Discovering Location Efficiency
In Cities

The Shifting Paradigm of the City
Rail~Volution
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Washington DC

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Center for Neighborhood Technology

- Non-profit applied research “think and do tank” based in Chicago

- Develop and implement strategies that benefit the environment and the economy

- Bridge information gaps and asymmetries between supply & demand for essential public goods and services

- Work includes energy efficiency, transportation efficiency, green infrastructure
Location Efficiency

• Degree to which a neighborhood’s layout, design, and amenities decreases its households’ costs and impacts.
  – Need to get groceries
    • Drive 15 miles to store - 😞
    • Live in neighborhood with stores within walking or short drive - 😊
  – Need to get to work
    • Commute in a single occupancy vehicle - 😞
    • Live near work and bike - 😊
Analogy: Energy Efficiency

Don’t invest in a house with good insulation, tight windows, and doors
- Pay for lots of fuel
- Be cold
- Worry about global natural gas prices
- Add to climate change

Invest in a house with good insulation, tight windows, and doors
- Amortize the cost over the lifetime of the house
- Be Warm
- Add value to house
- Help build sustainable communities

Source: http://www.dover.gov.uk/environment/energy_advice/home_energy.aspx
Neighborhoods

http://wjffradio.org/gallery/MakingWaves/Suburban_sprawl_in_Chester_Co_PA_Image_82686

Personal Photo – Peter Haas

http://rentrodger.com/rentals/equincapartments.htm

http://twochatelainesfarm.com/default.aspx

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Transportation costs vary by place, depending on:

- Access to services
- Walkable destinations
- Extent and frequency of transit
- Access to jobs
- Housing Density

**Places with these qualities:**

- Own less autos per household
- Drive less miles annually
- Use public transit more

→ Lower Transportation Costs
Model Costs of Transportation

6 Neighborhood Variables
- Residential Density
- Gross Density
- Average Block Size in Acres
- Transit Connectivity Index
- Job Density
- Average Time Journey to Work

3 Household Variables
- Household Income
- Household Size
- Commuters per Household

Car Ownership + Car Usage + Public Transit Usage

TOTAL TRANSPORTATION COSTS

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Independent Variable Significance
Auto per Household Fit

Fitting Washington DC area only
H+T Index: Rethinking Housing Affordability

- What about transportation expenditures?
  - Second largest after housing
  - Costs are largely unknown
  - Leads to inefficient development patterns

- H+T Affordability Index gives a more complete picture of affordability
Factoring Transportation into the Affordability Equation

- Transportation costs are typically 18% of household budget
- H+T Affordability Index calculates costs at the neighborhood level
- 30% housing + 15% transportation = 45% H+T affordability benchmark

Affordability = \frac{\text{Housing Costs} + \text{Transportation Costs}}{\text{Income}}
Why an Index?

Index

“...is a number that indicates the location of something in a list, scale, or array of numbers or prices; indexes are also primarily employed because their simplicity allows for ease of comparisons.”*

Allows Users to:

- Control for socio-economic variables.
- Therefore focuses on how urban form drives affordability.
- Allowing for comparison of affordability of a single representative household.

* Citation needed.
Shrinking Affordability

Typical Household:
Regional Median Income (RMI): $44,437
Size: 2.5 People
Commuters: 1.2 Workers

Moderate Household:
80% of RMI: $35,550
Size: 2.5 People
Commuters: 1.2 Workers

H+T at 45% for Moderate Household

Housing at 30%

H+T at 45%
Cost Breakout by Transportation Component

Cost Breakout Lincoln NE Metro

$8,249 , 84%
$1,609 , 16%
$10 , 0%

Cost Breakout All Metro Areas in US

$7,977 , 81%
$1,827 , 18%
$93 , 1%

- All Metro Areas
- New York Metro – largest percent transit
- Yuba City CA Metro – largest percent VMT
- Lincoln NE Metro – largest percent auto ownership
Cost Breakout by Transportation Component

- The mix varies as well as the overall cost
  - All – $9,897
  - NYC – $5,285
  - Yuba City – $10,449
  - Lincoln – $9,868

Using 2000 Gas Prices

<table>
<thead>
<tr>
<th>Metropolitan Area</th>
<th>Transit Cost</th>
<th>Auto Ownership Cost</th>
<th>VMT Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln, Metropolitan Area</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Yuba City, Metropolitan Area</td>
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<tr>
<td>New York, Metropolitan Area</td>
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</tr>
<tr>
<td>All Metropolitan Areas</td>
<td></td>
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</tr>
</tbody>
</table>
The mix varies as well as the overall cost:
- All: $9,897
- NYC: $5,285
- Yuba City: $10,449
- Lincoln: $9,868

The exposure to volatile gas prices:
- All: $12,305 (24% increase)
- NYC: $6,526 (23%)
- Yuba City: $13,471 (29%)
- Lincoln: $12,001 (22%)

(Using peak 2008 gas price)
Apps and Updates

• http://htaindex.cnt.org

• New websites with updated data
  ➢ Expand coverage to 940 Metropolitan and Micropolitan Statistical Areas (2008 OMB definition excluding PR)
  ➢ Use 2009 ACS 5 year estimates (2005-2009) at block group level to recalibrate
  ➢ Develop new national transit data and develop more ubiquitous and comparable transit access indicator

• Explore more detailed costing model for auto ownership
Thank you!

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For more information, visit:
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