Spatial Autocorrelation And Autoregressive Models In Ecology

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Spatial Regession in R 1: The Four Simplest Models Lesson 31c Conditional Autoregressive Models Lesson 1 - Part 1: Spatial Autocorrelation Preview: Spatial autoregressive models in Stata

Spatial Econometrics in Stata

Spatial Autocorrelation BasicsLesson 27e Time-Series: Autoregressive Models How autocorrelation works Spatial Autocorrelation: Global Moran's I Autoregressive model for forecast errors Spatial Autocorrelation Tests Spatial Panels I Local Indicators of Spatial Association (LISA) Autocorrelation Function - Data Science Terminologies - DataMites Training Spatial Lag Regression Model Auto-correlation Using R. Spatial Regression Estimation: HAC ~~Auto Regressive Models (AR) | Time Series Analysis | Data Analytics~~ ~~Moran's I : Data Science Concepts~~ Time Series Analysis (Georgia Tech) - 2.2.3 - ARMA - Parameter Estimation - Max Likelihood Est. Multiple Linear Regression | Multicollinearity | Heteroscedasticity | Autocorrelation | Statistics Semivariogram Explained ~~Spatial Autocorrelation~~ ~~Spatial Autocorrelation~~ Spatial Statistics in R: An Introductory Tutorial with Examples Week 4 - Spatial Autocorrelation How to Estimate Spatial Panel Data Models in Stata ~~Spatial Correlation (Moran's I) and Contiguity~~ Global Spatial Autocorrelation (Moran's I) Spatial Error Regression Model Spatial Autocorrelation And Autoregressive Models

These models were then modified to account for broadscale spatial trend (via trend surface analysis) and fine-scale autocorrelation (via an autoregressive spatial covariance matrix). Residuals from...

(PDF) Spatial Autocorrelation and Autoregressive Models in ...

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SPATIAL AUTOCORRELATION AND AUTOREGRESSIVE MODELS IN ...

autocorrelation (via an autoregressive spatial covariance matrix). Residuals from ordinary least squares regression models were autocorrelated, indicating that the assumption of independent errors was violated. In contrast, residuals from autoregressive models showed little spatial pattern, suggesting that these models were appropriate.

SPATIAL AUTOCORRELATION AND AUTOREGRESSIVE MODELS IN ECOLOGY

SPATIAL AUTOCORRELATION AND AUTOREGRESSIVE MODELS IN ECOLOGY SPATIAL AUTOCORRELATION AND AUTOREGRESSIVE MODELS IN ECOLOGY Lichstein, Jeremy W.; Simons, Theodore R.; Shriner, Susan A.; Franzreb, Kathleen E. 2002-08-01 00:00:00 Recognition and analysis of spatial autocorrelation has deï¬ ned a new paradigm in ecology.

Attention to spatial pattern can lead to insights that would have been ...

SPATIAL AUTOCORRELATION AND AUTOREGRESSIVE MODELS IN ...
ABSTRACT Aim Spatial autocorrelation is a frequent phenomenon in ecological data and can affect estimates of model coefficients and inference from statistical models. Here, we test the performance... Spatial autocorrelation and the selection of simultaneous autoregressive models - Kissling - 2008 - Global Ecology and Biogeography - Wiley Online Library

Spatial autocorrelation and the selection of simultaneous ...
Land use models that select drivers of land use patterns through regression, often overestimate their role in the presence of spatial autocorrelation. Spatial autoregressive models are suited to deal with spatial data and provide a solution that is statistically sound.

Spatial autocorrelation in multi-scale land use models ...
Here, we test the performance of three different simultaneous autoregressive (SAR) model types (spatial error = SARerr, lagged = SARlagand mixed = SARmix) and common ordinary least squares (OLS) regression when accounting for spatial autocorrelation in species distribution data using four artificial data sets with known (but different) spatial autocorrelation structures.

Spatial autocorrelation and the selection of simultaneous ...
[LIC1] Lichstein J W, Simons T R, Shriner S A, Franzreb K E (2002) Spatial autocorrelation and autoregressive models in Ecology. Ecological Monographs, 72, 445-63 [MAT1] Matheron G (1973) The intrinsic random functions and their application. Advances in Applied Prob., 5, 439-68

Regression and smoothing > Spatial series and spatial ...
However, to apply a spatial autoregressive model a spatial weights matrix is required. In the following example we have set the spatial weights to be defined by simple first-order rook's move contiguity (adjacent edges), and then examined the GeoDadiagnostics to determine which form of regression model seems most appropriate to apply.

Spatial autoregressive and Bayesian modeling
In statistics, econometrics and signal processing, an autoregressive (AR) model is a representation of a type of random process; as such, it is used to describe certain time-varying processes in nature, economics, etc.The autoregressive model specifies that the output variable depends linearly on its own previous values and on a stochastic term (an imperfectly predictable term); thus the model ...

Autoregressive model - Wikipedia
Autocorrelation and non-stationarity are characteristics of spatial data and models, respectively, and if present and unaccounted for in model development, they can result in poorly specified models as well as inappropriate spatial inference and prediction.

Species distribution models: Spatial autocorrelation and ...
Conditional autoregressive (CAR) models are regularly used for describing the spatial variation of quantities of interest in the form of aggregates over subregions. These models have been used to an- alyze data in various capacities, such as in demography, economy, epidemiology and geography.

Spatial Modelling of Some Conditional Autoregressive ...
tance Sampler (Beron and Vijverberg, 2004) performs best for high spatial autocorrelation. The same results are obtained by increasing the sample size. Finally, the linearized Gen-eral Method of Moments estimator (Klier and McMillen, 2008) is the fastest algorithm that provides accurate estimates for low spatial autocorrelation and large sample ...

Estimators of Binary Spatial Autoregressive Models: A ...
In lattice type of spatial data analysis, the choice of spatial weighting matrices is a main component of any spatial autocorrelation measures and spatial autoregressive models because the choice assumes priori structures of spatial dependency.

Introducing covariate dependent weighting matrices in ...
The particular framework in which spatial association is examined here is the spatial autoregressive model of Ord, although the technique can easily be applied to any form of spatial autocorrelation measurement. The conceptual and theoretical foundations of GWR applied to the Ord model are followed by an empirical example which uses data on ...

Spatial nonstationarity and autoregressive models - CORE
The spatial autoregressive (SAR) model is a classical model in spatial econometrics and has become an important tool in network analysis. However, with large-scale networks, existing methods of likelihood-based inference for the SAR model become computationally infeasible.

Randomized algorithms of maximum likelihood estimation ...
Bayesian spatial models are commonly used for this problem, with the model comprising a multiplicative relationship of available covariates and an additional random effects term that describes the residual spatial autocorrelation. These spatial random effects are often represented by a conditional autoregressive (CAR) distribution [7].

Spatial econometrics deals with spatial dependence and spatial heterogeneity, critical aspects of the data used by regional scientists. These characteristics may cause standard econometric techniques to become inappropriate. In this book, I combine several recent research results to construct a comprehensive approach to the incorporation of spatial effects in econometrics. My primary focus is to demonstrate how these spatial effects can be considered as special cases of general frameworks in standard econometrics, and to outline how they necessitate a separate set of methods and techniques, encompassed within the field of spatial econometrics. My viewpoint differs from that taken in the discussion of spatial autocorrelation in spatial statistics - e.g., most recently by Cliff and Ord (1981) and Upton and Fingleton (1985) - in that I am mostly concerned with the relevance of spatial effects on model specification, estimation and other inference, in what I call a model-driven approach, as opposed to a data-driven approach in spatial statistics. I attempt to combine a rigorous econometric perspective with a comprehensive treatment of methodological issues in spatial analysis.

This study considers the estimation of spatial autoregressive models with censored dependent variables, where the spatial autocorrelation exists within the uncensored latent dependent variables. The estimator proposed in this paper is semiparametric, in the sense that the error distribution is not parametrically specified and can be heteroscedastic. Under a median restriction, we show that the proposed estimator is consistent and asymptotically normally distributed. As an empirical illustration, we investigate the determinants of the risk of assault

and other violent crimes including injury in the Tokyo metropolitan area.

In recent years there has been a growing interest in and concern for the development of a sound spatial statistical body of theory. This work has been undertaken by geographers, statisticians, regional scientists, econometricians, and others (e. g. , sociologists). It has led to the publication of a number of books, including Cliff and Ord's Spatial Processes (1981), Bartlett's The Statistical Analysis of Spatial Pattern (1975), Ripley's Spatial Statistics (1981), Paelinck and Klaassen's Spatial Econome t~ics (1979), Ahuja and Schachter's Pattern Models (1983), and Upton and Fingleton's Spatial Data Analysis by Example (1985). The first of these books presents a useful introduction to the topic of spatial autocorrelation, focusing on autocorrelation indices and their sampling distributions. The second of these books is quite brief, but nevertheless furnishes an eloquent introduction to the rela tionship between spatial autoregressive and two-dimensional spectral models. Ripley's book virtually ignores autoregressive and trend surface modelling, and focuses almost solely on point pattern analysis. Paelinck and Klaassen's book closely follows an econometric textbook format, and as a result overlooks much of the important material necessary for successful spatial data analy sis. It almost exclusively addresses distance and gravity models, with some treatment of autoregressive modelling. Pattern Models supplements Cliff and Ord's book, which in combination provide a good introduction to spatial data analysis. Its basic limitation is a preoccupation with the geometry of planar patterns, and hence is very narrow in scope.

Interest in spatially weighted regression analysis has increased due to corresponding increases in access to publicly available spatial data. Spatial autocorrelation occurs when the ordering of observations across space produces a relationship between pairs of individual observations. Instances of spatial autocorrelation necessitate the use of alternative approaches to parameter estimation other than ordinary least squares. With a focus on autocorrelation resulting from spatial dependence in the dependent variable or the error term, this report summarizes basic methodology for detecting spatial autocorrelation and spatial autoregressive model selection. The approaches outlined in this report are then applied to an analysis of county-level turnout in Texas.

Spatial autocorrelation has been a popular research topic in spatial analysis for decades, mainly attributable to its frequent detection in georeferenced phenomenon. In addition, the presence of spatial autocorrelation complicates statistical analysis, because it violates the independence assumption in conventional statistics. However, most research, to date, focus on positive spatial autocorrelation while works about negative spatial autocorrelation relatively are scant. Negative spatial autocorrelation has long been neglected in literature, largely because of its rare observation in empirical data. This dissertation aims to contribute to the understanding of negative spatial autocorrelation with two major goals. One goal is to examine the impacts of spatial autocorrelation on statistical random variables with both positive and negative spatial autocorrelation being assessed and contrasted with each other. The literature is replete with acknowledgments that positive spatial autocorrelation inflates the variance of a random variable, and it also may alter other random variable distributional properties. Moreover, due to different quantifications of negative and positive spatial autocorrelation, their impacts on random variables are expected to differ. The other goal is to explore simultaneous materialization of negative spatial autocorrelation with positive spatial autocorrelation in empirical data, and a potential treatment of spatial autocorrelation mixture in spatial statistical analysis. Moran scatterplot and local Moran statistics can furnish efficient methods to uncover spatial autocorrelation mixture patterns. Other statistical methodologies are also employed to identify and capture negative spatial autocorrelation, including a spatial autoregressive model

with two-spatial autocorrelation-parameters, the mixed regressive spatial autoregressive moving average model, and Moran eigenvector spatial filtering method.

This dissertation, "Spatial Autocorrelation and Liquidity in Hong Kong's Real Estate Market" by Chun-wah, Li, □□□, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. Abstract: □Spatial autocorrelation is commonly found in the Hedonic Pricing model for real estate prices, but little attention has been paid to identify the causes behind. The primary objective of this research is to examine the causes of spatial autocorrelation in housing prices. Observed autocorrelation is often attributable to the omission of important location characteristics in the modelling process. Since it is practically impossible to exhaustively include all location characteristics, some variables may eventually be omitted, leaving spatially autocorrelated residuals in the Hedonic Pricing model. This thesis proposes a new source of spatial autocorrelation: real estate market liquidity. We hypothesize that liquidity affects the geographical boundary within which buyers and sellers search for price information. When the "immediate vicinity" of a property has few transactions, buyers and sellers may have to search for price information from more distant locations. Therefore, low liquidity in the vicinity of a property should strengthen the spatial autocorrelation of real estate prices. A Spatial - Liquidity Hedonic Pricing (SLHP) model is proposed to test the above hypothesis. The SLHP model generalizes traditional spatial autoregressive models by making the spatial process liquidity dependent. When applied to the apartment market in Hong Kong, the model is operationalized by defining "immediate vicinity" as the building where the subject unit locates. Furthermore, the SLHP model recognizes that past transactions may affect current transactions, but not vice versa, so the spatial weight matrix is simply lower triangular. Under this condition, we have shown that the Maximum Likelihood Estimation is equivalent to the Ordinary Least Squares Estimation. This greatly simplifies the estimation procedures and reduces the empirical analysis to a feasible scale. Based on 15 500 transactions of residential units in Taikooshing, Hong Kong from 1992 to 2006, we conclude that while positive spatial autocorrelation is present in housing prices, its magnitude decreases when liquidity, as measured by the past transaction volume in the immediate vicinity of a subject unit, is high. In addition, we found that current prices are spatially correlated with transactions occurred up to the last three months only, reflecting the relatively high information efficiency of Hong Kong's residential market. All these results are generally robust across a variety of distance, liquidity, and time weight specifications. This study establishes liquidity as a determinant of spatial autocorrelation in real estate prices. This is a new finding contributing to the economic literature on liquidity effects and technical literature on spatial estimation. Our results not only reveal the spatially dependent price formation process in the real estate market, but also have practical applications on the hedonic modelling of real estate prices for mass valuation and index construction. DOI: 10.5353/th_b4727800 Subjects: Real property - Prices - Statistical methods - China - Hong Kong

This monograph, part of the Resource Publications in Geography Series of the Association of American Geographers, presents standard statistical models modified to take into account the presence of spatial autocorrelation & SAS code for implementing these models. The first chapter defines the concept of spatial autocorrelation & discusses various interpretations of it. This chapter also presents two simulation games designed to familiarize players with spatial autocorrelation patterns. The second chapter reviews the basic statistical indices to measure levels of spatial autocorrelation in geographic distributions & presents SAS code for computing

them using three sample data sets. The third & fourth chapters demonstrate how conventional regression models can be converted into one of three spatial autoregressive models. Detailed mathematical formulations of the models are given. SAS computer code for implementing each of the models is presented. The conclusion verifies the procedures described in the monograph by using them to estimate results reported in earlier empirical studies. Order from Association of American Geographers, 1710 16th St., N.W., Washington, D.C. 20009-3198; 202-234-1450.

Geographical Information Systems is a computer system used to capture, store, analyze and display information related to positions on the Earth□s surface. It has the ability to show multiple types of information on multiple geographical locations in a single map, enabling users to assess patterns and relationships between different information points, a crucial component for multiple aspects of modern life and industry. This 3-volumes reference provides an up-to date account of this growing discipline through in-depth reviews authored by leading experts in the field. VOLUME EDITORS Thomas J. Cova The University of Utah, Salt Lake City, UT, United States Ming-Hsiang Tsou San Diego State University, San Diego, CA, United States Georg Bareth University of Cologne, Cologne, Germany Chunqiao Song University of California, Los Angeles, CA, United States Yan Song University of North Carolina at Chapel Hill, Chapel Hill, NC, United States Kai Cao National University of Singapore, Singapore Elisabete A. Silva University of Cambridge, Cambridge, United Kingdom Covers a rapidly expanding discipline, providing readers with a detailed overview of all aspects of geographic information systems, principles and applications Emphasizes the practical, socioeconomic applications of GIS Provides readers with a reliable, one-stop comprehensive guide, saving them time in searching for the information they need from different sources

This is a new edition of the accessible and student-friendly 'how to' for anyone using R for the first time, for use in spatial statistical analysis, geocomputation and digital mapping. The authors, once again, take readers from □zero to hero□, updating the now standard text to further enable practical R applications in GIS, spatial analyses, spatial statistics, web-scraping and more. Revised and updated, each chapter includes: example data and commands to explore hands-on; scripts and coding to exemplify specific functionality; self-contained exercises for students to work through; embedded code within the descriptive text. The new edition includes detailed discussion of new and emerging packages within R like sf, ggplot, tmap, making it the go to introduction for all researchers collecting and using data with location attached. This is the introduction to the use of R for spatial statistical analysis, geocomputation, and GIS for all researchers - regardless of discipline - collecting and using data with location attached.

Autocorrelation occurs whenever a variable exhibits a regular pattern over space, when its values at a set of locations depend on values of the same variables at other locations.Odland introduces spatial autocorrelation to the reader in a concise and readable fashion, and describes the statistical p.