

9. Spatial Autocorrelation Analysis in GeoDa

ACE 492 SA - Spatial Analysis
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1 Objectives

This lab illustrates how to test for and visualize global and local spatial autocorrelation in *GeoDa*. The technical documentation for these items can be found in the *GeoDa User's Guide*, pp. 88–105. A tutorial with exercises is in the *Introduction to spatial autocorrelation analysis with GeoDa*, pp. 7–20.

2 Things You Should Know

2.1 Moran Scatterplot

- the Moran scatter plot is invoked from the `Explore` menu or by clicking on the matching toolbar button
- you must always specify the file name for a weights file; you may have to create that file first
- the Moran scatter plot behaves like a regular scatter plot and can use the `Exclude Selected` option; this is particularly useful to assess the influence of boundary locations
- use the randomization option with several runs to assess the sensitivity of the pseudo significance level
- link the four quadrants in the scatter plot to the map to distinguish different types of spatial autocorrelation
- add envelope slopes to visualize the likely range of Moran's I under spatial randomness
- use the special Moran scatter plot for rates to assess the effect of variance instability on your inference
- repeat the analysis for different spatial weights to assess the sensitivity of your inference to the weights choice

2.2 Bivariate Moran Scatterplot

- the bivariate Moran scatter plot works like the univariate version, except that two variables must be specified
- each of the two variables can be lagged in turn, this provides two different views of bivariate spatial correlation
- arrange the various univariate and bivariate Moran scatter plots as a scatter plot matrix

2.3 LISA Maps

- you invoke the LISA map functionality from the `Explore` menu or by clicking the matching toolbar button
- as for the Moran scatter plot, you must always specify a spatial weights file
- use both the `Significance Map` and the `Cluster Map` options to identify *spatial clusters* and *spatial outliers*
- link the locations classified as clusters or outliers back to maps with different variables, and/or other graphs to look for potential associations
- assess the sensitivity of the cluster/outlier locations by varying the number of permutations and the significance cutoff
- add the Local Moran statistic (classification and p-value) to the table and save for future use in other analyses
- repeat the analysis for different spatial weights to assess the sensitivity of your inference to the weights choice

3 Practice

Skim the *User's Guide* and work through the steps in the *Tutorial*. Practice with some of the sample data sets, or with the data set you used in Assignment 1. Make sure to check the sensitivity of your inference to the choice of spatial weights, the number of permutations and the significance cut off (for LISA).