Assignment 5
UPP 465
Due: Monday 04/13/2020 12:00PM via Blackboard

1. Researchers sought to examine if the pattern of industries in North Eastern United States formed spatial knowledge clusters. A measure they thought would capture knowledge creation at the firm level was the number of patents granted over the prior 3 years. Their analysis planned to use county level data for 60 counties (N=60). They start their analysis by first assessing global autocorrelation. Based on this information, answer the following questions:
    a. What variable should they use for their spatial analysis at the county level? Fully explain your reasoning.
    b. Briefly explain what type of neighbor definitions you would use? Why?
    c. Suppose the researchers used two different weight matrices: one based on a nearest k neighbors (k=2) definition and another using an inverse distance weight matrix to compute the Global Moran's I. They found the following results:

Type	I	N	E(I)	Z-stat	p(>Z)
Nearest K	0.3	60		2. 5	0.006
Inv. Distance	0.19	60		3.1	0.001

- Compute what the expected value of the global Moran's I E(I) is under the null hypothesis.
- Interpret both results. Which result shows stronger evidence of spatial autocorrelation?

2. Suppose you were undertaking an analysis of local spatial autocorrelation for a variable of interest X. The Moran scatter plot is as shown in the figure below where the dotted lines indicate the means of the variable and its spatial lag. Answer the following questions (see next page for plots):
    a. Describe what the spatial lag variable indicates.
    b. What type of spatial autocorrelation does the figure suggest? Random, positive, or negative?
    c. In figure 1, label the areas of positive and negative spatial autocorrelation.
    d. In figure 2, label the four quadrants in terms of the relationship of the variable with its spatial lag. Note figure 1 and 2 are the same.

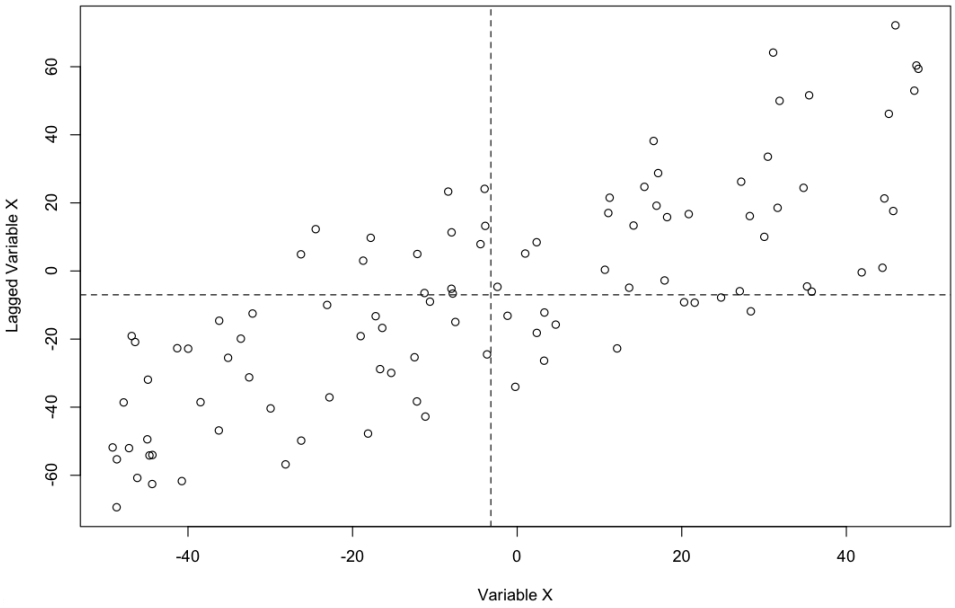

Figure 1: Moran's Scatter Plot for problem 2C

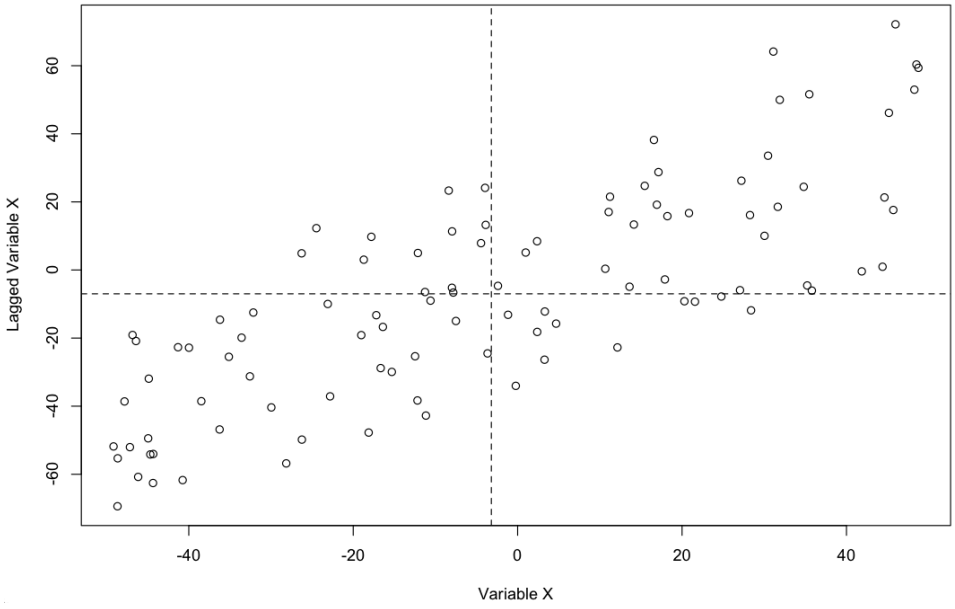

Figure 2: Moran's Scatter Plot for problem 2D