

# ECON 0150 | Economic Data Analysis

*The economist's data analysis pipeline.*

*Part 2.3 | Relationships In Space*

# Exercise: Restaurants by Zipcode

*Are there fewer restaurants further from downtown Pittsburgh?*

We're going to use Census maps and openly available data on restaurant locations to answer this question.

- *Data: Census Shapefiles and Open Street Maps*

# Geographic Data

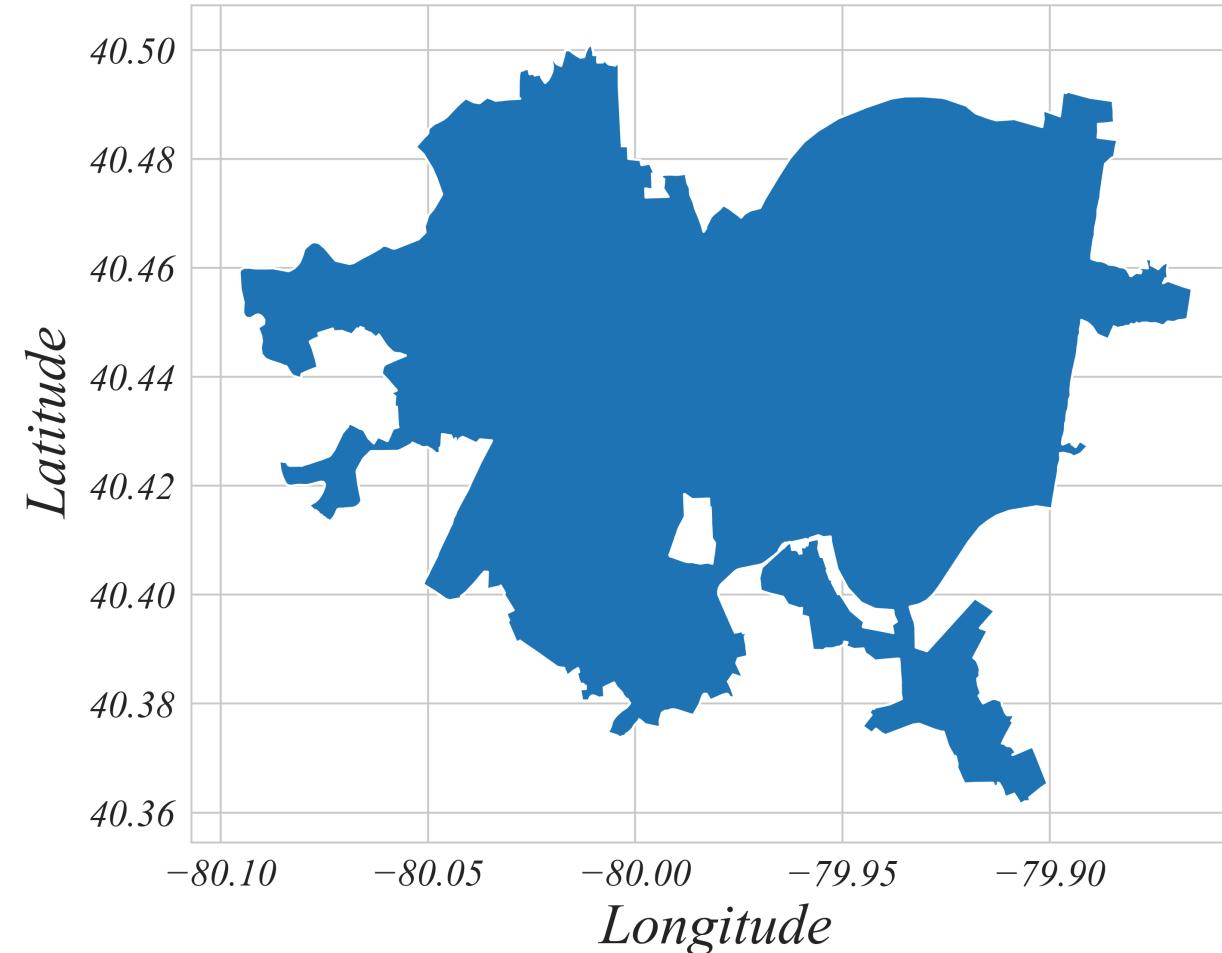
*Some types of relationships in space*

- *Geographic data is data organized on three axes (latitude, longitude, altitude)*
- *We typically only use latitude and longitude*
- *Geo data is often combined with other variables like population*
- *Two main types of geo data: points, shapes*
- *We sometimes observe points, but most data comes in groups*

# Geographic Data

*Maps are (typically) plots on two axis*

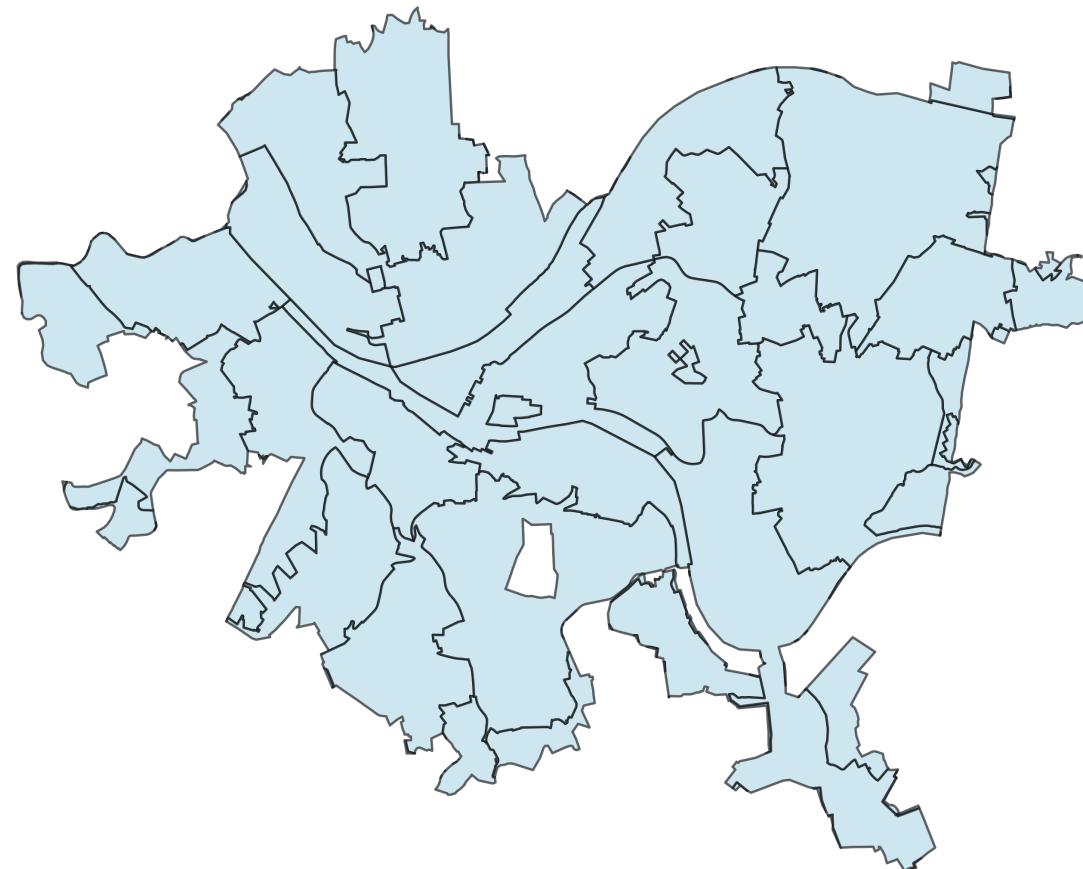
> a basic map of Pittsburgh



# Geographic Data

*Maps can show any level of detail available in the data*

> *a map of Pittsburgh Zipcodes*



# Geographic Data

*We can add information: colors*

> a map of Pittsburgh Zipcode populations



# Geographic Data

*We can add information: colors*

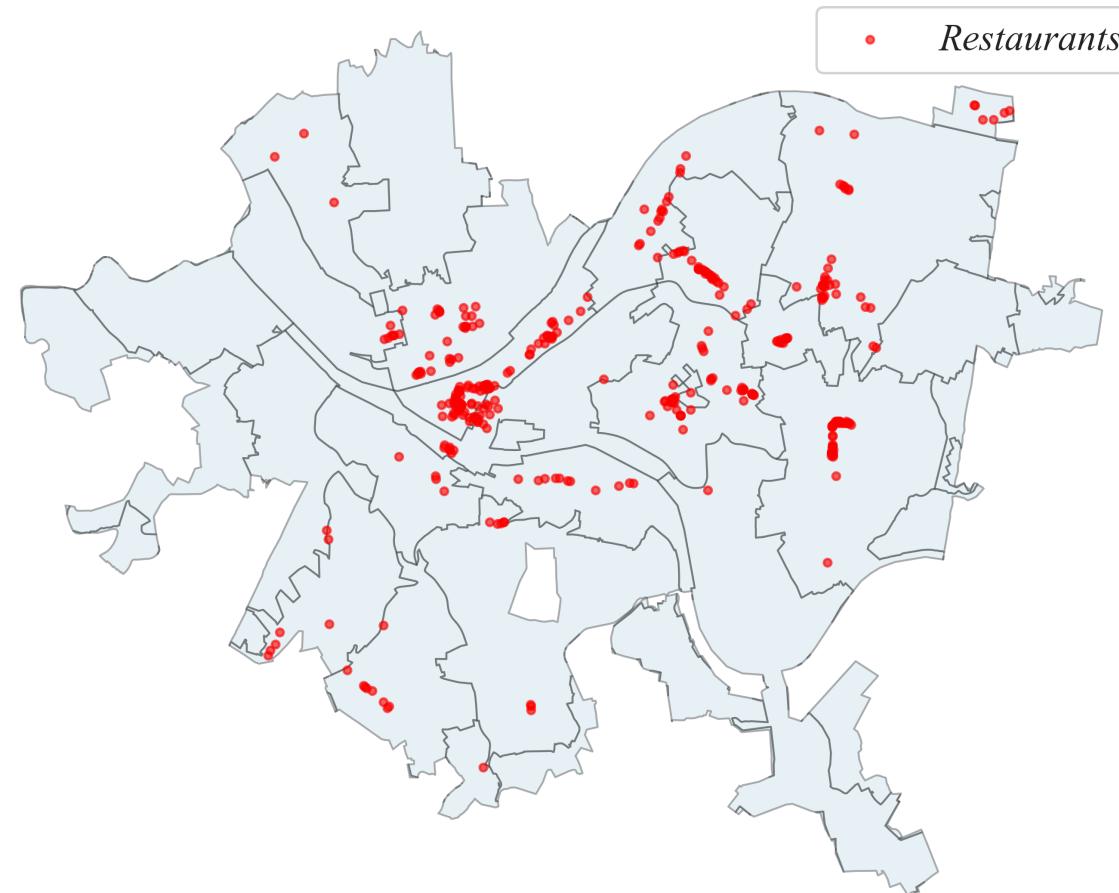
> *a map of Pittsburgh Zipcode populations: interactive!*



# Geographic Data

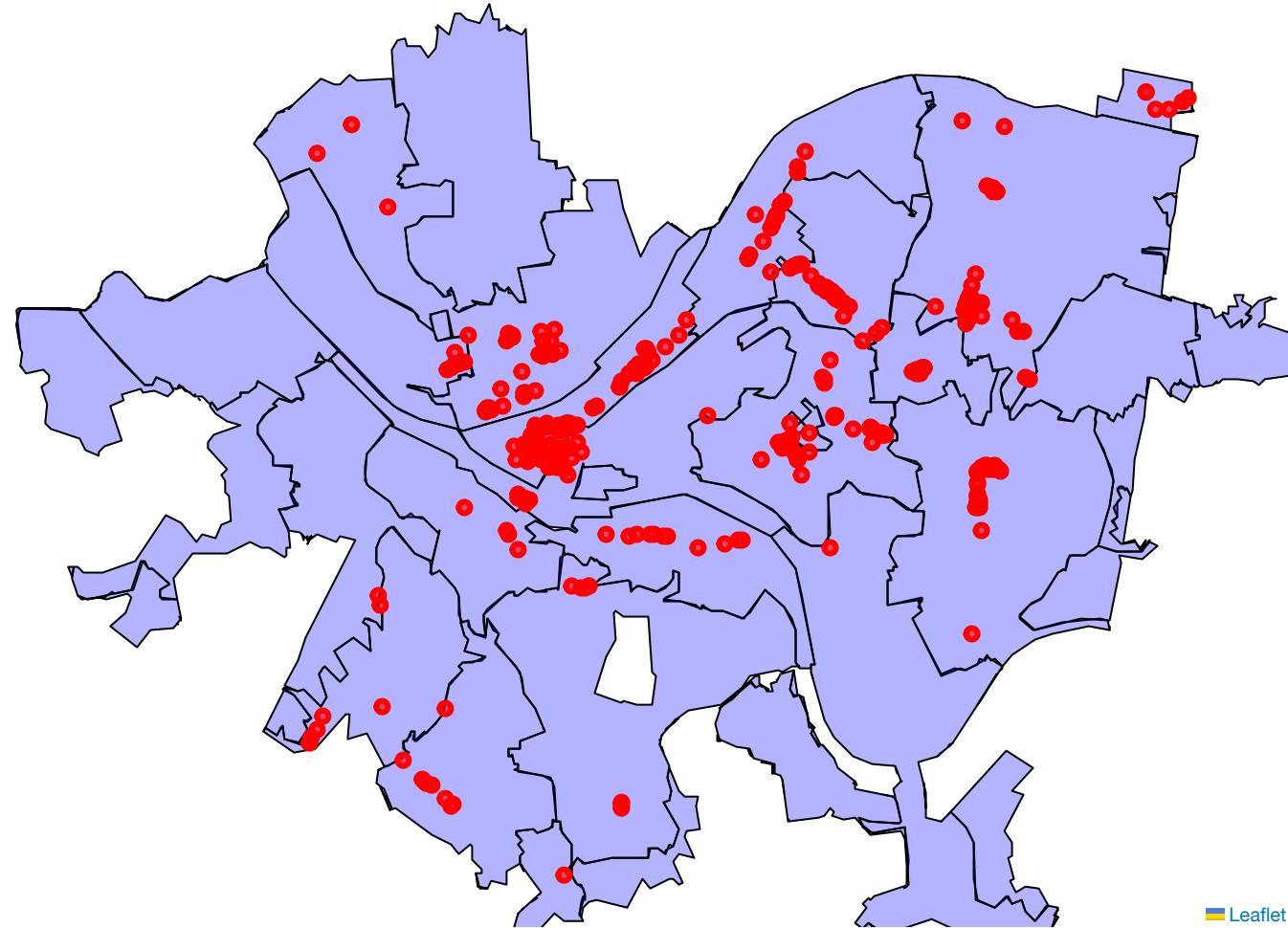
*Maps can also show points*

> *some restaurants in Pittsburgh!*



# Geographic Data

*Maps can also show points*



Leaflet | © OpenStreetMap contributors

# Geographic Data

*Maps can also show points*

- *Points are nice but we typically can't use them raw*
- *Some point transformations: distances between points; group by area; etc*
- *We can also relate points to other variables (eg. zipcode population for each restaurant)*

# Geographic Data Example: Nunn (2008)

*Did the historical trade of enslaved people impact modern economic development in Africa?*

**Method:** Uses historical data and the distance from major ports

**Findings:** Areas more disrupted by enslavement have lower GDP today, due to:

- *Weakened institutions (political fragmentation, mistrust).*
- *Disrupted societies (population loss, economic stagnation).*

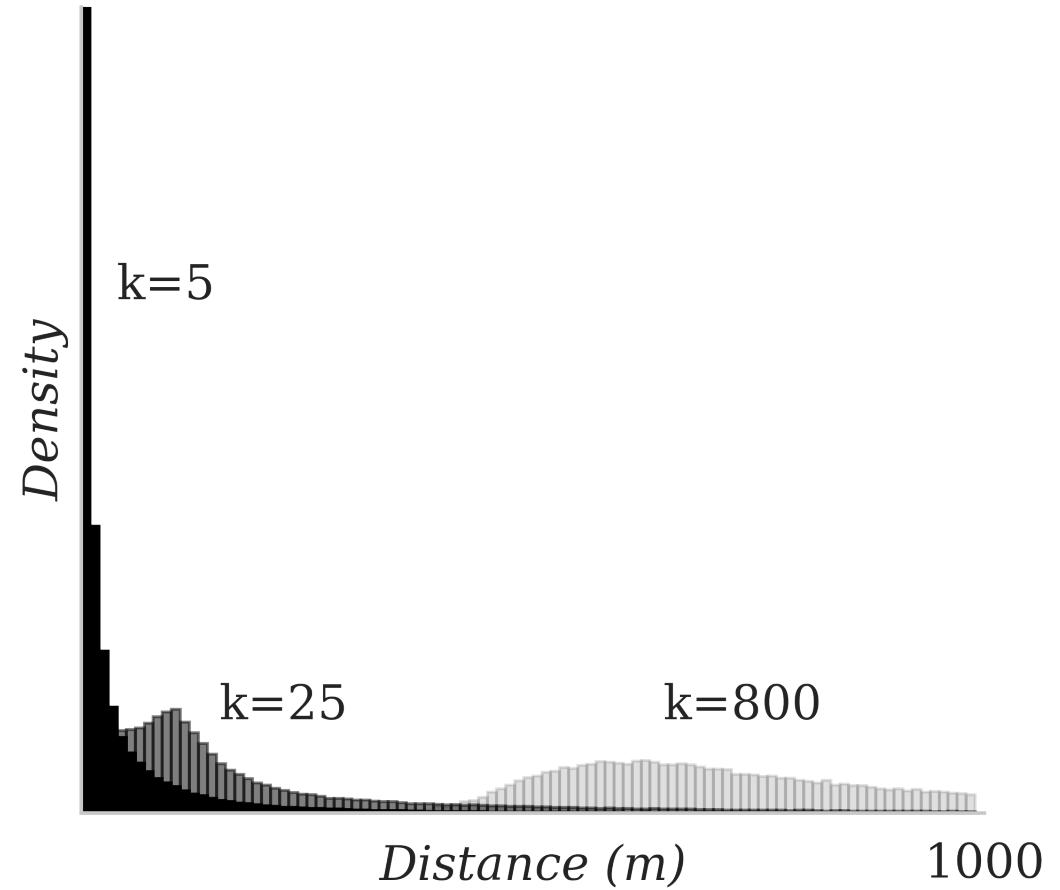
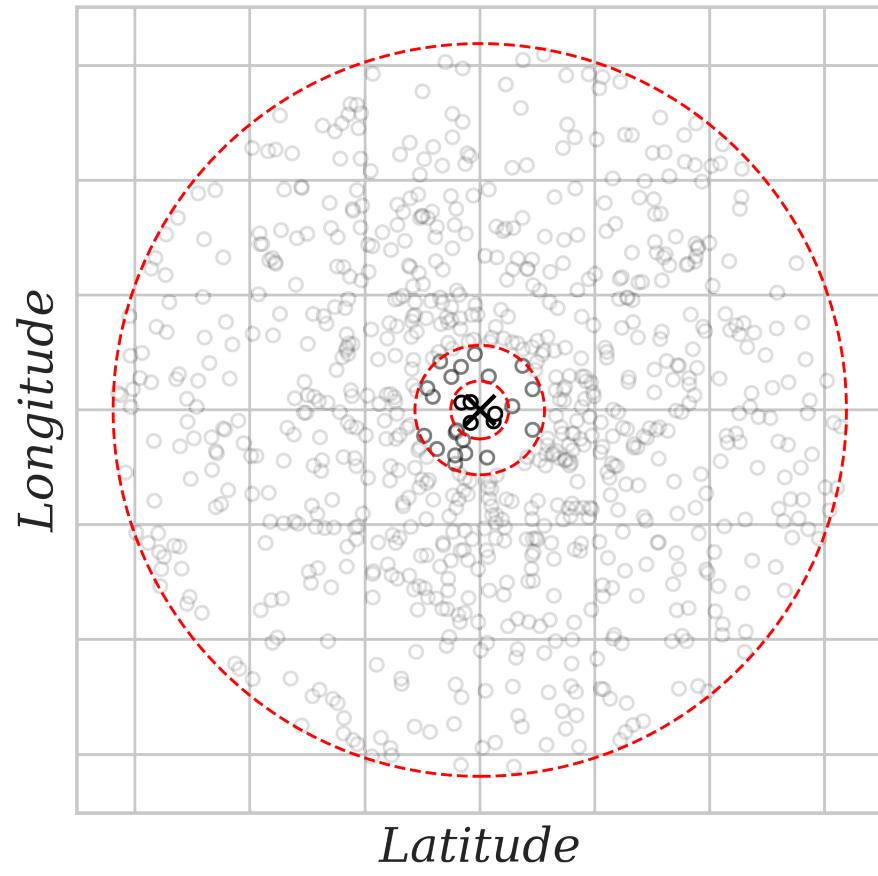
**Implication:** Historical shocks can have persistent economic effects.

# Geographic Data Example: Weidman (2024)

*Does the party of your neighbors impact your decision to vote?*

# Geographic Data Example: Weidman (2024)

*My dissertation involved measuring distances between voters*



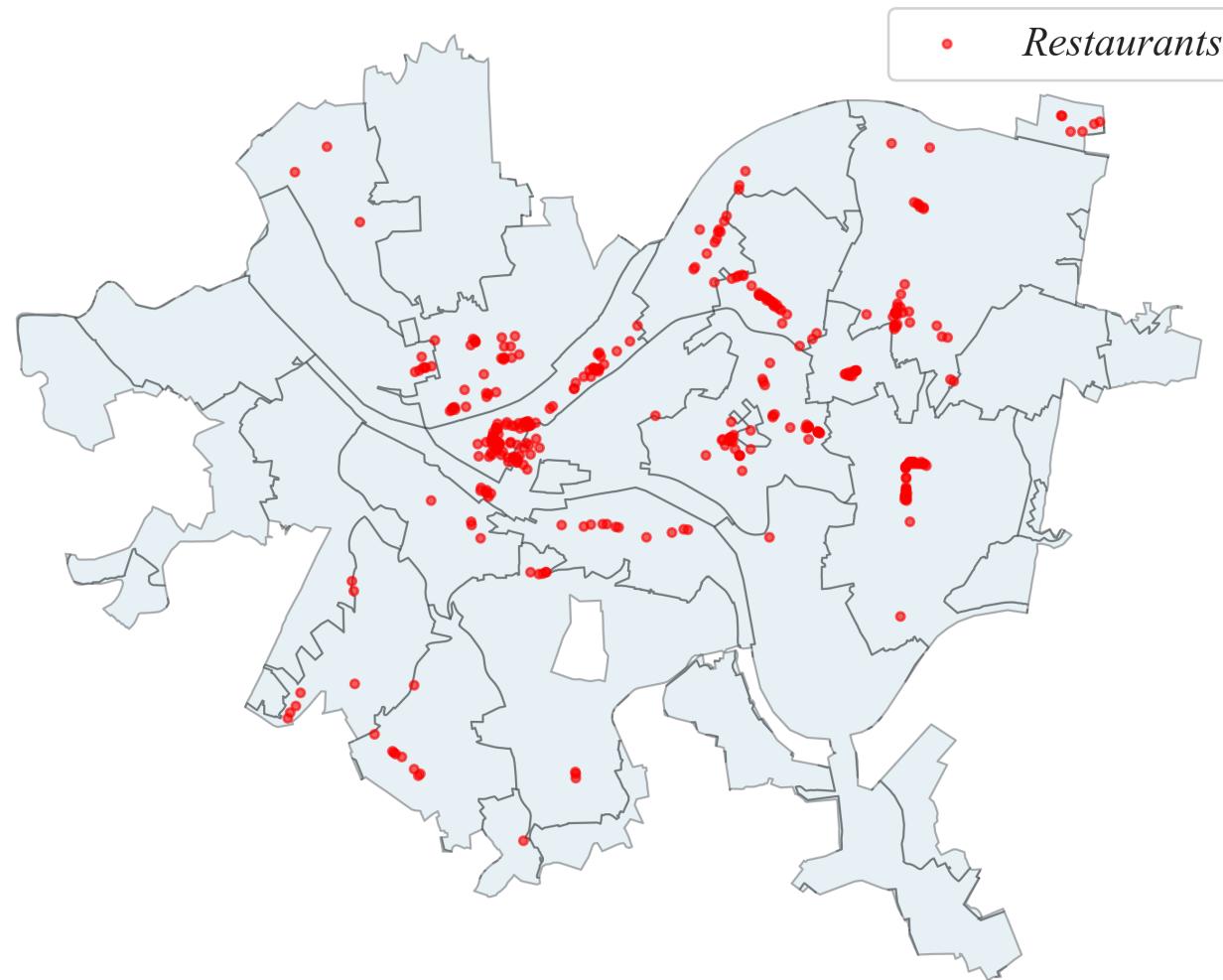
# Geographic Data

*Are there fewer restaurants further from downtown Pittsburgh?*

*> lets get back to our question!*

# Geographic Data

*Are there fewer restaurants further from downtown Pittsburgh?*



# Geographic Data

*Are there fewer restaurants further from downtown Pittsburgh?*

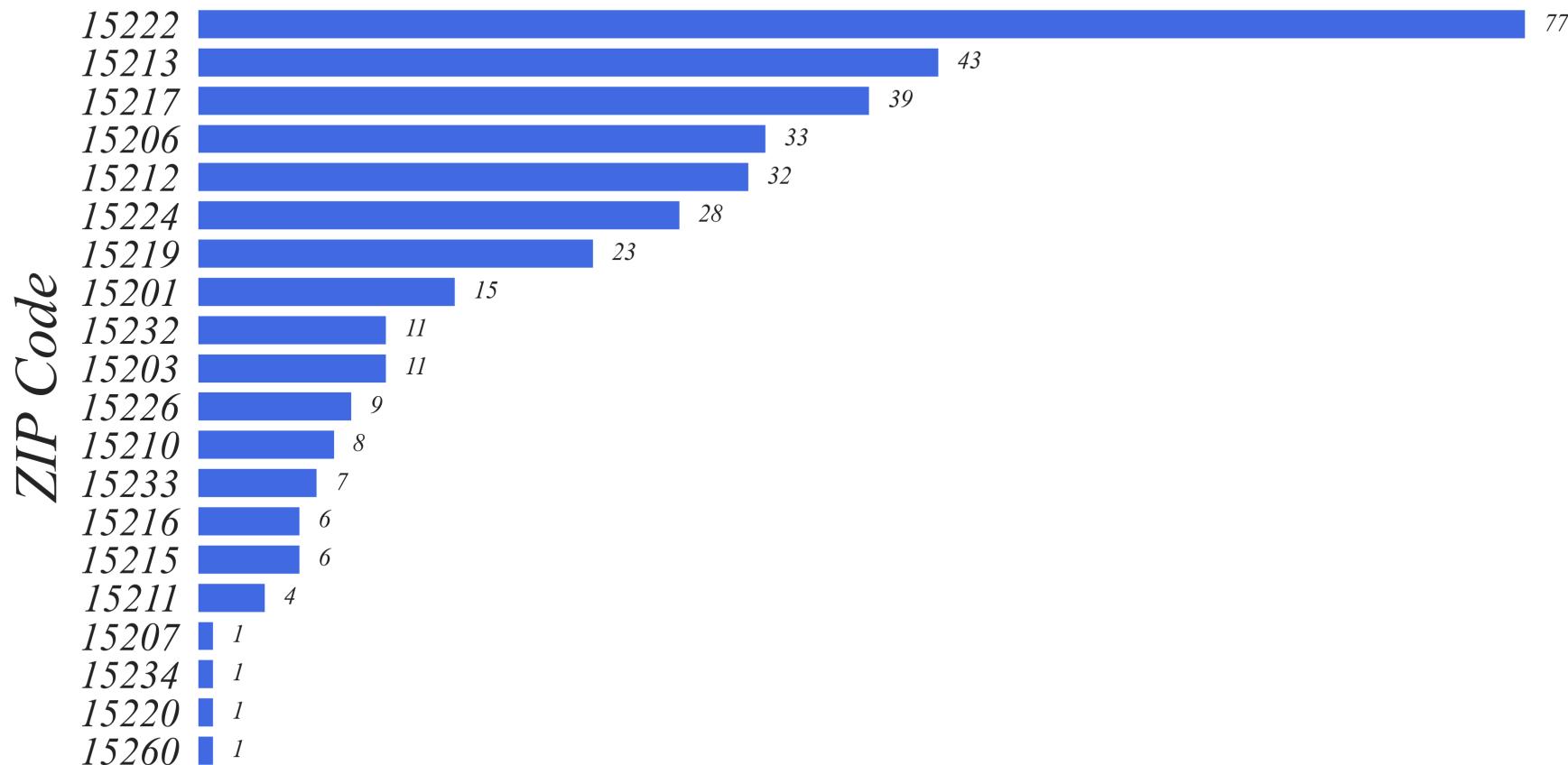
## Steps:

- *Measure points by zipcode area*
- *Measure distances between groups (take the centroid, etc)*

# Geographic Data

*Subquestion 1: how many restaurants are in each Pittsburgh zipcode?*

## *Number of Restaurants by ZIP Code in Pittsburgh*



# Geographic Data

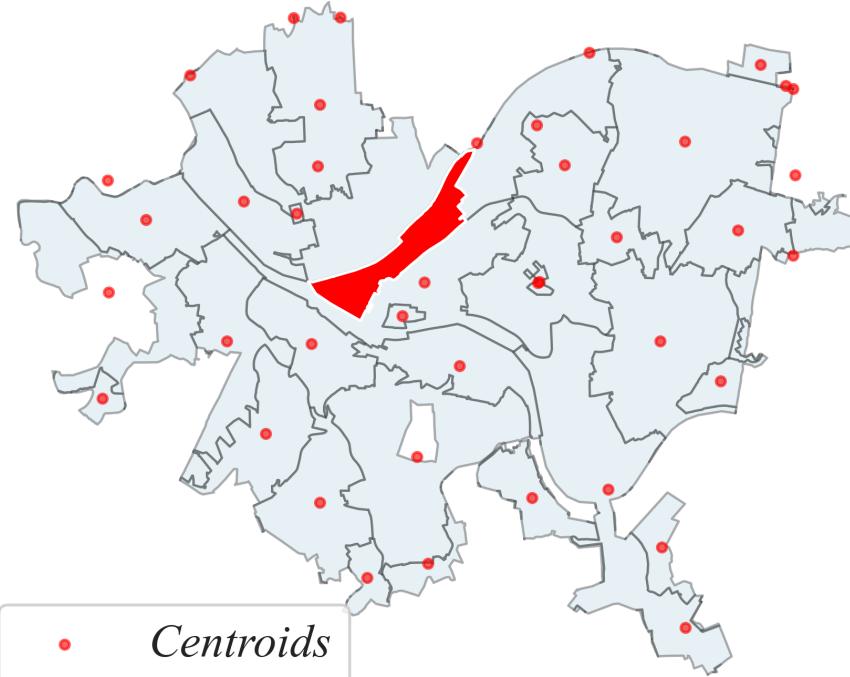
*Subquestion 2: how far is each zipcode from downtown?*



> measure from the center (*centroid*) of the zipcode

# Geographic Data

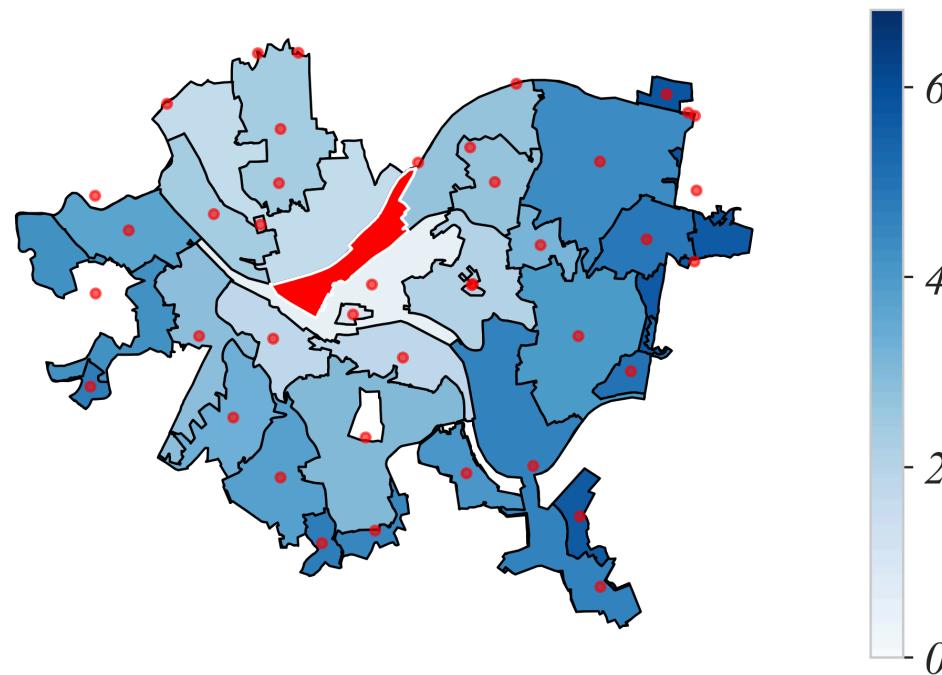
*Subquestion 2: how far is each zipcode from downtown?*



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# Geographic Data

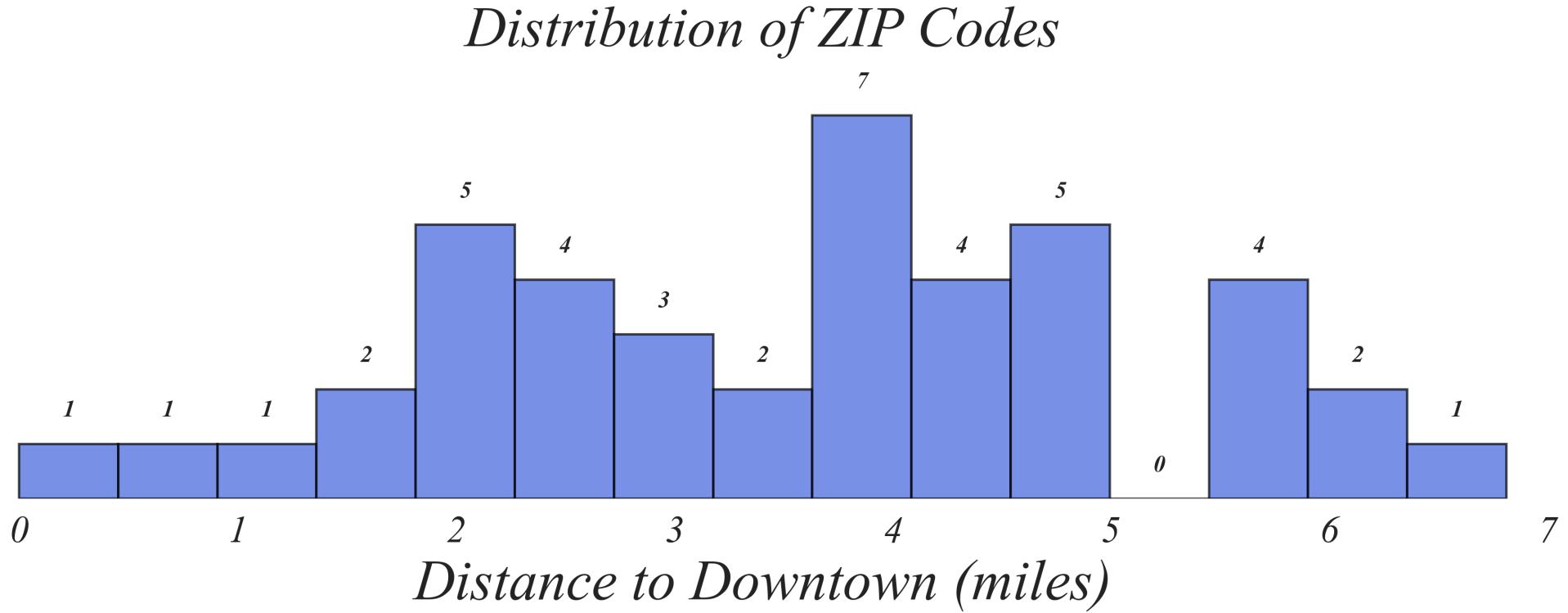
*Subquestion 2: how far is each zipcode from downtown?*



> what's the distribution?

# Geographic Data

*Subquestion 2: how far is each zipcode from downtown?*



> we now have enough to answer our main question!

# Geographic Data

*Are there fewer restaurants in areas further from downtown Pittsburgh?*

