WALK SCORES: A QUANTILE APPROACH TO RESIDENTIAL HOUSE PRICES AND WALKABILITY

ERES – June 9, 2016
NEW URBANISM DESIGN
Walk Score™

Walk Score measures the walkability of any address using a patented system. For each address, Walk Score analyzes hundreds of walking routes to nearby amenities. Points are awarded based on the distance to amenities in each category. Amenities within a 5 minute walk (.25 miles) are given maximum points. A decay function is used to give points to more distant amenities, with no points given after a 30 minute walk.

Walk Score also measures pedestrian friendliness by analyzing population density and road metrics such as block length and intersection density. Data sources include Google, Education.com, Open Street Map, the U.S. Census, Localeze, and places added by the Walk Score user community.

The Walk Score for 35 Broad Street Northwest is based on the following categories:

- Dining & Drinking
- Groceries
- Shopping
- Errands
- Parks
- Schools
- Culture & Entertainment

Scores for 35 Broad Street Northwest

Walk Score: 98
Transit Score: 80
Bike Score: 86

The Walk Score for 35 Broad Street Northwest is based on the following categories.
Carr et al. (2010) - significant correlation with street connectivity, but also crime

Carr et al. (2011) - high correlation with number of amenities within a one-mile radius

Duncan et al. (2011) - significant correlation with spatial walkability measures, but also speed limit and highway density; varies by city
Ability to walk or cycle to school, public transit, and shopping, relatively unimportant (Handy et al., 2008)

NAR (2011) - Most Americans would like to live where shops, restaurants, and local businesses are an easy walk from their houses,

but

single-family houses on large lots with more distance from neighbors more important.

- Younger, single, highest and lowest incomes prefer walkable
- Middle-income, middle-aged, married couples prefer suburban design
Neighborhood internal street connectivity - mixed results
(Song and Knaap, 2003; Song and Quercia, 2008)

Neighborhood density - mixed results
(Song and Knaap, 2003)

Proximity to retail sites - mixed results
(Song and Knaap, 2003, 2004; Matthews and Turnbull, 2007; Song and Quercia, 2008)
- Size of retail center matters
  (Des Rosiers et al., 1996)

Proximity to parks – mixed results
(Song and Knaap; 2003, 2004; Cho et al., 2006; Conway et al., 2010)
WALK SCORES AND REAL ESTATE VALUE

- Pivo and Fisher (2011) - premium for office, rental multifamily, and retail properties, but none for industrial properties

- Rauterkus and Miller (2011) – premium, especially in urban neighborhoods

- Gilderbloom et al. (2015) – premium by neighborhood
Diao and Ferreira (2010) – Spatial error model – significance of walkability sensitive to walking environment and only where good transit access

Manaugh and El-Geneidy (2011) - households differ in their response to the walkability level of their neighborhood depending on their socioeconomic characteristics

Boyle et al. (2014) – Walk Score’s impact on housing value becomes statistically insignificant and sometimes negative when control for heteroscedasticity and neighborhood fixed effects
KING COUNTY, WASHINGTON
BASIC MODEL

\[ \ln \text{Price}_{\text{int}} = c + \alpha S + \delta N + \beta L + \gamma T + \varphi W + \varepsilon \]

- **S** - structural characteristics of the house
- **N** - neighborhood characteristics
- **L** - location and time trend variables
- **T** - month of sale
- **W** - walkability

**Data:** 21,937 house sales
King County (Seattle), Washington 2014
Walk Score 2016

Percent of Census Tract Area within
- ½ mile of destination in low density areas ( < 7.6 people per acre)
- ⅓ mile of destination in medium density areas (7.6-10.8 people per acre)
- ¼ mile of destination in high density areas (> 10.8 people per acre)

Destinations:
- Park
- Public elementary school
- Grocery store or farmers’ market
- Library
## OLS Regression Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
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<td>R-squared</td>
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Quantile Regression

\[
\ln \text{Price}_{int} = c_\tau + \alpha \tau S + \delta \tau N + \beta \tau L + \gamma \tau T + \phi \tau W + \varepsilon
\]
### QUANTILE REGRESSION RESULTS

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CONCLUSIONS

- Neighborhood controls eliminate the positive relationship between WalkScore and house price.

- Proximity to some destinations included in WalkScore are positively related to price (public elementary school, grocery and market, park).

- Effect of WalkScore consistent across price distribution.

- Set of destinations may not be the ones buyers value.

- Quality and scale of destination matters.

- Quality of walking route matters.