

Abstract

Residential population data are frequently employed to link the crime incidence of an area with the number of residents to estimate the underlying risk. Human mobility patterns cause shifts in the baseline population, however, that can potentially influence the crime statistics. This study therefore employed an ambient population that combined residential population data with data depicting the commuting activity in small administrative areas. The effects of the commuter-harmonized ambient population on crime were then evaluated in a series of negative binomial regression models. The models also controlled for criminogenic factors and incorporated eigenvector spatial filtering to adjust for spatial effects. The results show significant effects of commuting patterns on crime outcomes. For certain crimes, such as violence, theft, and disorder, the inbound commuters are significantly associated with high risk. It was further discovered that an offset variable comprising the commuter-harmonized ambient population data models the crime outcomes more reliably than when residential population data are used. Spatial filtering was found to effectively eradicate residual spatial autocorrelation after accounting for effects of the predictor variables. We conclude that calculating crime rates using the residential population does not constitute an accurate risk measure and that the ambient population has crucial implications for realistic and reliable target representation and crime modeling.