

# Geographic Data Science

The spatial lag

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# The spatial lag

Product of a spatial weights matrix  $W$  and a given variable  $Y$

$$Y_{sl} = WY \quad \gamma_{sl} - i = \sum_j w_{ij} \gamma_j$$

- Measure that captures the behaviour of a variable in the neighborhood of a given observation  $i$ .
- If  $W$  is standardized, the spatial lag is the *average value of the variable in the neighborhood*

- Common way to introduce space formally in a statistical framework
- Heavily used in both ESDA and spatial regression to delineate neighborhoods. Examples:
  - Moran's I
  - LISAs
  - Spatial models (lag, error...)



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