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The Three Most Important Variables in Internet Retailing

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Overview

- Historical Perspective / Data and Models
- Four Studies: Findings and Implications
  - “Neighborhood Effects and Trial on the Internet”
  - “Spatio-Temporal Analysis of Imitation Behavior”
  - “Preference Minorities and the Internet”
  - “Traditional and IS-enabled Customer Acquisition”

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Historical Perspective

- "Retail Gravitation Models"
  - Reilly (1930); Huff (1964)
- Key Ideas
  - Traditional retailers have small trading areas
  - The probability a customer visits a store is inversely proportional to the distance to the store
  - Traditional retailers find it relatively easy to determine customer locations
- … Key Differences in Internet Retailing

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Data and Models

- Participating Internet Retailers
  - Netgrocer.com, Diapers.com, [Bonobos.com]
- Typical Data
  - Customer ID, Date, Transaction Value, Zip Code
  - Geo-demographic “real world” data
- Typical Models
  - Discrete time hazard, Poisson, NBD

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Key Ideas

- **Social Contagion** from communication and observation affects online demand evolution
- **Spatial Structure** follows a pattern of proximity and similarity (spatial “Long Tail”)
- **Preference Isolation** brings shoppers online and explains geographic breakdown of online brand demand
- **Acquisition Modes** vary in efficacy according to location characteristics

Bell, D. and S. Song (2007) “Neighborhood Effects and Trial on the Internet: Evidence from Online Grocery Retailing,” *Quantitative Marketing and Economics.*

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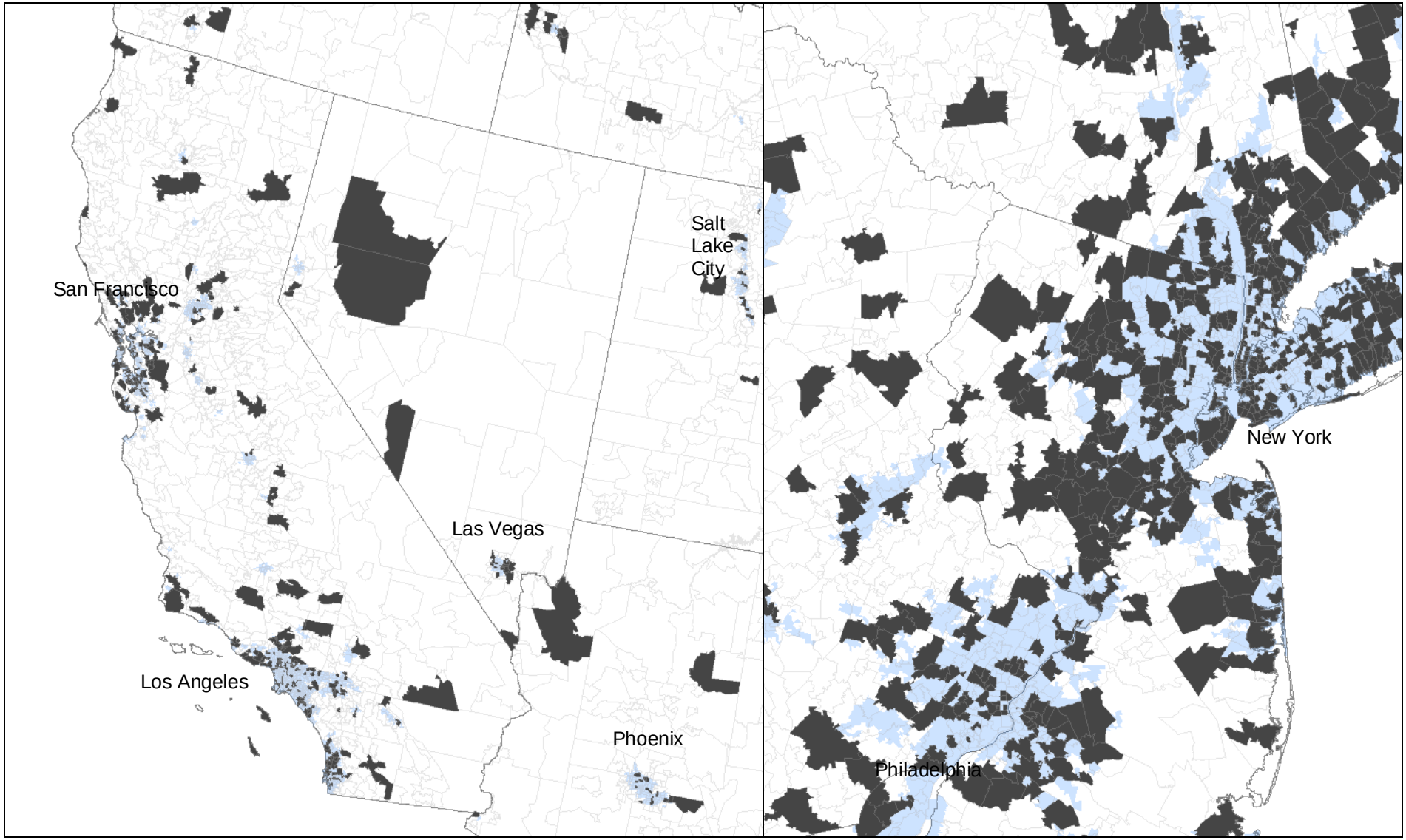
Neighborhood Effects and Trial



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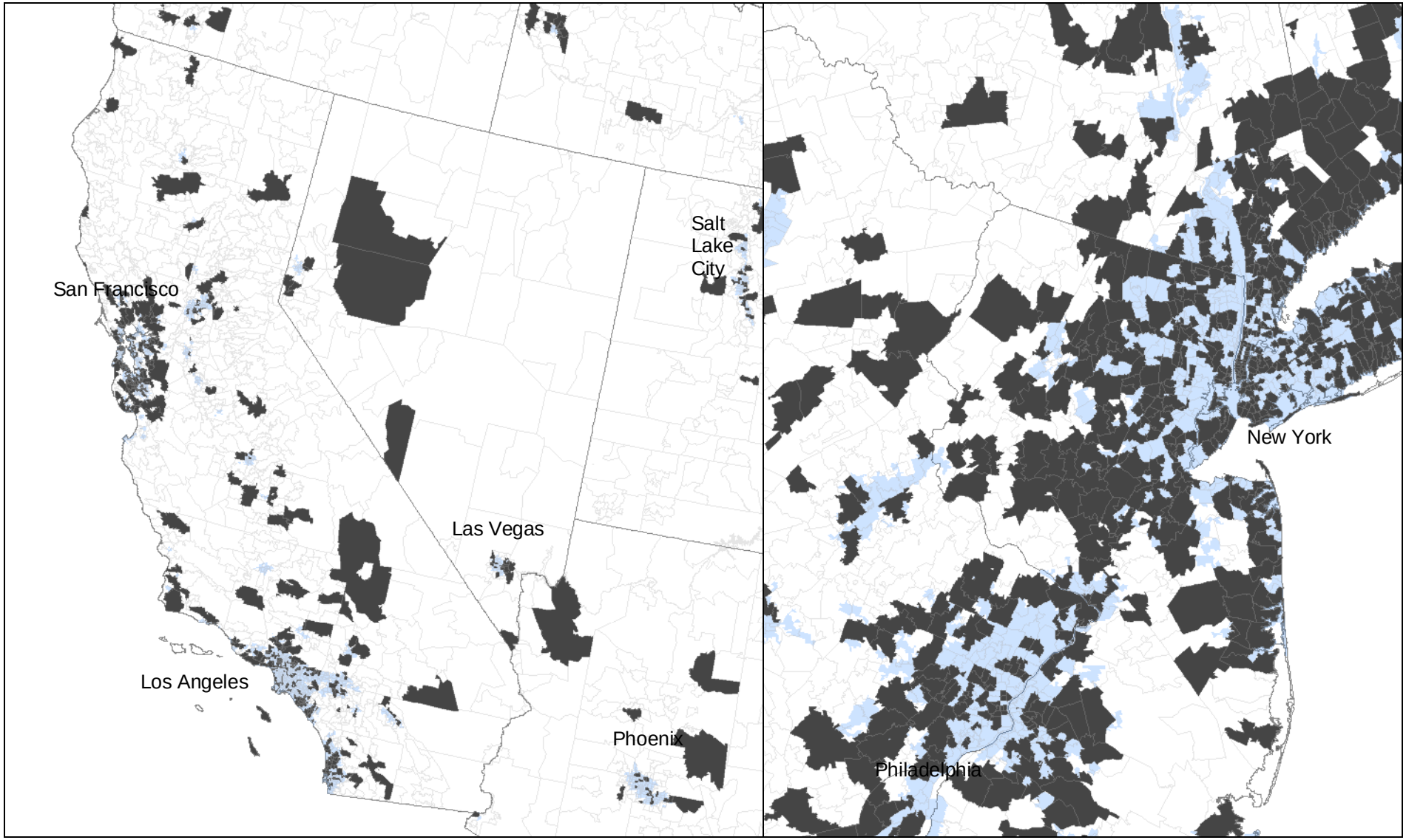
Neighborhood Effects and Trial



Neighborhood Effects and Trial

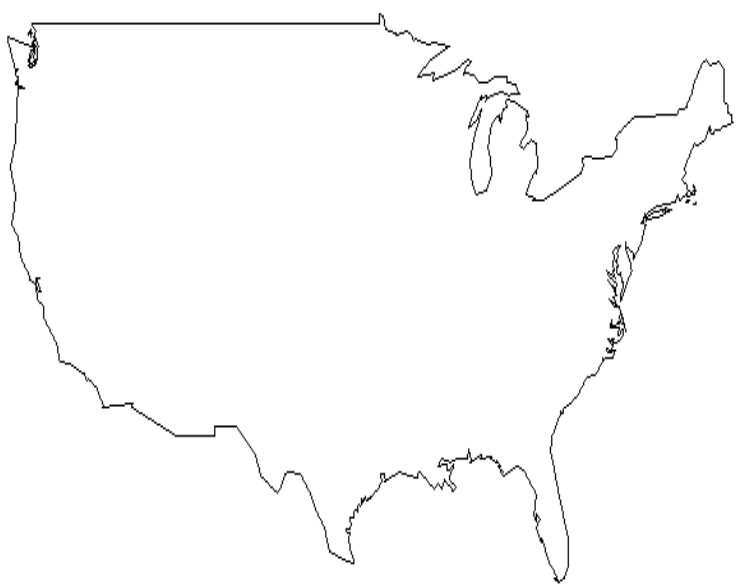
Main Findings

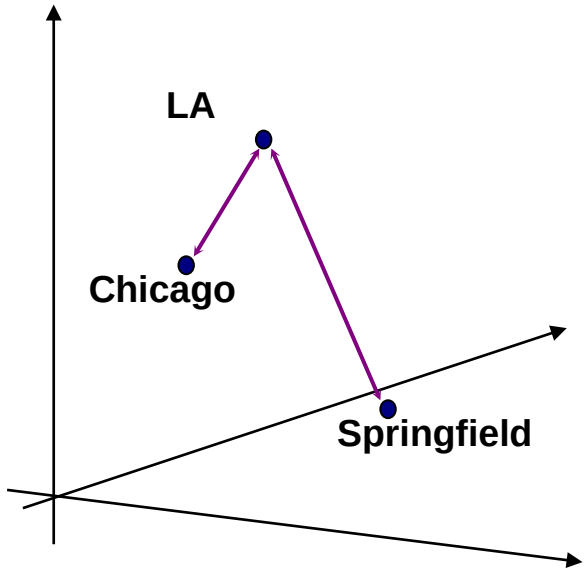
- **Customer adoption is "non-random" over space; more likely to arise in locations contiguous to existing customer locations**
- **The neighborhood effect is robust to Internet penetration, observed geo-demographic heterogeneity and unobserved heterogeneity**
- **The marginal effects are economically meaningful for the firm**
- **Location still matters in Internet retail, but it is the location of *customers* relative to other customers and to offline options**

J. Choi, K. Hui, and Bell, D. (2010) “Spatio-Temporal Analysis of Imitation Behavior Across New Buyers at an Online Grocery Retailer,” *Journal of Marketing Research*.

Spatio-Temporal Imitation

- **Geographic and "Demographic" Neighbors**





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Spatio-Temporal Imitation

The number of new buyers in zip i at time t is Poisson distributed with λ_{it}

$$y_{it} \sim \text{Poisson}(\lambda_{it})$$

$$\log(\lambda_{it}) = \underbrace{\log(n_{it})}_{\text{Offset}} + \underbrace{\gamma_i + \vec{x}_i'\vec{\tau}}_{\text{Regional effect}} + \underbrace{\zeta_t}_{\text{Temporal effect}} + \underbrace{\beta_t^W z_{it} + \beta_t^G G_{(i)}\vec{z}_t + \beta_t^D D_{(i)}\vec{z}_t}_{\text{Imitation effect}} + \underbrace{\varepsilon_{it}}_{\text{Error}}$$

- n_{it} : the number of people yet to try (Netgrocer.com)
- γ_i : unobserved regional heterogeneity, $\gamma_i \sim N(0, \sigma_\gamma^2)$
- $\vec{x}_i$: observed regional heterogeneity
- ζ_t : temporal baseline effect
- ε_{it} : error, $\varepsilon_{it} \sim N(0, \sigma_\varepsilon^2)$

Spatio-Temporal Imitation

Main Findings

- **Customer base grows through proximity initially, then later via "similarity" among physically distant locations**
- **Proximity effects "tap out" but similarity effects hold at a steady rate of accumulation**
- **Market seeding strategies that combine the two effects lead to increased total sales**
- **Internet retailers benefit from serving sparse pockets of geographically diverse demand (spatial "Long Tail")**

J. Choi and D. Bell (2011) “Preference Minorities and the Internet,” *Journal of Marketing Research* (forthcoming).

Preference Minorities

Market 1

100 Others

100 Babies

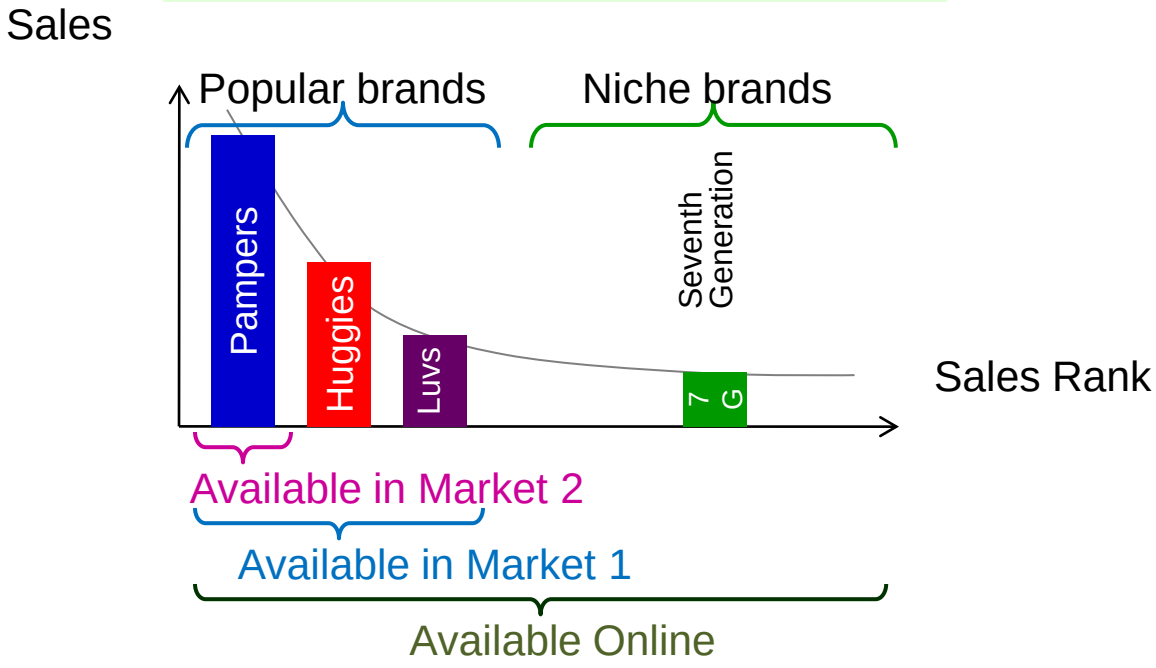
versus

Market 2

1900 Others

100 Babies

The Long Tail Sales Distribution



Market 1

Market 2

Assortment at local retailers

Demand for online retailers

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Preference Minorities

Findings and Implications

- **Target segment size alone is insufficient; "preference minority status" of target group is key**
- **Customer s in the preference minority have higher offline shopping costs; less price-sensitive and more receptive to shopping online**
- **"Preference minority markets" have disproportionately higher online category sales; effect strongest for niche brands**
- **Preference isolation drives consumers online, explains geographic variation in demand, and decomposition of niche vs. popular brand sales**

J. Choi, D. Bell, and L. Lodish (2011) “Traditional and IS-enabled Customer Acquisition on the Internet,” *Management Science*, (forthcoming).

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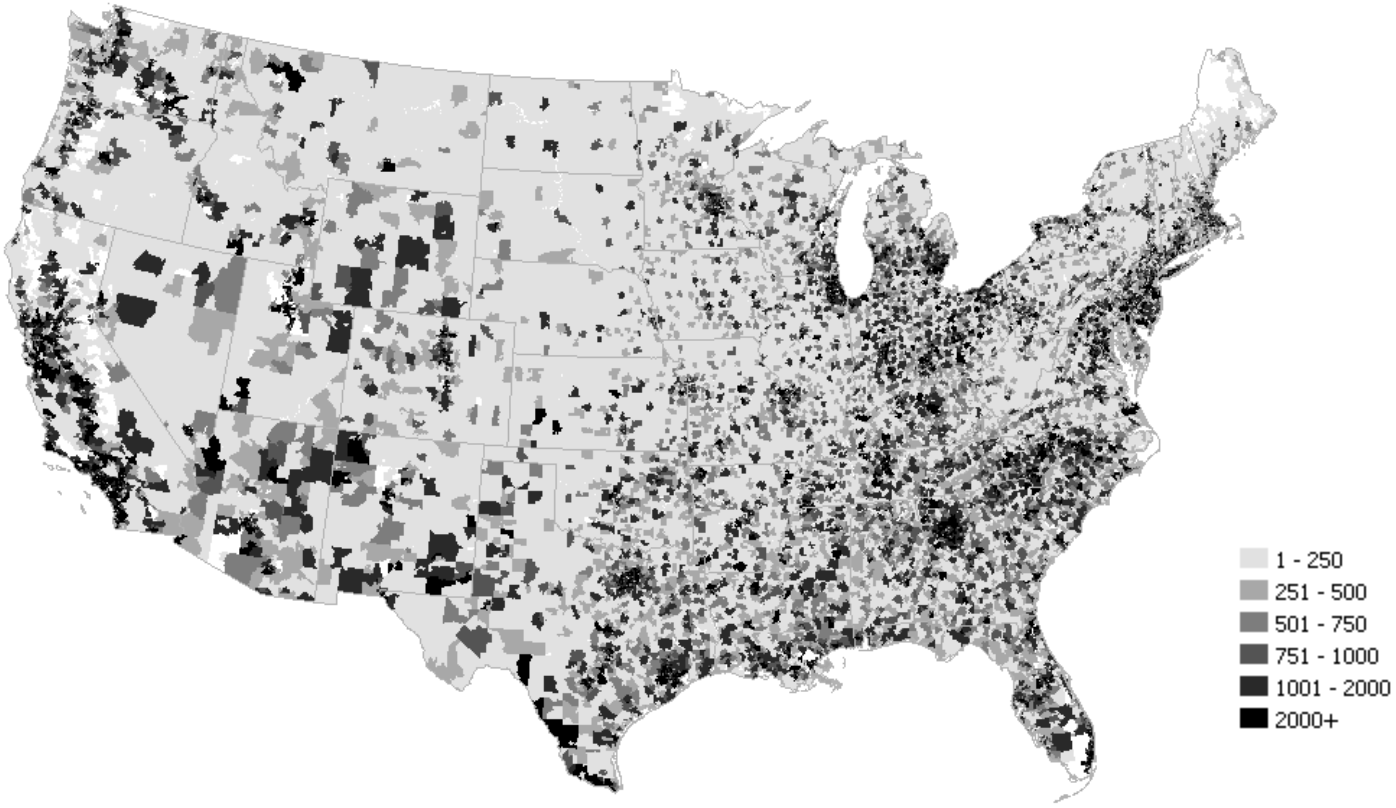
Customer Acquisition



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Customer Acquisition

	Traditional Acquisition Methods	IS-enabled Acquisition Methods
Customer-generated Acquisitions per Zip Code (*Interdependence* at the individual consumer level)	**(a) Offline Word-of-Mouth** 	**(b) Online Word-of-Mouth** 
Firm-initiated Acquisitions per Zip Code (*Independence* at the individual consumer level)	**(c) Magazine Advertising** 	**(d) Online Search** 

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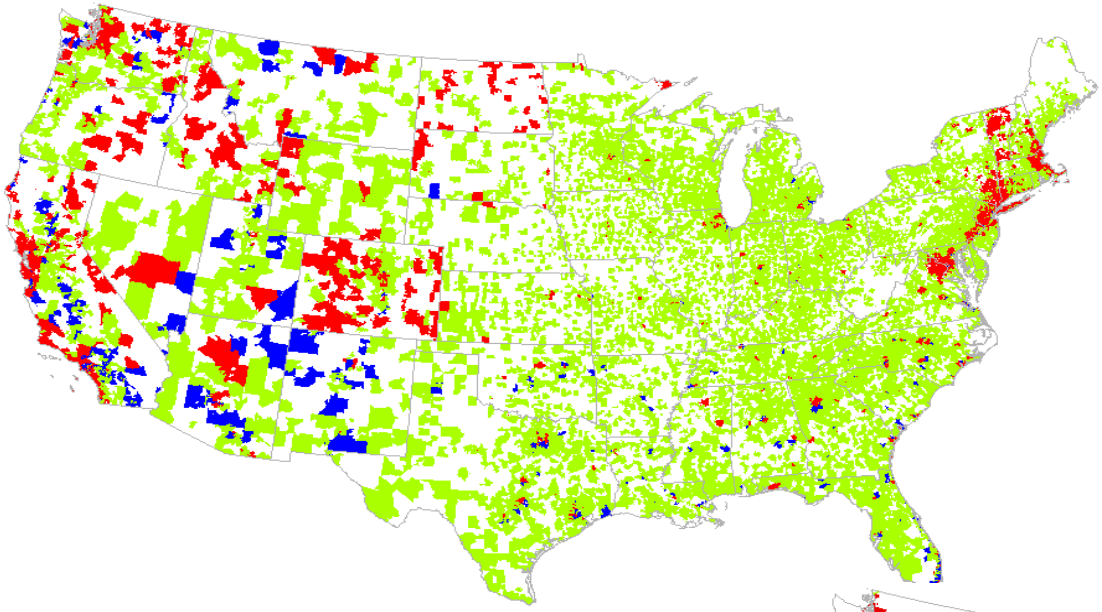
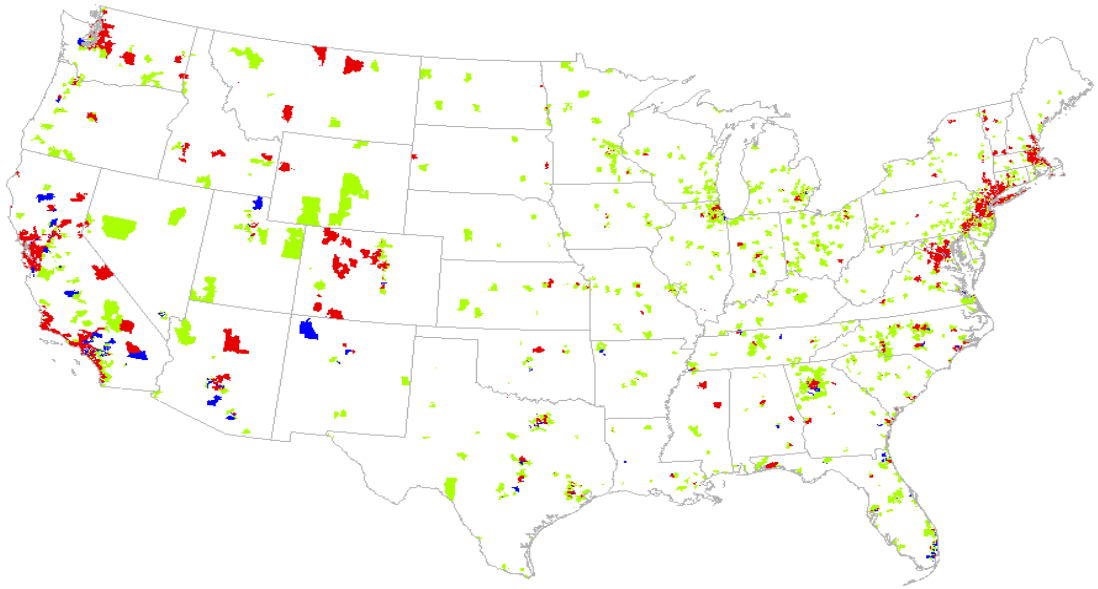
Customer Acquisition



Using zip codes
with 1+ buyers

Predicted buyer < 1
Offline WOM
Online WOM
Online Search
Magazine Advertising



Using zip codes
with 10+ buyers

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Geo-Targeting

A Comparison of Expected New Buyers Per Household and Click-to-Order Conversions[1]

Number of Cities[2]	Actual Buyers	Expected Buyers	Expected Buyers per HHs w/ Children	Conversion Rates
Top Two Groups				
1	6857	6646	.102	.183
7	2163	1934	.050	.182
Middle Two Groups				
35	2045	2083	.009	.102
42	1595	1573	.009	.099
Bottom Two Groups				
42	1436	1480	.004	.078
30	1105	1084	.005	.076

Notes

[1] In the interests of space, we show only six clusters of cities. Full information for all 50 clusters is available from the authors upon request.

[2] This best performing group includes one city, New York City. The number of cities in the other groups is variable, but all cities in a group have roughly equal predictions for the expected number of new buyers per household.

Customer Acquisition

Findings and Implications

- **Acquisitions in general and word-of-mouth (WOM) acquisitions in particular benefit from physical proximity among targets (*offline* WOM—contagion; *online* WOM—connectivity)**
- **Location-based benefits have stronger effects when senders and recipients of WOM are co-located**
- **Different acquisition modes are complementary and substantial gains from geo-targeting are possible**
- **Acquisition mode by geography interaction creates substantial opportunities for Internet retailers**

Discussion