Houses from Outer Space

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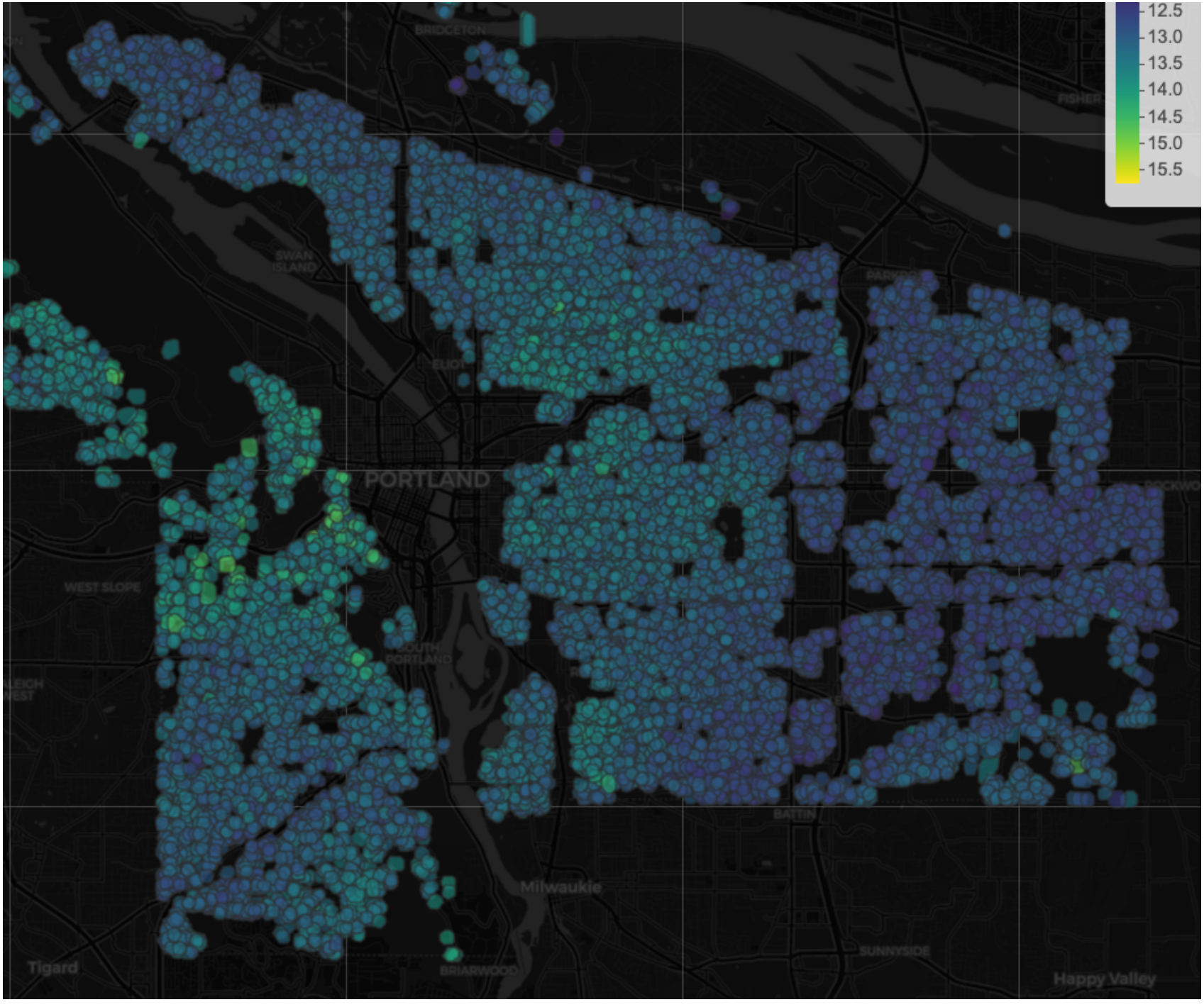
1 of many thesis problems

Goal: estimate the value added or subtrated from a few dozen environmental land constraints

Method: let's use the hedonic price method and estimate the effect of each constraint with OLS! Not so fast...


12.5
13.0
13.5
14.0
14.5
15.0
15.5
BRIDGETON
FISHER
SWAN ISLAND
PARKROSE
ELIOT
PORTLAND
ROCKWOOD
WEST SLOPE
SOUTH PORTLAND
BATTIN
Milwaukie
SUNNYSIDE
Tigard
BRIARWOOD
Happy Valley

What is spatial autocorrelation?

- The degree to which two observations at a spatial location are similar to one another

What breaks?

- *Lag:* how do neighboring property values affect me
  - Biased coefficient estimates from OLS
- *Correlated errors:* model over/under predicts in spatial clusters
  - OLS p-values can't be trusted! :-(

Potential remedies

- Spatial dummies for local neighborhoods
  - Ex: census tracts, neighborhood associations, zip codes, school districts
  - Can mitigate omitted-variable bias
  - Tradeoff shrinking nbhd size reduces bias but reduces identifying variation in amenity (increasing variance)
- Model the correlation explicitly using spatial error or lag models

Option 1

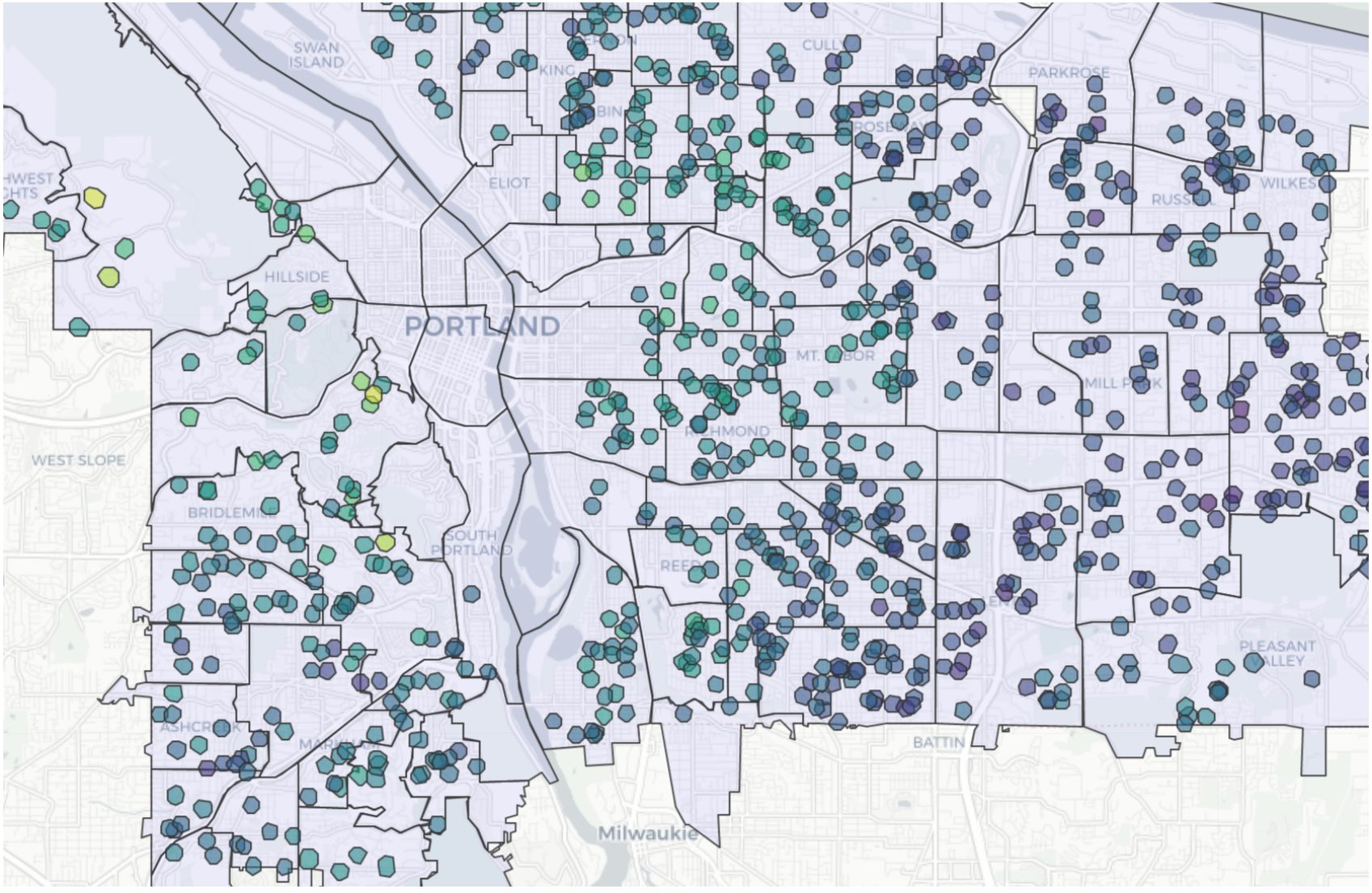
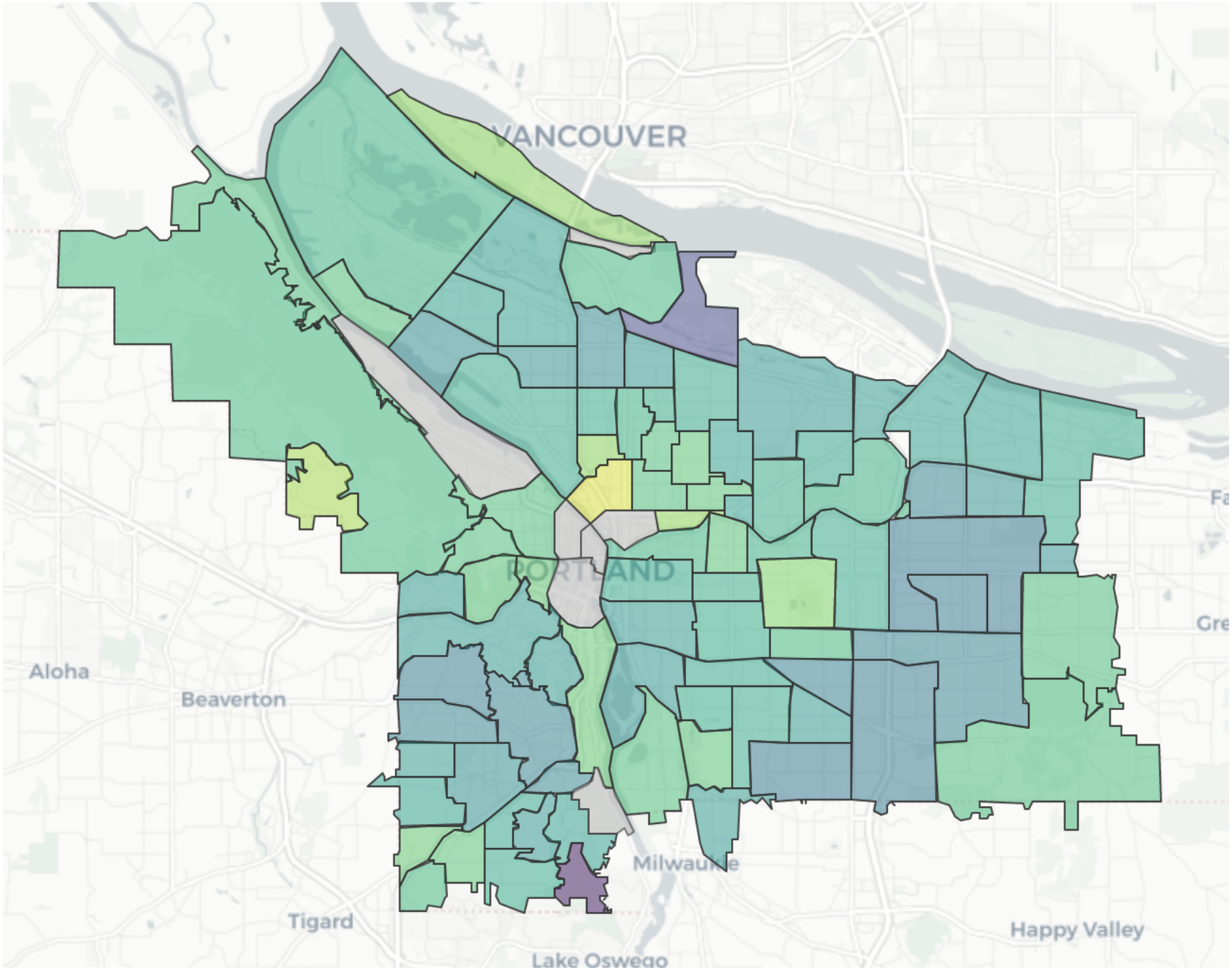


Figure 2: Dummy boundaries


VANCOUVER
PORTLAND
Aloha
Beaverton
Tigard
Milwaukie
Lake Oswego
Happy Valley

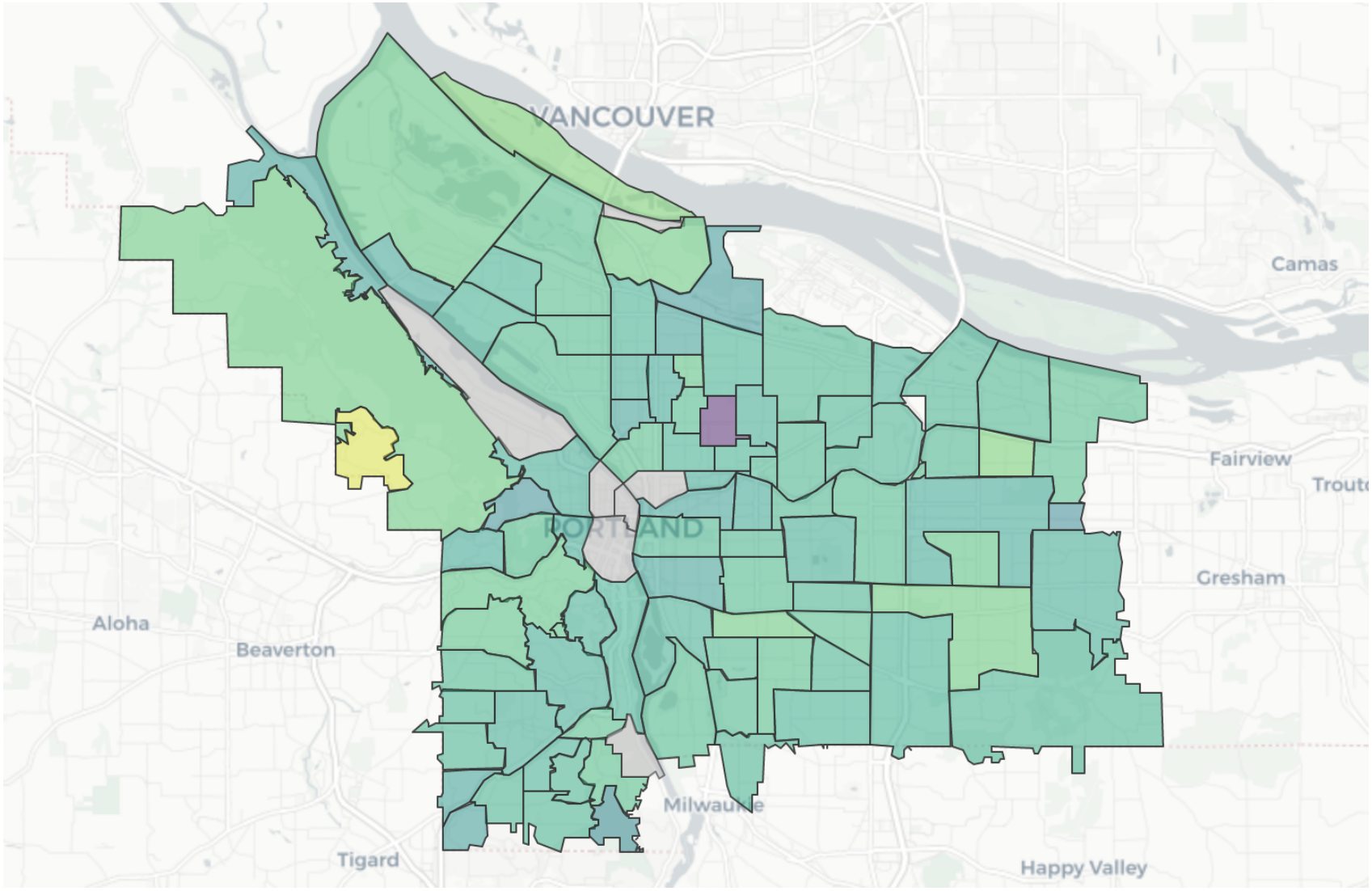


Figure 4: Residual map with spatial dummies

- This looks better, but is there still evidence of correlation?

Use Moran I