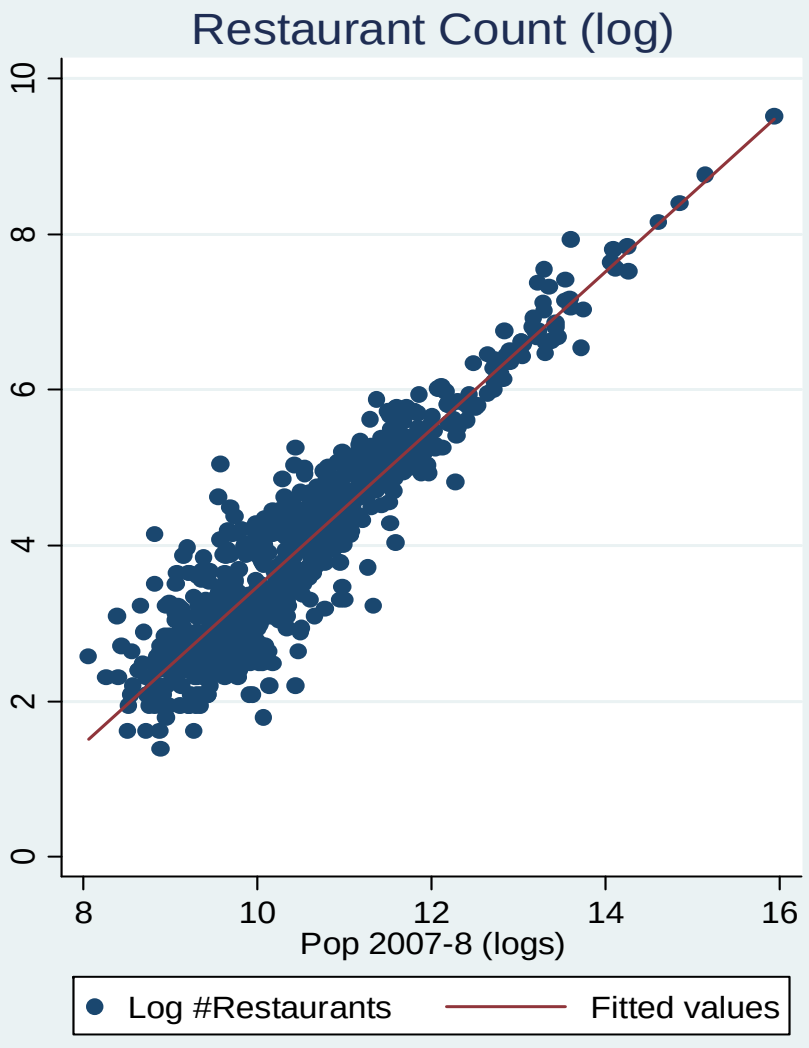
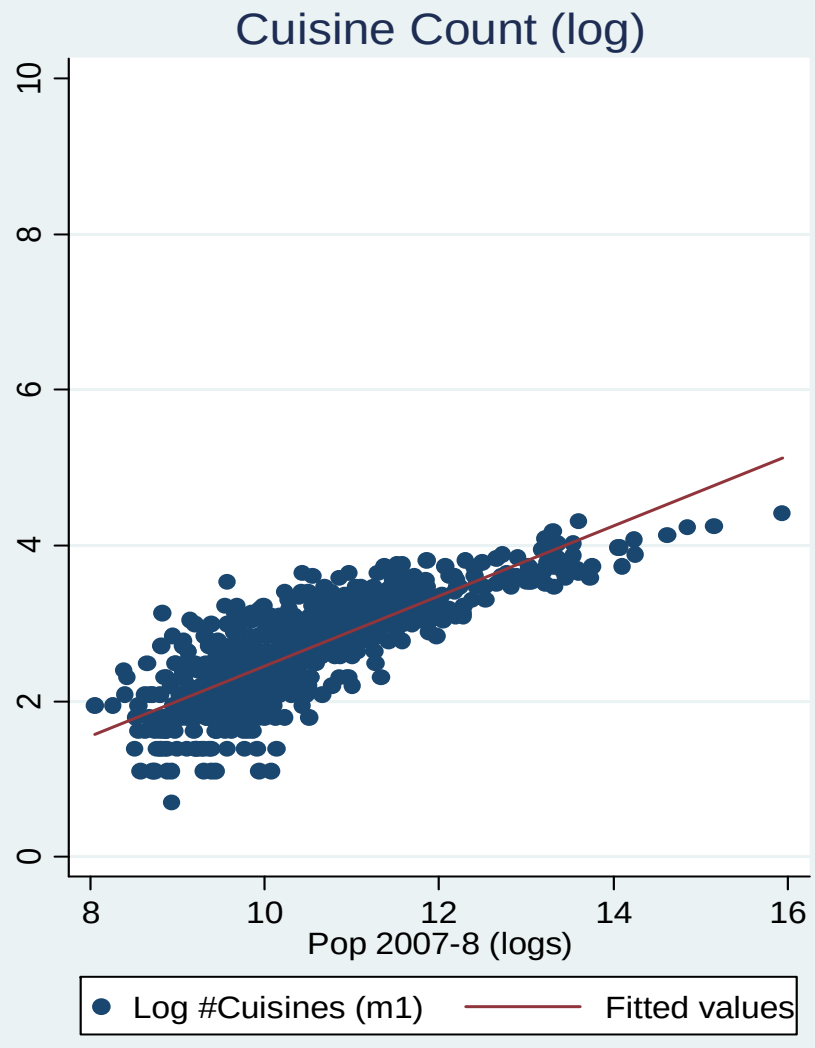
Afghan Kebab House--Midtown
Restaurant, Afghan, Delivery, $$ ($21 - $30)
Send to Phone
0.14 miles
155 W 46TH St
New York, NY 10036-8521
BEST OF 8.7 Overall

Population, number of restaurants, number cuisines

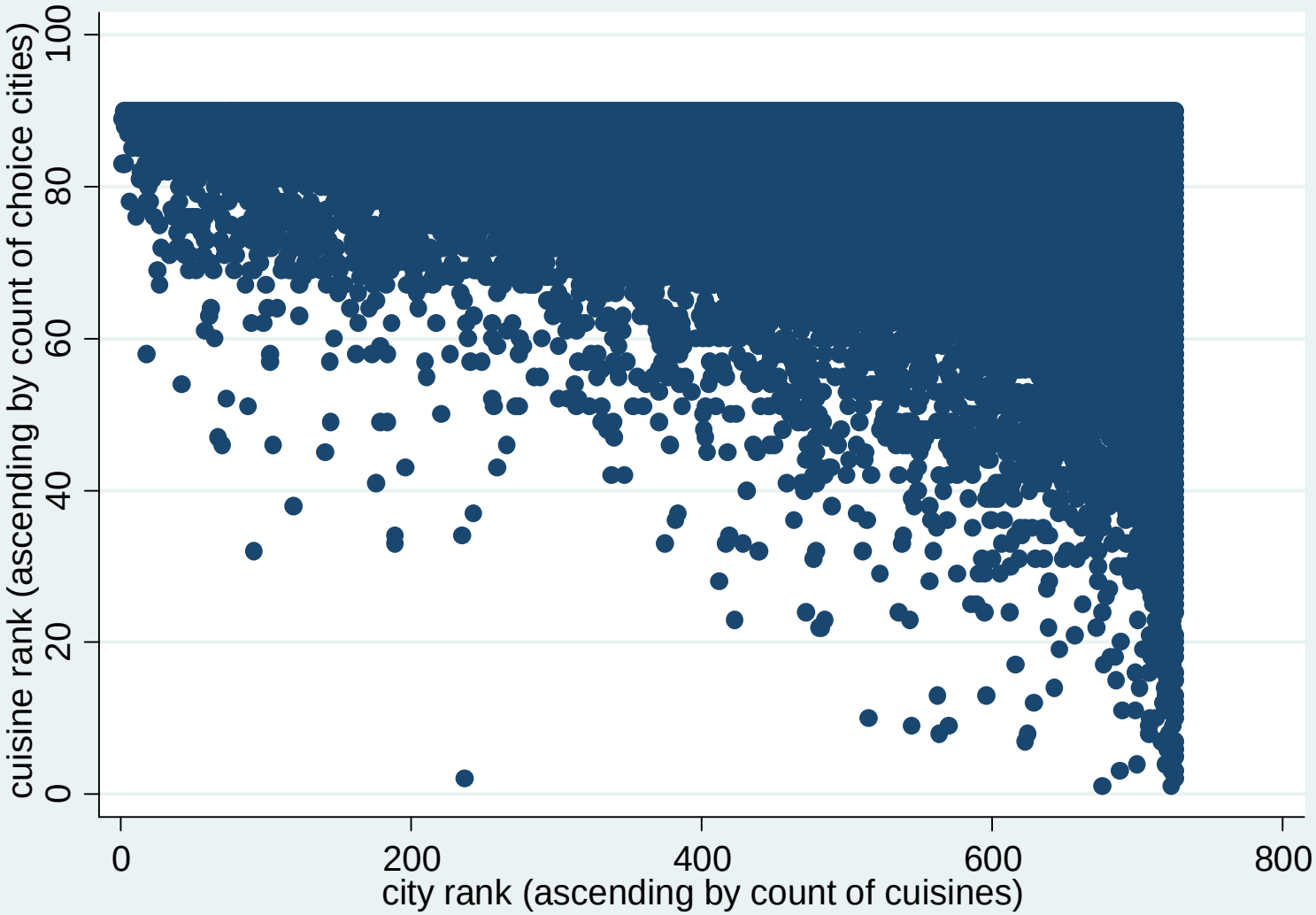


Slope=1.01, RSq=.86, results for 726 Census Places

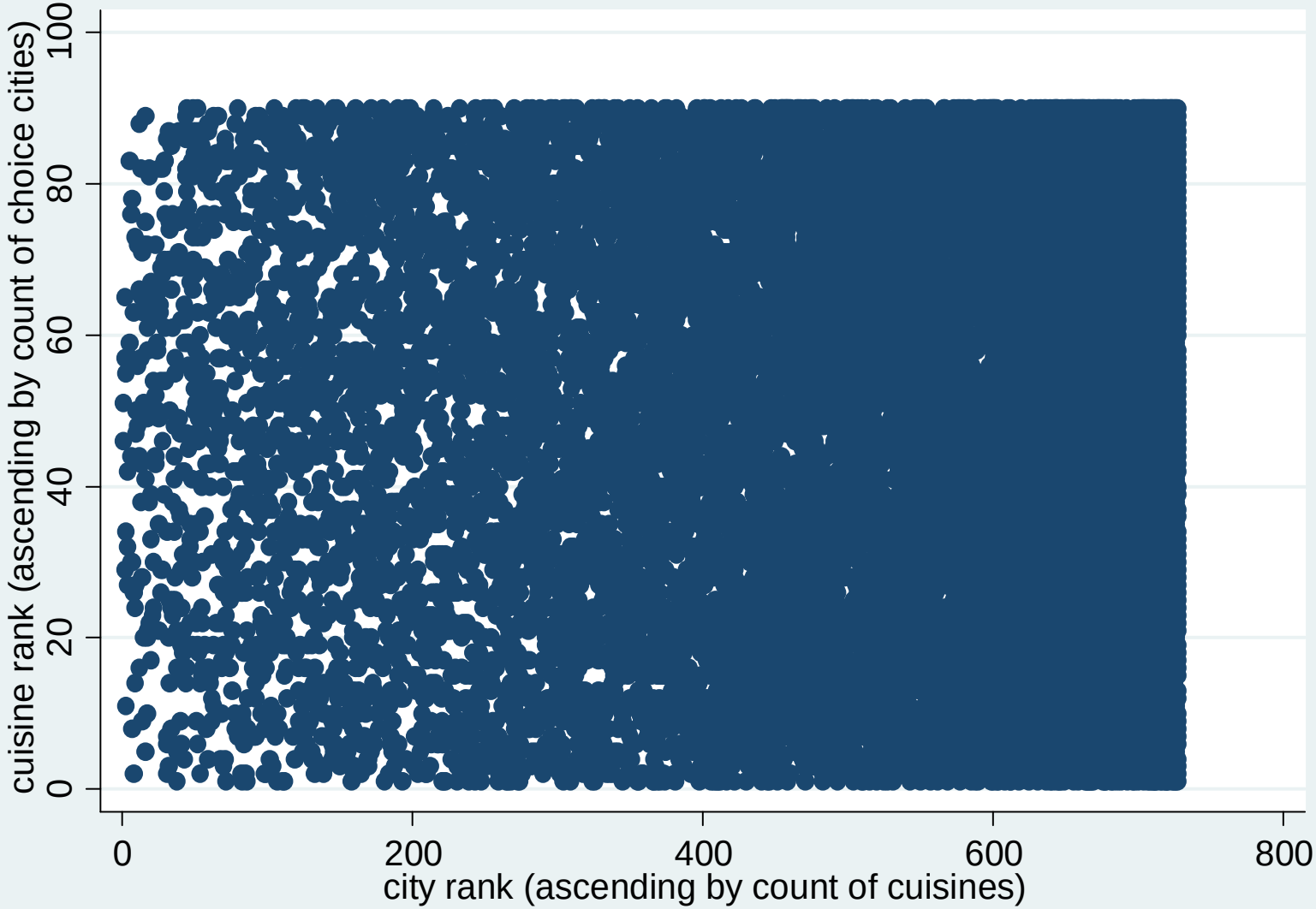


Slope=.49, RSq=.67, results for 726 Census Places

Hierarchy Diagram (MNS 2008)



Hierarchy picture from random assignment



Outline of empirical work

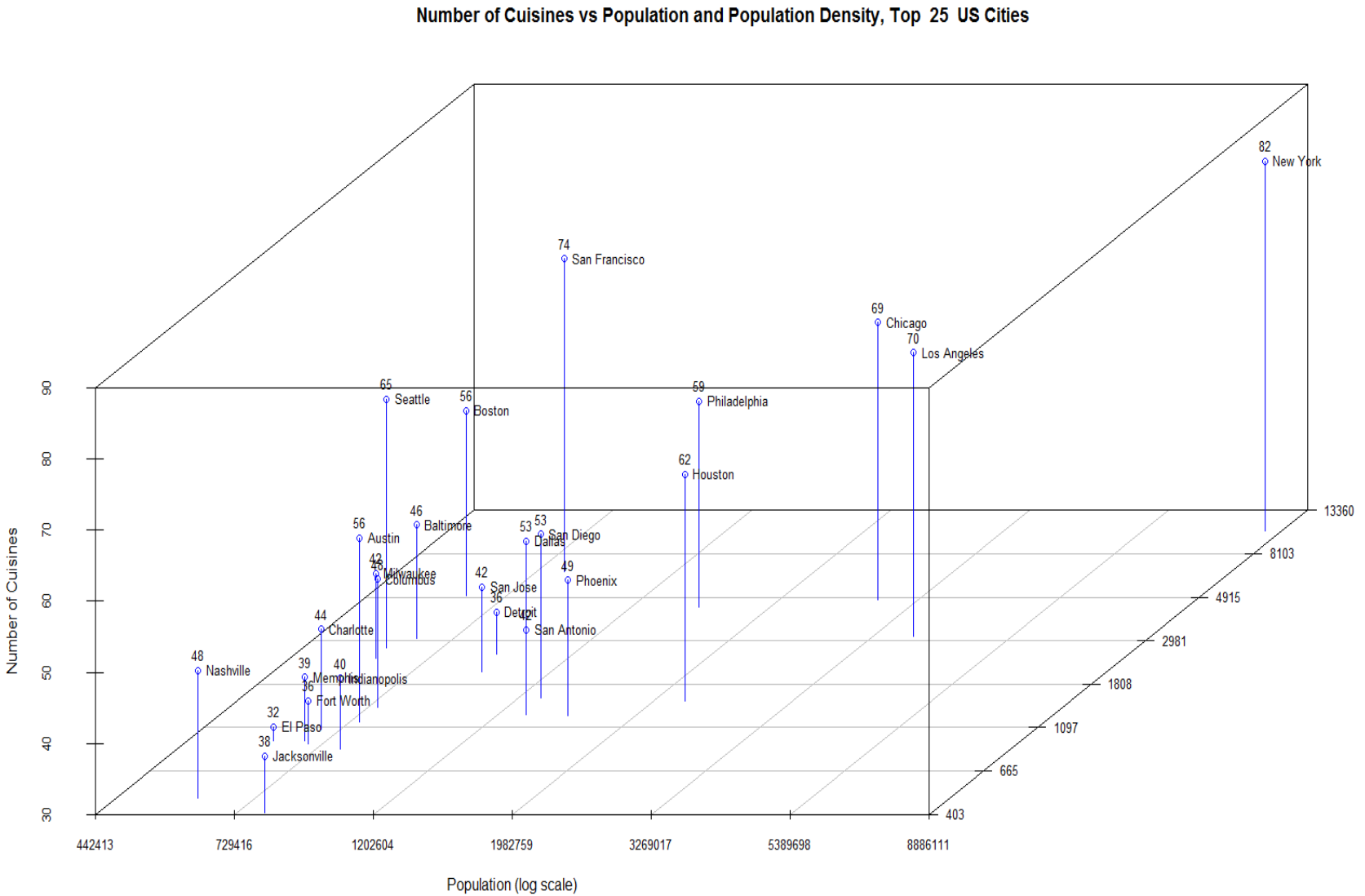
Model predictions:

- Population increases # cuisines, land decreases # cuisines
- Hierarchy related to thresholds in population and land

Testing

1. Run cross-city regressions of number of cuisines on population and land area
2. Include many controls for city demographics: ethnicity, income, education, family size, age distribution
3. Omitted variable bias: “instrument” for key variables using historical measures
4. Also run regressions at cuisine level–likelihood of having a cuisine
5. Robustness checks on role of ethnicity and spatially clustered ethnic populations

Variety, Population, Population Density



Summary of Results

1. A 1% increase in city population leads to a 0.35% to 0.49% increase in cuisine count
2. A 1% *decrease* in city land area (density increase) leads to an additional 0.16% to 0.21% increase in cuisine count
3. Bigger, denser cities also have rarer cuisines–not just more cuisines
4. Likelihood of having a specific cuisine is increasing in population and density, controlling for ethnicity
5. Spatial concentration of ethnic groups increases likelihood city has corresponding cuisine

▸ Ethnic Concentration

Concluding Remarks

Bigger, denser cities have greater restaurant variety

Patterns are not consistent with mechanical explanations (ex: cities have more restaurants, cuisines randomly assigned to restaurants)

Fairly regular pattern to cuisines across cities: bigger, denser cities have rarer cuisines, increases overall count

These results are consistent with model of demand aggregation

Suggests that cities have greater variety through larger populations and greater density

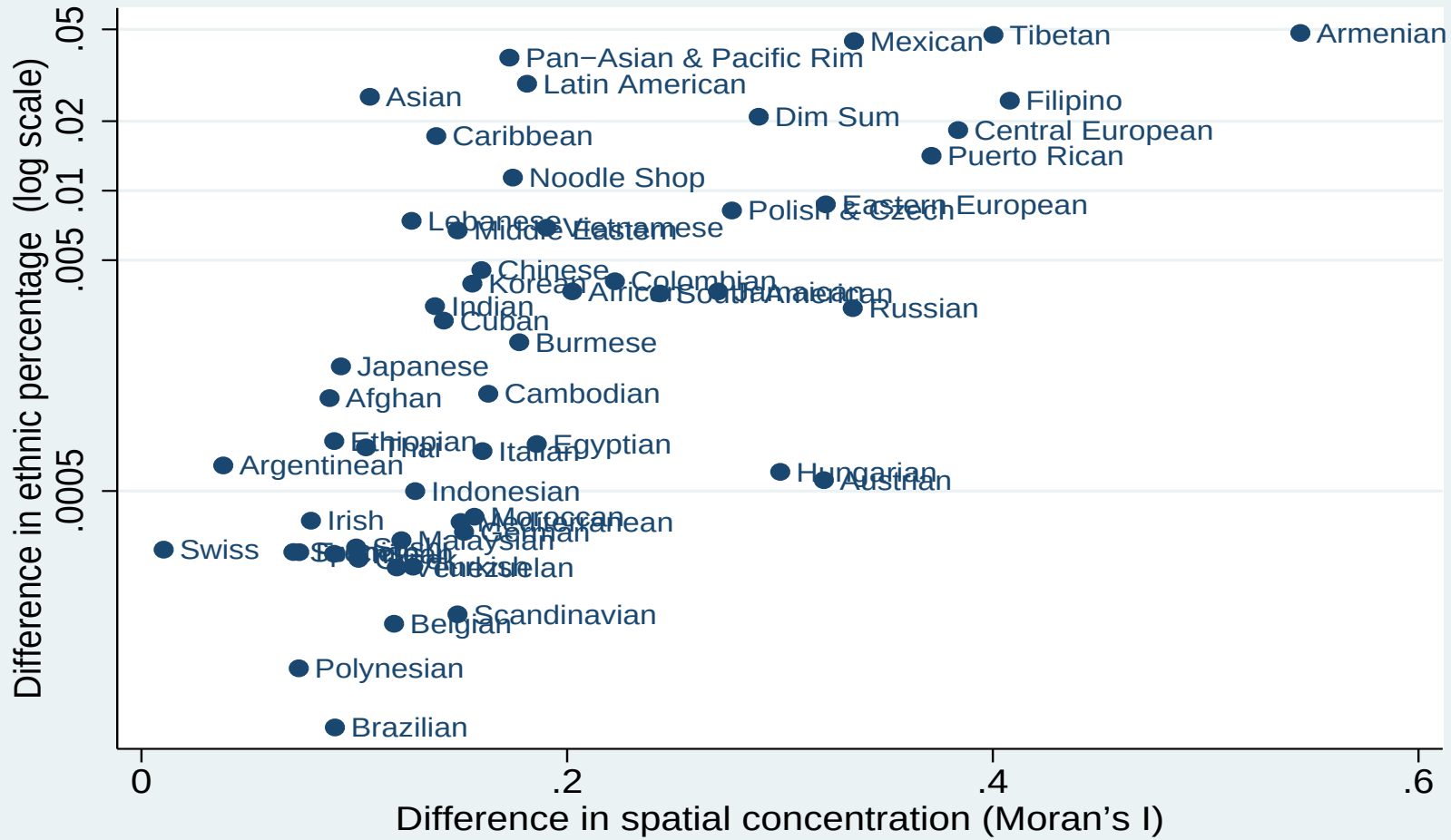
Urban policies (ex: zoning) encouraging density may lead to greater variety and provision of varieties appealing to minority tastes

End of slides

Thank you!

Ethnic Population and Concentration

Back



Differences in average spatial concentration and average ethnic percentage of cities with a cuisine versus without the cuisine. Shown for 55 cuisines.