



Quantitative Geography: The Basics

By Richard Harris

288 pages; \$34.00 (<https://us.sagepub.com/en-us/nam/quantitative-geography/book243240>)

Sage Publishers

Reviewed by Sean Little

This book discusses geographic statistical analysis and data visualization. The author, Richard Harris, has written two quantitative geography textbooks. His intent in this book differs. Harris describes his intent to cover a wide “range of topics from the basic to the more advanced.” This wide range becomes the central problem of this short book, which lacks an identifiable target audience.

Harris covers some basic topics such as elementary algebra. He explains that “the letters ‘a’ and ‘b’ are simply arbitrary and simply mean ‘a number’.” By the book’s ends, he discusses spatial autocorrelation among the residuals in multiple regression analysis, quite a range for a mere 288 pages.

On page 52, Harris provides the formula to calculate a simple percentage. One-hundred and thirty-five pages later, he discusses “heteroscedasticity”. This aspirational learning curve stretches credibility.

Few readers will find both the elementary and more advanced mathematics and statistics levels useful. People who find the elementary portions useful may find the advanced material intimidating.

About 115 pages of this 288-page book contain relatively basic mathematics and “Stat 101” material. This limits the space available to discuss the unique statistical issues of quantitative geography such as spatial autocorrelation and Moran plotting.

Spatial autocorrelation refers to “the idea that geographically proximate values are correlated with one another.” For example, those areas with high-priced housing tend to cluster together. In a similar manner, those areas with low-priced housing tend to cluster together. This challenges the assumption of independence upon which much of non-geographic statistical analysis rests.

The Moran Plot measures spatial autocorrelation in multiple regressions. Moran’s I refers to a trend line on a Cartesian grid. Its X-axis measures the standardized residuals. Its Y-axis measures the “Spatial Lag of Standardized Residuals.” This grid has four quadrants: High-High, High-Low, Low-Low, and a Low-High. An upward-sloping line indicates that high values cluster together as do low values.

While its wide range is frustrating, this book has many good points. Even somewhat mathematically advanced people can have weak spots. I found the review of logarithms

useful. Harris discusses problems surrounding the p-value. He then goes on to discuss confidence intervals and effect sizes.

Analysts use rasters and vectors to display geographic data. Rasters form grid-like units, called “cells.” Overlaid on a map, raster cells have a very unnatural block-like shape. Computer software uses values stored in an N-Row by N-Col matrix to produce a raster display. Analysts generally use raster displays for continuous variables without clear boundaries.

Vectors can be points, lines, or polygons. When analysts display vector data as polygons, they form geographically recognizable shapes. They differ from the “blocky” display of raster data. In visual displays of vector data, analysts overlay other polygons on vector displays to emphasize, organize, or exclude data. Discrete variables are most suitable for use in vectors.

Cartograms have great utility for the visual display of areas with unequal density. They resize areas to reflect those differing densities, much like a bubble chart.

This book closes with a 37-page chapter called “An Introduction to R”, an open-source statistical software package. Many evaluators on tight budgets prefer the free R to the more expensive SPSS or SAS. The first part of “An Introduction to R” shows how to use R as a calculator. In the second part, Harris describes how to replicate some of the charts in the book in R.

As learning to use R has been on my “to do” list for years, I was very interested. I had downloaded an earlier version of R. When I tried to download some of the libraries necessary for graphics, I could not get them to work with my version of R. After a couple of hours of trying to download these libraries, I gave up. I have gone back to R manuals. R requires more than a 37-page introduction.

In a similar manner, books about quantitative geography should target specific audiences. And they probably should have more than 288 pages.