

ESTIMATION OF SPATIAL AUTOREGRESSIVE MODELS
WITH DYADIC OBSERVATIONS AND LIMITED
DEPENDENT VARIABLES

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ABSTRACT

Spatial correlation, like temporal correlation, often leads to inconsistent estimates if not properly handled. This dissertation addresses spatial correlation in flow data that are recorded as binary or censored values. Flow data involve both an origin and a destination by nature, so they are subject to spatial dependence in a complicated manner. Similar to the spatial OD modeling suggested by LeSage and Pace (2008), this dissertation devises three spatial lag terms to specifically capture spatial correlation between observations on OD flows induced by a neighboring relationship between origins, between destinations, as well as a dual neighboring relationship both at the origin and the destination. The three spatial lags are incorporated into regression models with binary and censored dependent variables, respectively. However, the non-linearity of the limited dependent variable models in the presence of spatial lags makes an ML estimator inconsistent. To circumvent the inconsistent estimation, this study develops Bayesian estimation procedures for the newly proposed spatial models.