

Housing & Transportation Affordability Index:

A New Tool for Measuring the True
Affordability of Housing Choice

Overview

- Introductions
- Background and Purpose of the Index
- Review of Methods
- Phase 2 and how LED can help

Background and Purpose of Index

Center for Neighborhood Technology



- 28 year old Chicago-based non-profit
- Promotes economic development that is environmentally sustainable through:
 - Research
 - Advocacy
 - Demonstration projects
- Co-developer of the Location Efficient Mortgage SM
- Partner in the CTOD
- <http://www.cnt.org>

Brookings UMI Pilot – Goals for H&T Affordability Index

- Used to accurately price the true affordability of housing
- Provide input into investments in urban market
 - Minneapolis-St. Paul as a pilot deployment location...use and document implementation and impact on community investments
 - Methodology uses national datasets so that it can be replicated in cities throughout the US



The Affordability Index: A New Tool for Measuring the True Affordability of a Housing Choice

By Center for Transit Oriented Development and Center for Neighborhood Technology

This brief describes a new information tool developed by the Urban Markets Initiative to quantify, for the first time, the impact of transportation costs on the affordability of housing choices. This brief explains the background, creation, and purpose of this new tool. The first section provides a project overview and a short summary of the method used to create the Affordability Index. The next section highlights the results from testing the index in a seven-county area in and around Minneapolis-St. Paul, MN. To demonstrate the usefulness of this tool at a neighborhood level, the third section projects the effect of transportation and housing choices on three hypothetical low- and moderate-income families in each of four different neighborhoods in the Twin Cities. The brief concludes with suggested policy recommendations and applications of the new tool for various actors in the housing market, and for regulators, planners, and funders in the transportation and land use arenas at all levels of government.

The Housing and Transportation Affordability Index is a groundbreaking innovation because it prices the trade-offs that households make between housing and transportation costs and the savings that derive from living in communities that are near shopping, schools, and work, and that boast a transit-rich environment. Built using data sets that are available for every transit-served community in the nation, the tool can be applied in neighborhoods in more than 42 cities in the United States.¹ It provides consumers, policymakers, lenders, and investors with the information needed to make better decisions about which neighborhoods are truly affordable, and illuminate the implications of their policy and investment choices.

I. Housing and Transportation: Key Elements of the Cost of Living

The cost of living for an American family consists of many components. The two largest are housing and transportation. Housing affordability is most commonly understood as the extent to which a household's income can cover the purchase price of a home. However, the traditional definition of housing affordability may be too limited. The cost of transportation, while not currently factored in to the affordability equation, has become increasingly central to family budgets, given their choices to live

Rethinking Affordability

- **The standard measure of affordability is percentage of income on housing**
 - e.g. no more than 30% should go for housing
- **But transportation costs are directly tied to the location of housing and truly affect cost of living:**
 - Housing and transportation costs are typically >50% of income for low and moderate income households

Household Transportation Costs

- **The Median Income U.S. household in 2003:**
 - 19% of household budget on transportation (BLS)
- **U.S. is 19% - but costs vary by place:**
 - Baltimore was 14%
 - Chicago was 16%
 - Houston was 21%
- **What drives the difference in transportation costs?**

Transportation Cost Model Methods

Locating and Valuing Location Efficiency

- The “H+T Affordability Index” locates location efficiency through a single number:

the percentage of income a household, of a given size and income, would have to spend on housing and transportation in a particular neighborhood, e.g. 50%

Affordability Index Equation

$$\text{Affordability} = \frac{(\text{Housing Costs} + \text{Transportation Costs})}{\text{Income}}$$

Approach – Calculating the Index

- **Modeled Transportation costs**
 - The model estimates costs at the “neighborhood” level (census tract); which are otherwise not available
 - Incorporates auto use, auto ownership, and transit use based on the built environment and the household size and income.
- **Reported Housing costs and Income.**

Model Inputs

MODEL INPUTS

9 Independent Variables

7 Local Environment variables:

Households/residential acre
Household/total acre
Avg. block size in acres
Transit Connectivity Index
Distance to employment centers
Job density (jobs per square mile)
Access to amenities

2 Household variables

Household income
Household size

Proxies for convenience and accessibility

Model

MODEL RESULTS (Total Household Transportation Costs)

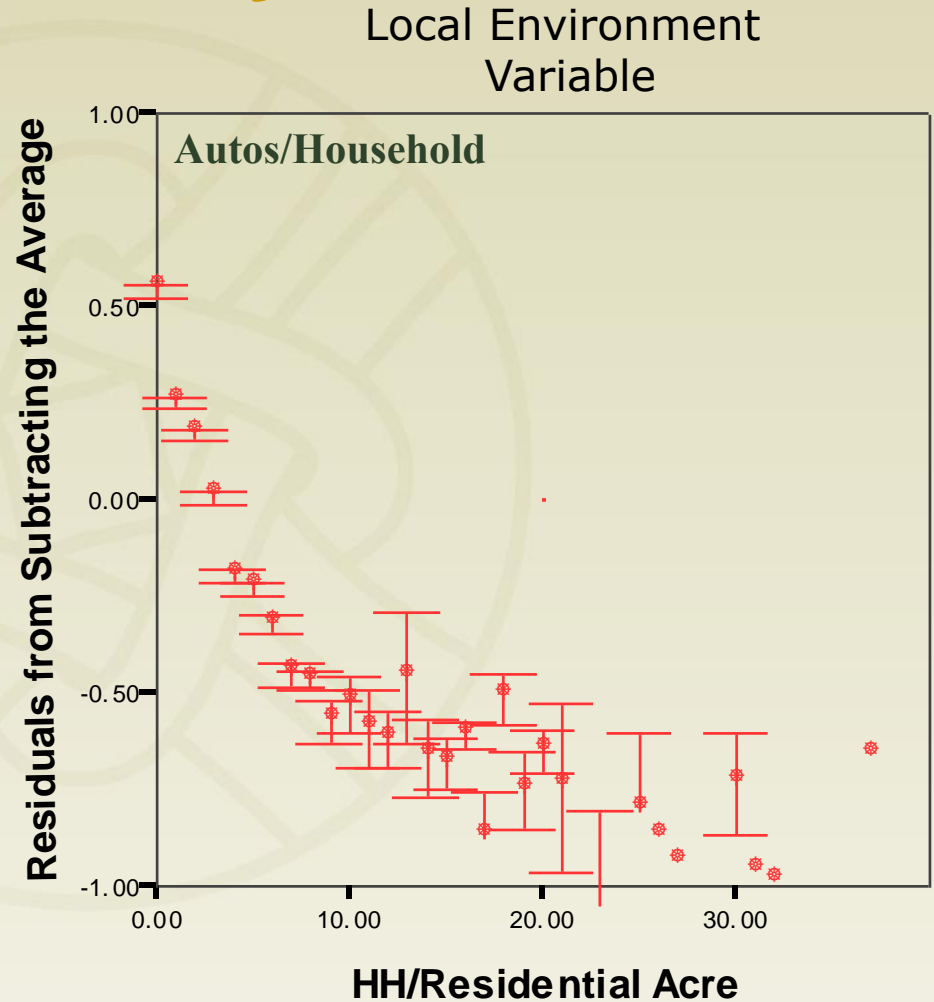
Auto ownership costs
+
Auto usage costs
+
Transit usage costs

Total Transportation Costs



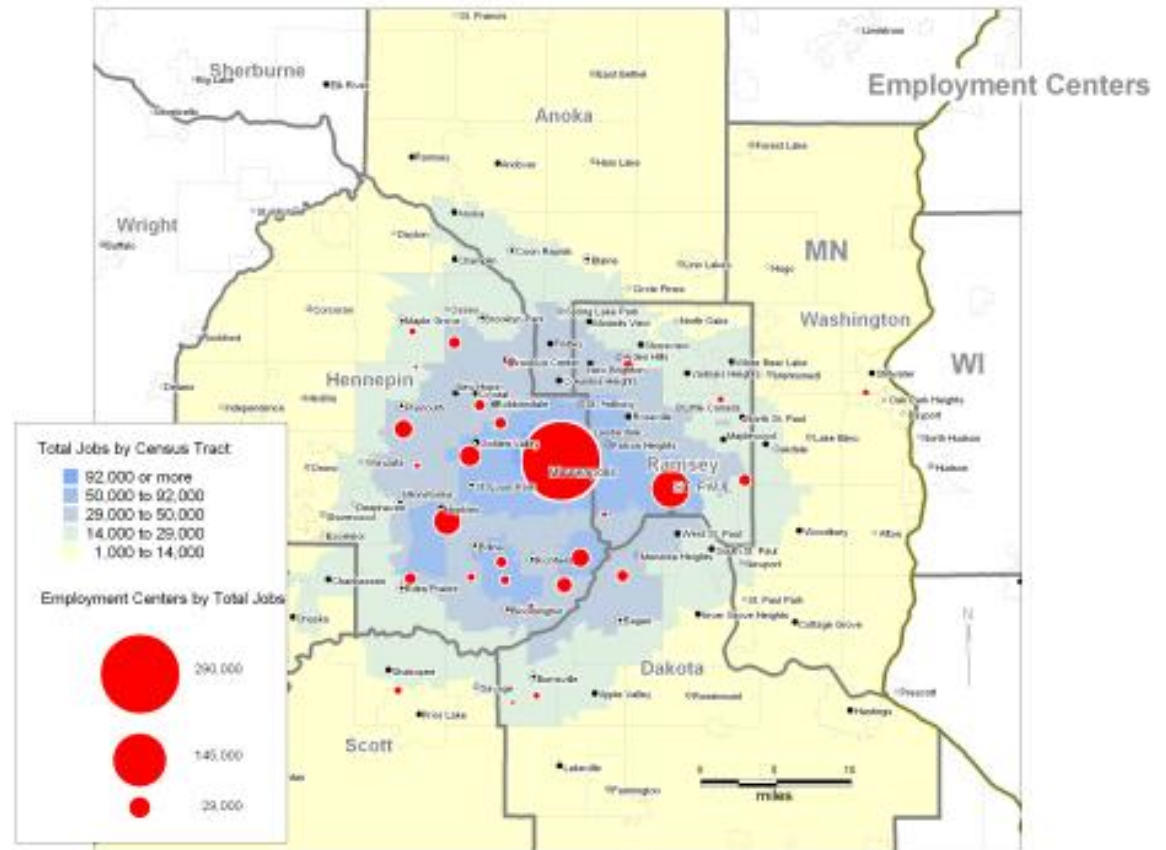
Independent Local Environment Variables – Density Measures

Variable	Source
Households per residential acre	Census 2000
Households per total acre	Census 2000



Independent Local Environment Variables – Access to Jobs and Amenities

Variable	Source
Distance to Employment Centers	Census Transportation Planning Package (CTPP) 2000 <i>Or LED</i>
Job Density- Number of jobs per square mile	Jobs and locations from CTPP 2000 <i>Or LED</i>
Access to amenities	Service jobs in CTPP 2000 <i>Or LED</i>

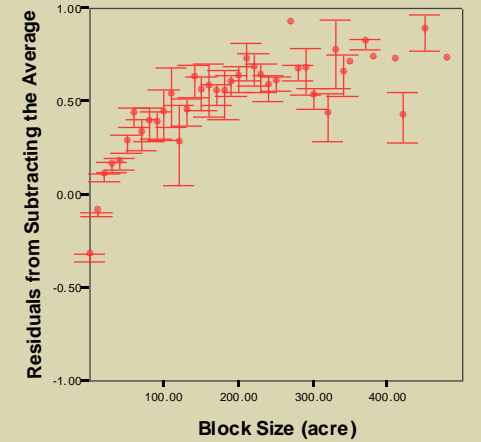
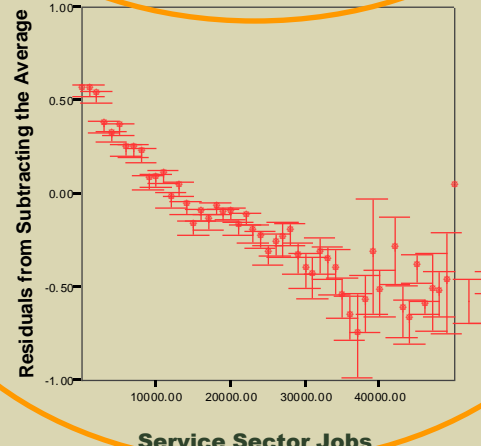
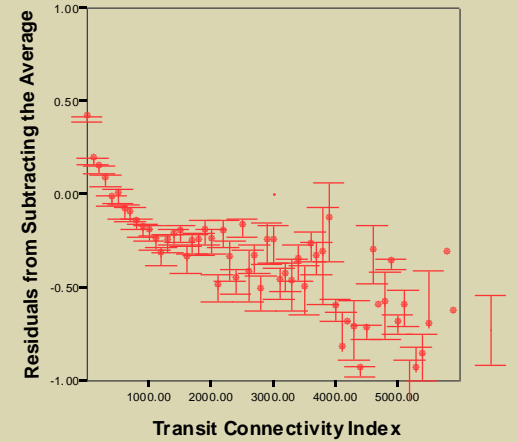
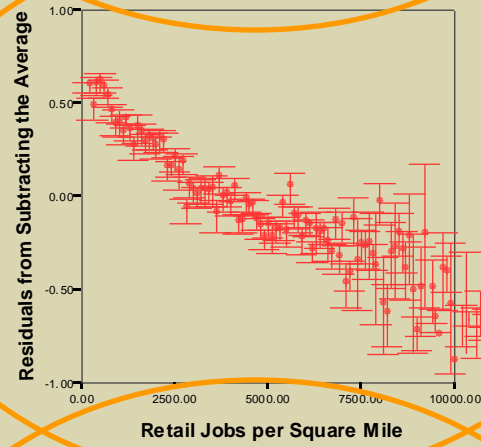
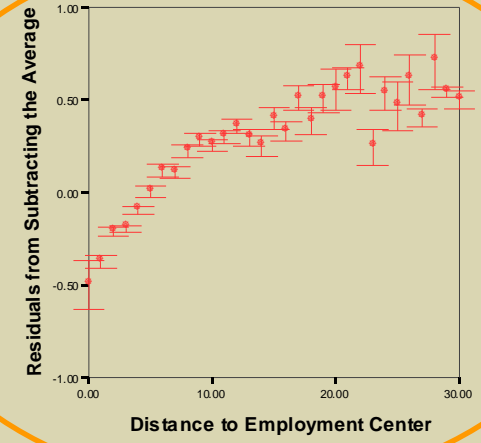
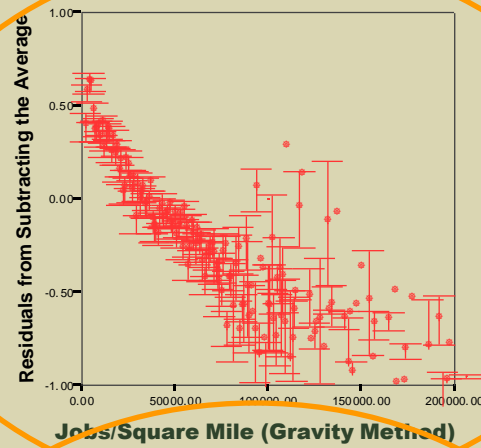
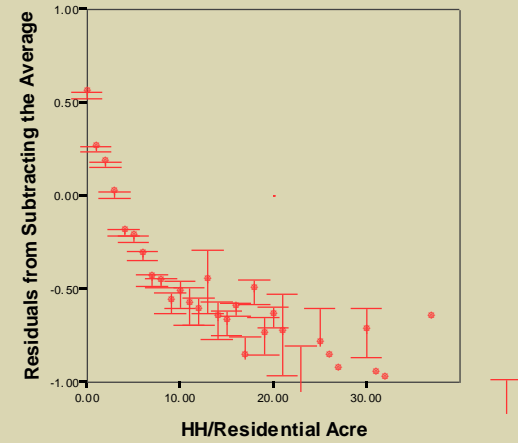


Model Mechanics

- Multiple regression modeling to “fit” each dependent variable to the independent variables;
- Then fit the household variables to the same independent variables;
- Found the 5 environment variables, and the two household variables were needed to optimize model;
- That is a total of 21 fits!
- We found that the Local Environment variables are more important than Household variables.

Seven Environment Variables

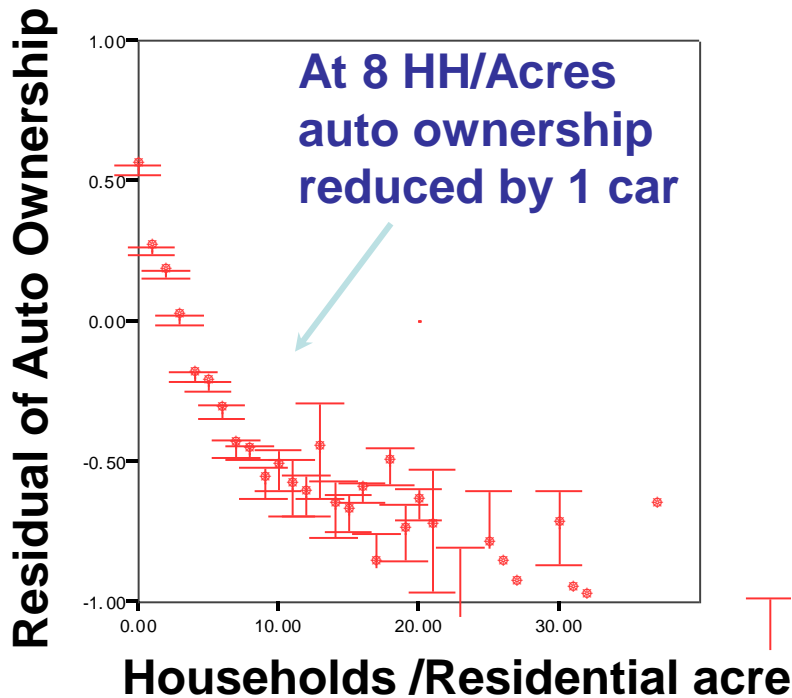
VS. Auto Ownership



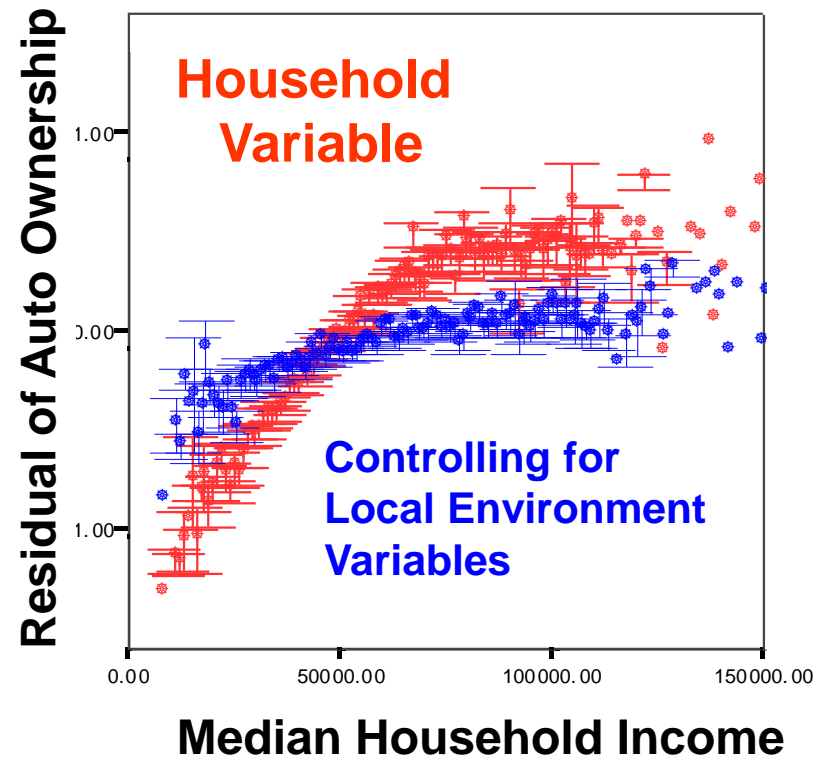
Model Mechanics

- Example of fit for Auto Ownership:

“Fit” Example for an Independent Variable



Fit of HH Variable Controlling for Local Environment Variables



Phase 2



Goals to Improve the Index

- **Modeled Transportation costs**
 - Incorporate other environment and household variables to increase precision of model.
 - Opportunities to improve fits.
 - Look at cost in more detail.
- **Develop Website so People Could find their Affordability Index**
 - How do we bring the index into using today's local environment variables?
- **Develop advisory board to develop strategies for implementation**

Model Inputs Phase 2

MODEL INPUTS

9+? Independent Variables

Local Environment variables:

Households/residential acre

Household/total acre

Avg. block size in acres

Transit Connectivity Index (Available?)

Distance to employment centers

Job density (jobs per square mile)

Access to amenities

Actual Commute Distance

Others?

Household variables

Household income

Household size

Number of Workers per HH

Others?

**Enhanced
Model**

MODEL RESULTS (Total Household Transportation Costs)

Auto ownership costs

+

Auto usage costs

+

Transit usage costs

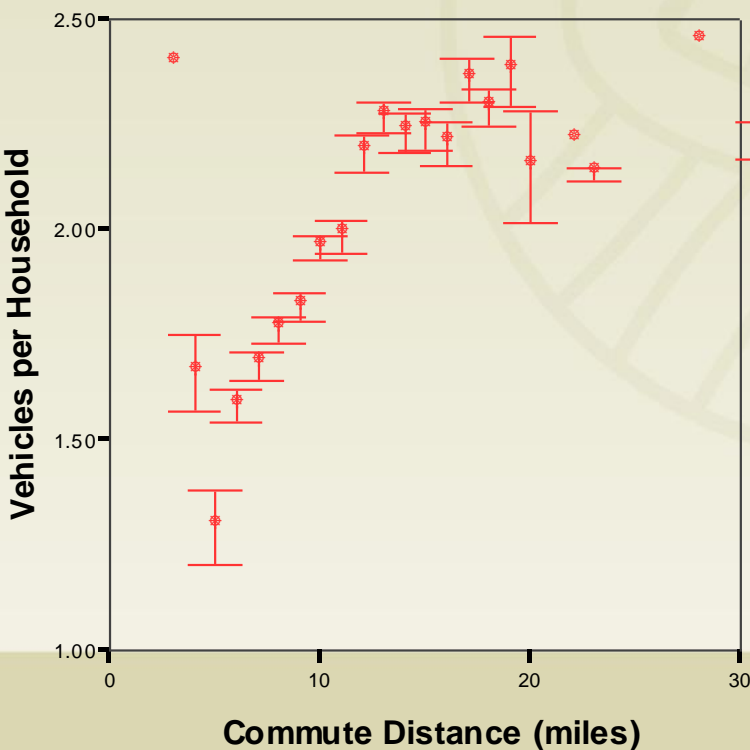
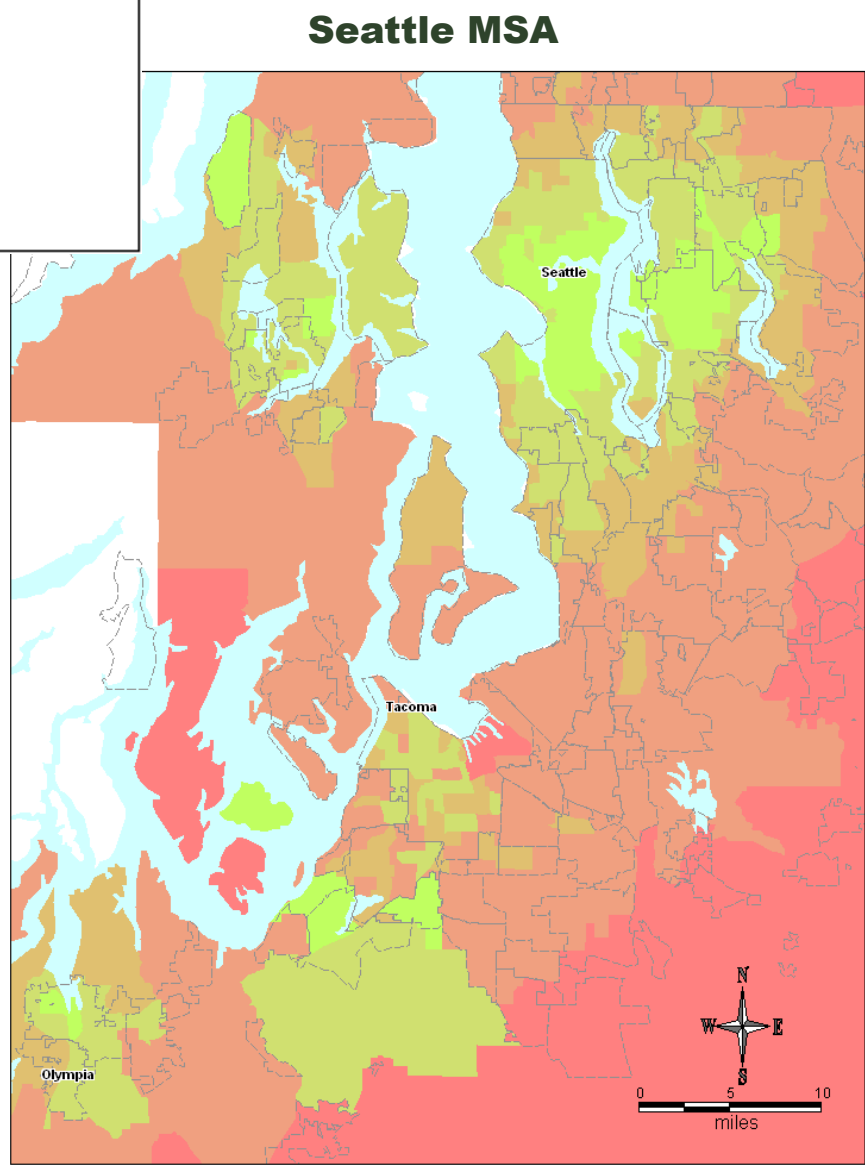
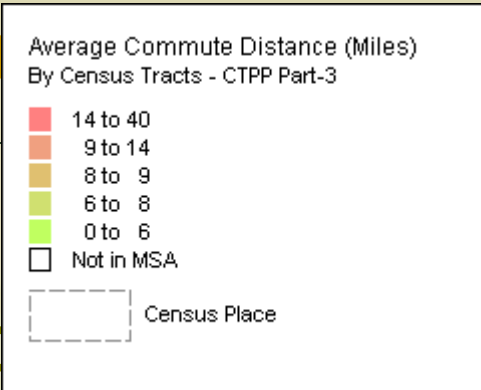
Total Transportation Costs



Other Environm

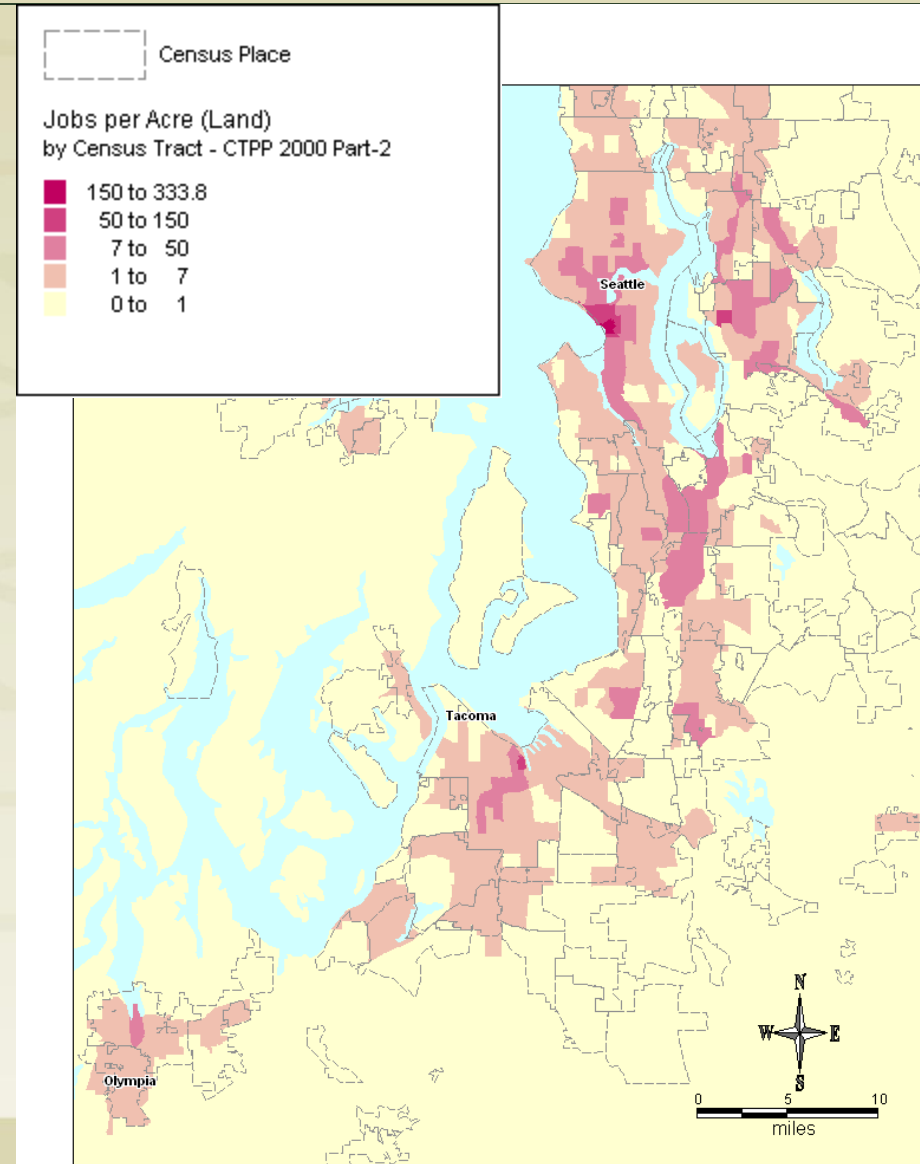
Household Variables

- Commute Distance
- Using CTPP (or LEDS) Part-3 (OD) tables to get “as the crow flies distance” and obtain weighted average.



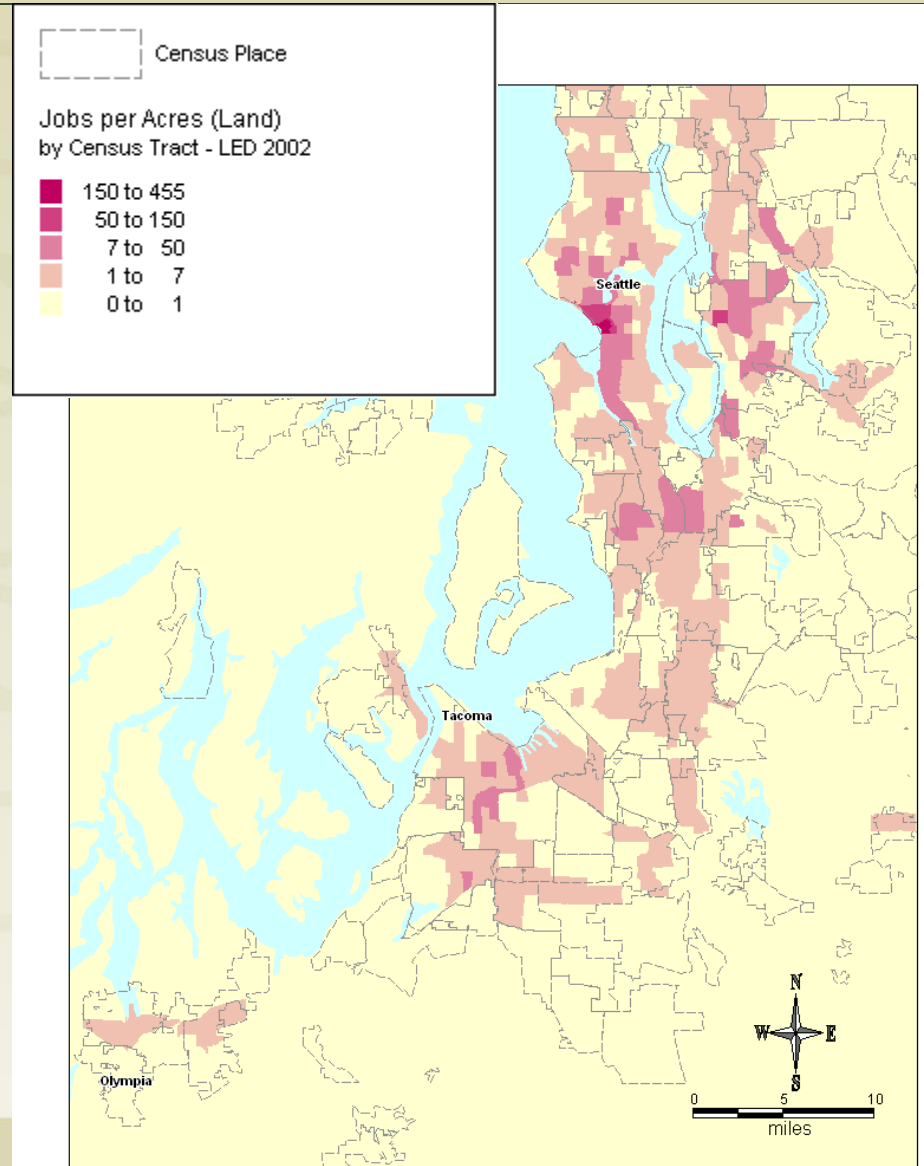
Index Using *Today's* Local Environment Variables

- Obvious place to start is employment data from LED!
- We only have access right now to OR, TX and WA
- For only years 2002, and 2003
- Just starting to work with it.
- Start with some employment changes
- Jobs per Acre – 2000 CTPP



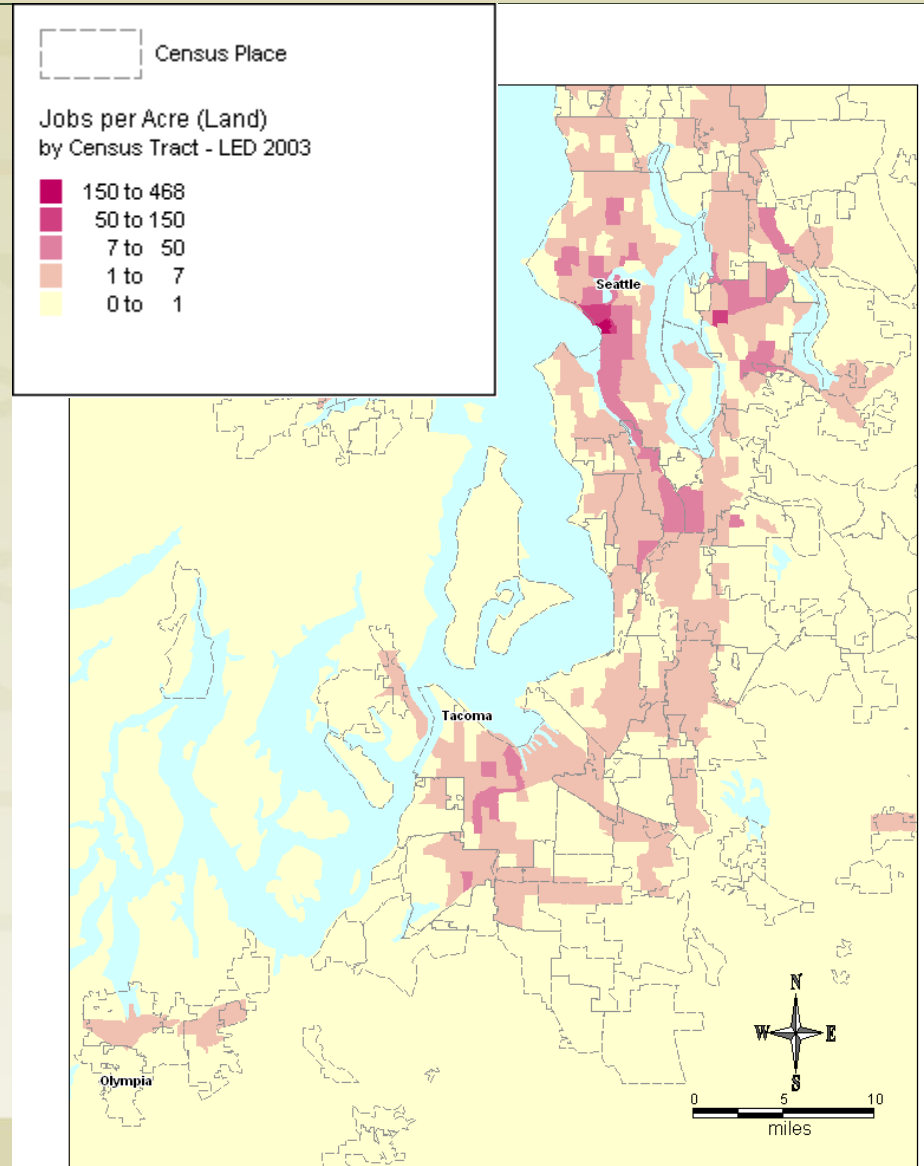
Index Using *Today's* Local Environment Variables

- Jobs per Acre – 2002 LED



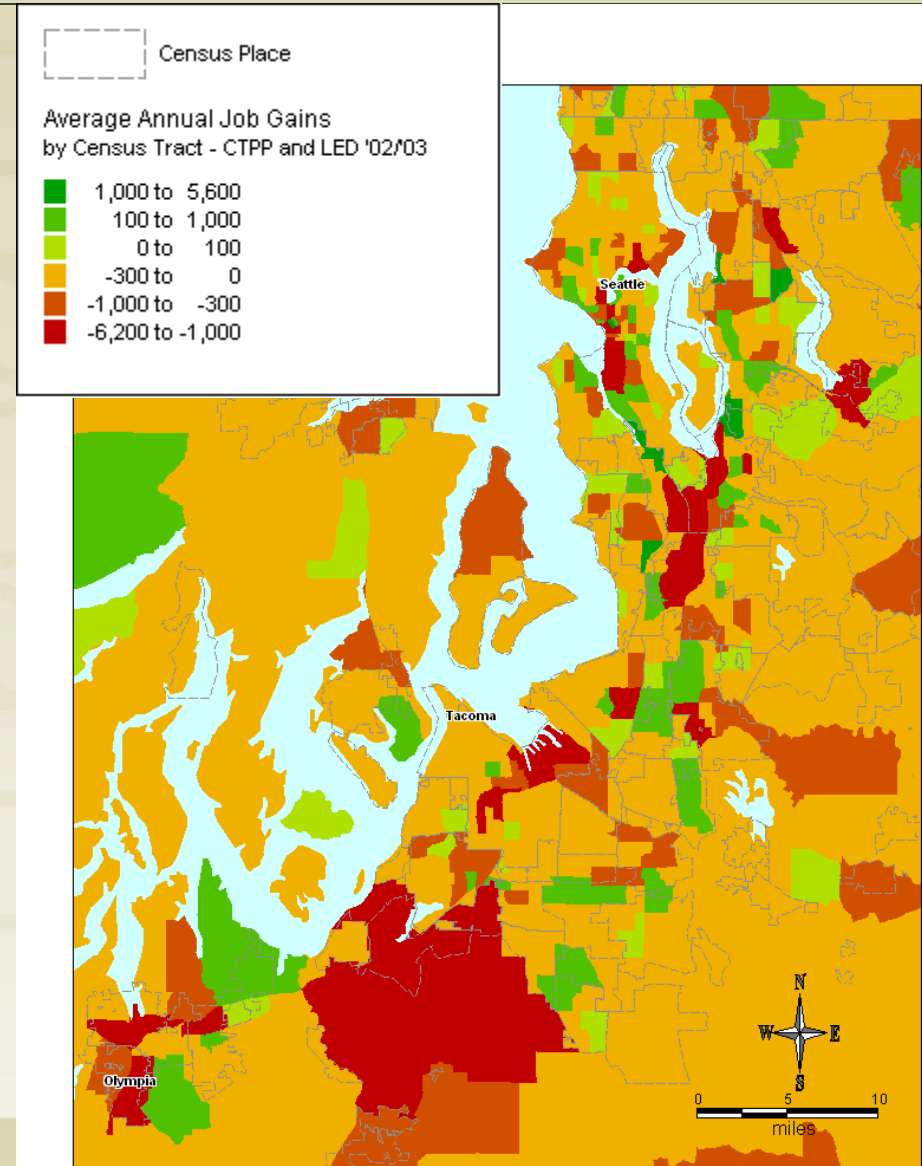
Index Using *Today's* Local Environment Variables

- Jobs per Acre – 2003 LED



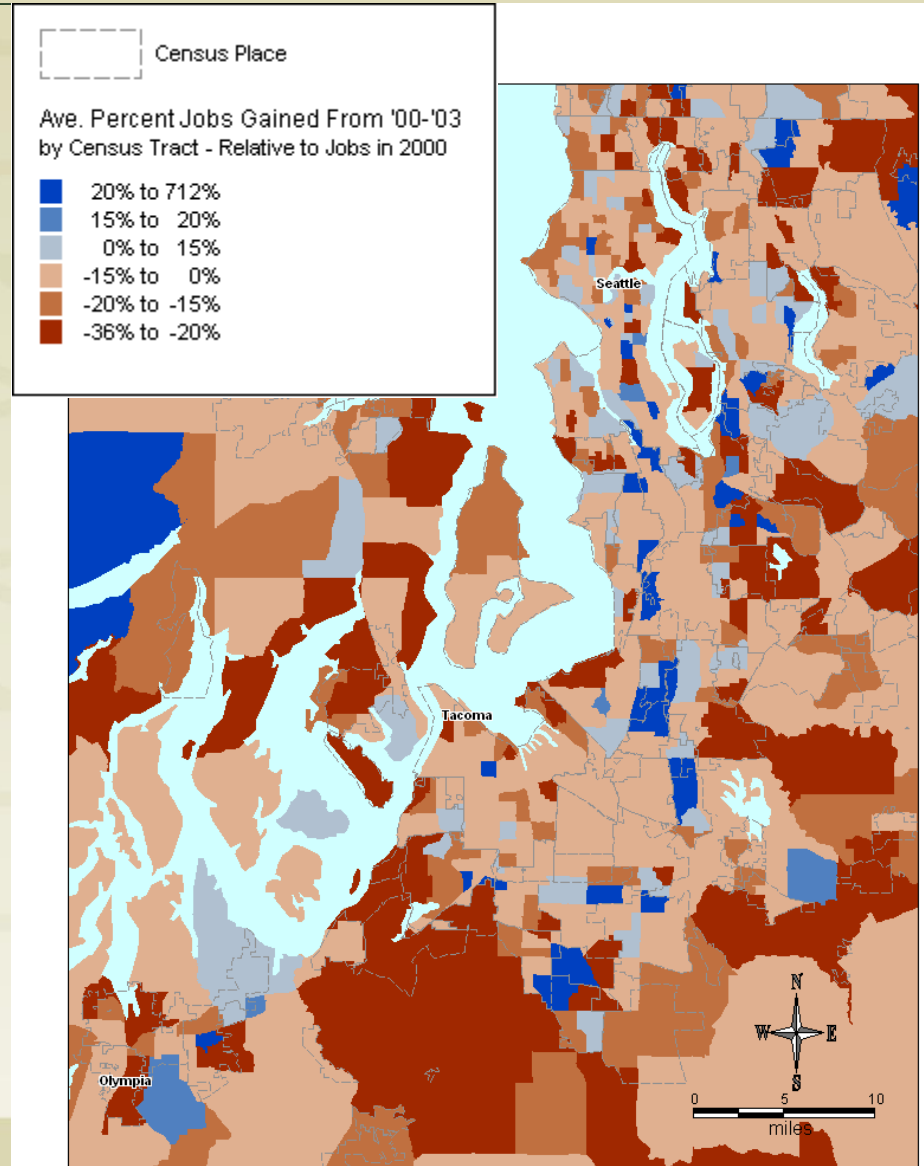
Index Using *Today's* Local Environment Variables

- Average annual increase in raw numbers of jobs



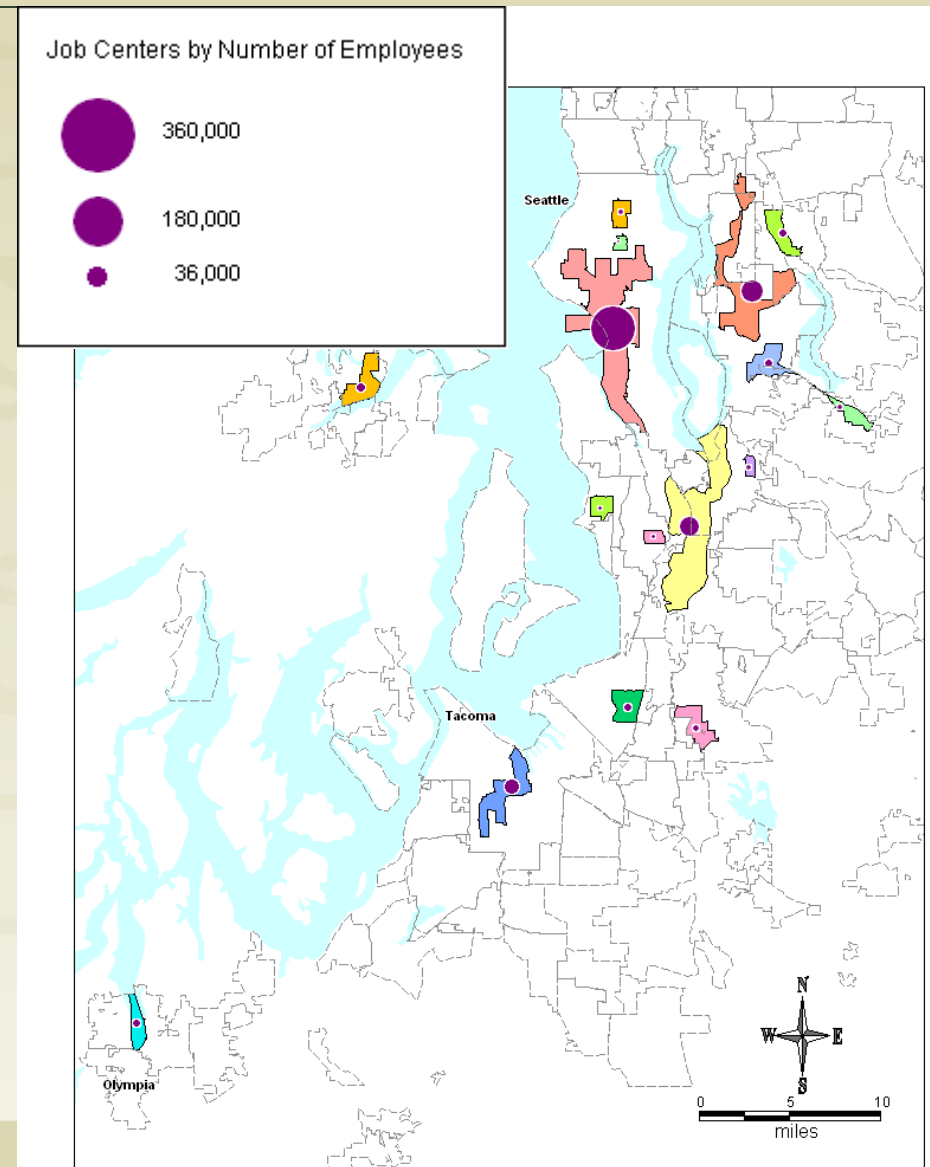
Index Using *Today's* Local Environment Variables

- Average annual percent increase in jobs



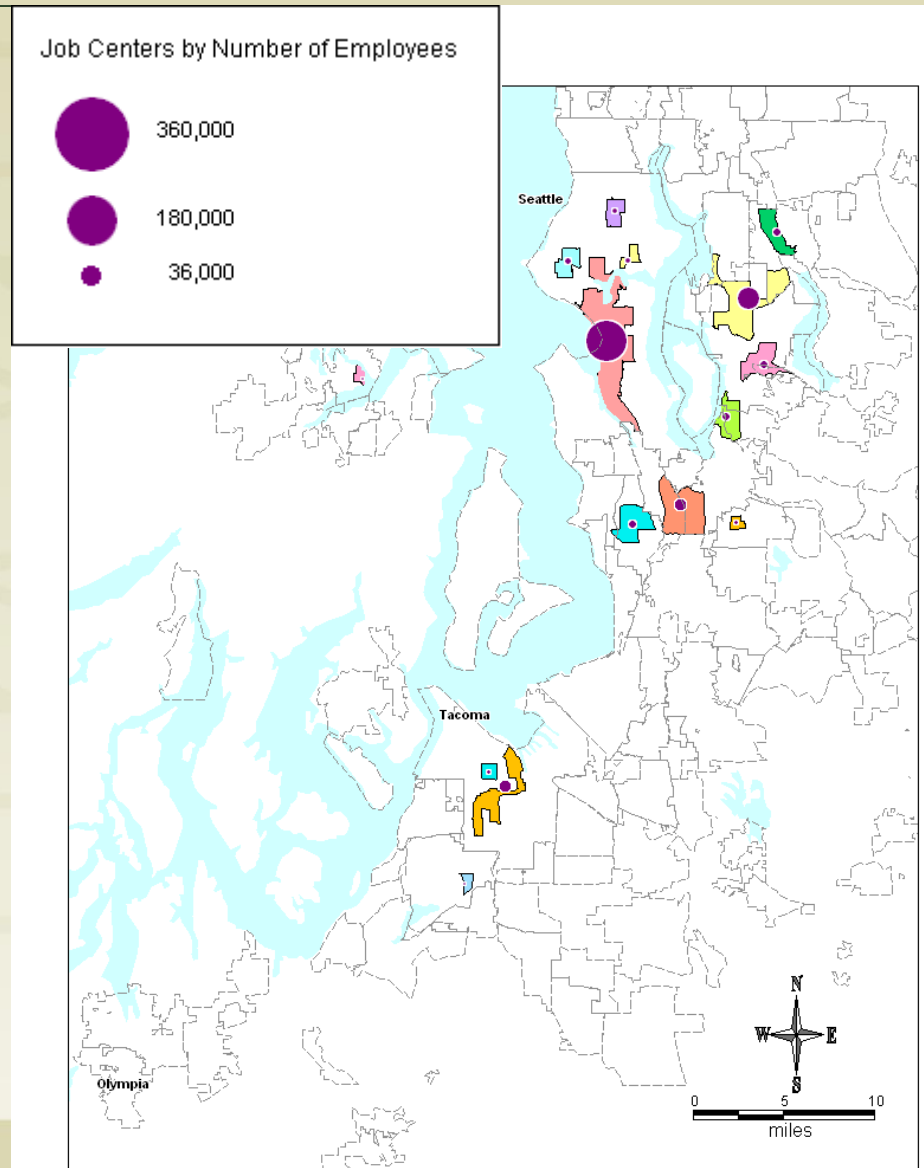
Index Using *Today's* Local Environment Variables

- **Employment Centers:**
 - Using CTPP and/or LED look at how tracts cluster with employment density of greater than 7 jobs/acre.
 - Then we use only the centers of greater than 5,000 employees.
- **2000 Job Centers by number of employees.**



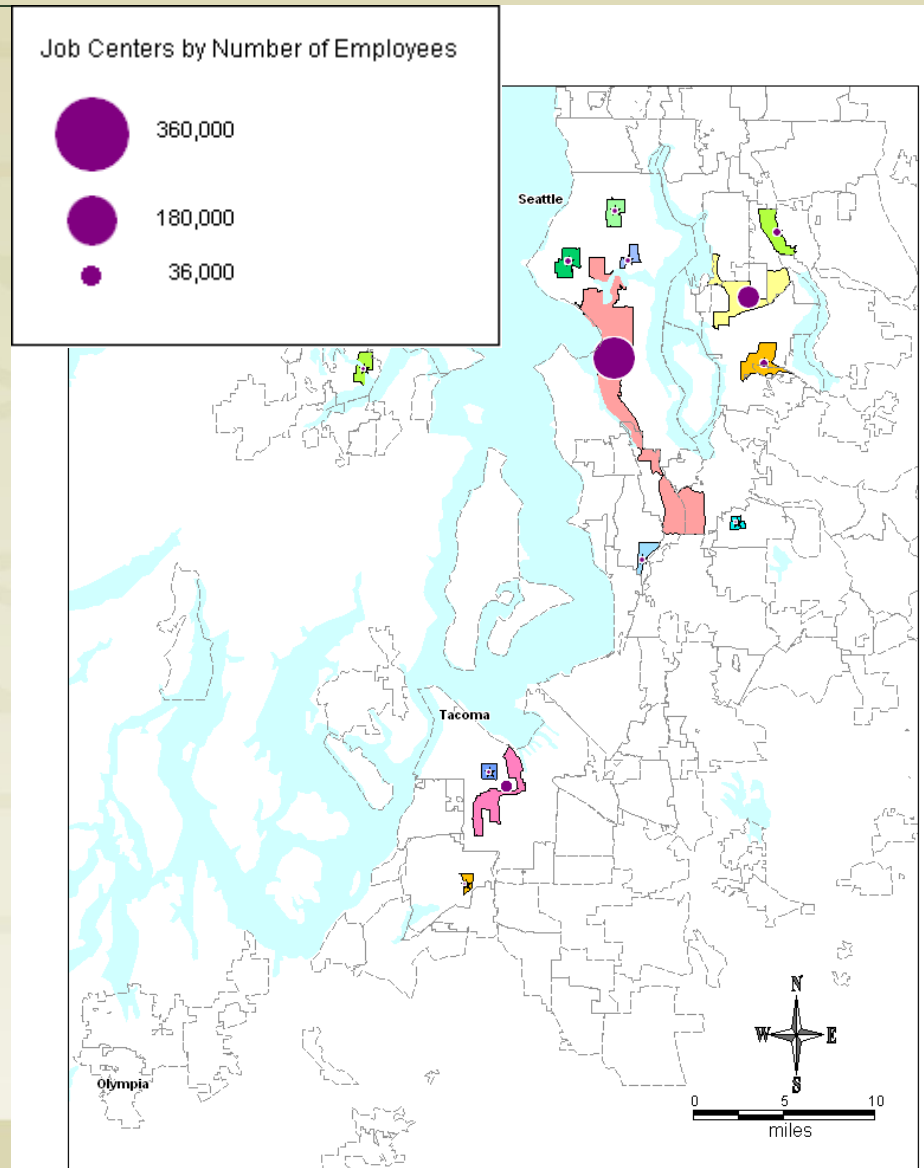
Index Using *Today's* Local Environment Variables

- 2002 Job Centers



Index Using *Today's* Local Environment Variables

- 2003 Job Centers



Questions for Further Research

- **How do these changes effect our transportation cost model?**
- **Area these changes typical of metropolitan regions?**
- **What happens to the regional job centers over this period of time?**

Future Work

- **First get better access to the LED data.**
- **Finish modeling the different metropolitan area types.**
- **Develop a real time link with LED data (web service ???).**
- **Finish research.**
- **Develop Website.**
- **Release Website (March '07).**
- **Develop strategies for change.**