

Spatial Econometrics

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Definition: Empirical research in regional econometrics relies heavily on sample data that are collected with reference to locations in space-dimension. When researchers deal with sample data with a locational component, two problems arise: one is that spatial dependence exists between the observations and the other is that spatial heterogeneity occurs in the modeling relationships. These two problems distinguish spatial econometrics from traditional econometrics.

Traditional econometrics has largely ignored these two issues that violate the Gauss-Markov assumptions used in regression modeling. With regard to spatial dependence between observations, recall that Gauss-Markov assumes the explanatory variables are fixed in repeated sampling. Spatial dependence violates this assumption, a point that will be made clear in the next section. This gives rise to the need for alternative estimation approaches.

Similarly, spatial heterogeneity violates the Gauss-Markov assumption that a single linear relationship exists across the sample data observations. If the relationship varies as we move across the spatial data sample, alternative estimation procedures are needed to successfully model this type of variation and draw appropriate inferences.

Therefore, spatial econometrics is a subfield of econometrics that deals with the treatment of spatial interaction (spatial autocorrelation) and spatial structure (spatial heterogeneity) in regression models for cross-sectional and panel data. As such, the field is similar to geostatistics and spatial statistics, which form an important part of the methodological toolbox of the physical scientists. However, spatial econometrics is distinct from spatial statistics in the same sense as econometrics is distinct from statistics in general. This albeit subtle distinction boils down to the central role attributed to the theoretical model rather than the data when it comes to dictating the types of specifications that are of interest in spatial econometrics.

References/Sources:

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