

The ASA Spring Methodology Conference



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SESSION : Network and Multilevel Analysis

PRESENTERS:

Malcolm Fairbrother
University of Bristol

m.fairbrother@bristol.ac.uk

Herman van de Werfhorst
University of Amsterdam

h.g.vandewerfhorst@uva.nl

Silvia Neamtu
Central European University

neamtu_silvia-ioana@student.ceu.hu

Katherine Woolf
University College London

k.woolf@medsch.ucl.ac.uk

Presenter

Fairbrother, Malcolm; University of Bristol

Authors: Mark Tranmer; Peter Neal; Malcolm Fairbrother; Johan Koskinen

Title

An Autoregressive Multilevel Model for Investigating Two Kinds of Dependency in Social Surveys

Abstract

Survey research increasingly uses multilevel models to analyse grouped survey data—such as where respondents are nested in higher-level geographical/socio-political units of interest, like countries, states, or provinces. Members of a given group are expected to be more similar than members of different groups, since they are conditioned by group-level covariates and random error. At present, such analyses treat the higher-level units as independently and identically distributed (IID)—an assumption which for many applications is clearly untenable, given that spatially contiguous or proximate units are likely to affect each other. (Tobler’s First Law of Geography states that everything is related to everything else, but near things are more related than distant things.) The violation of this assumption may be leading to unjustified inferences and biased estimates.

To address this problem, we present an autoregressive multilevel model—combining existing approaches in spatial econometrics and multilevel modelling—and discuss how its parameters may be estimated using MCMC in R. We apply these models to two datasets—one from education and one from political geography—and discuss the substantive research value of this new approach. Both multilevel modellers and spatial econometricians argue that dependency should be regarded not just as nuisance, but as substance—that is, as a feature of social life that is of social scientific interest in its own right. The model we present allows for the analysis of both kinds of dependency simultaneously: spillover effects, on the one hand, and within-group similarity, on the other. The same model is also applicable for analyses of survey data where respondents’ social networks are known, and networks represent a potential mechanism for diffusion or spillover effects.

Author and presenter

Neamtu, Silvia; Central European University

Title

Patterns of Legislative Behavior. A Network Analysis on Electoral System Change

Abstract

In this paper, I analyze the characteristics of the legislative networks inside the Romanian Parliament. By treating the Members of the Parliament (MPs) as nodes and their initiated proposals as links between the nodes, therefore measuring the relationships among them, I map out the networks of collaboration of the Romanian legislature for a period of four years and between two electoral systems – proportional representation with closed lists (2006-2007) and mixed-member proportional with single member districts (2009-2010). Based on the theory of competing principals with respect to legislative accountability, this descriptive account of the networks aims at spotting the differences in the structural positions of MPs before and after the electoral reform in 2008. For this purpose, I compute centrality measures and sub-group analysis for each of the networks, and, in a comparative fashion, I set the basis for further analyses on how much of the difference can be attributed to the electoral system. Further research might be concerned with refining theoretical and empirical models as to capture the effect of other explanatory variables, such as the government coalitions, or less visible principals (like financial supporters behind the candidates, or pressure groups).

Presenter

Werfhorst van de, Herman; University of Amsterdam

Authors

Rüya Gökhan Koçer; Herman van de Werfhorst; University of Amsterdam

Title

Opinions on Economic Inequalities: A Multilevel Means and Dispersion Model

Abstract

Public opinion on economic inequality has been mainly analyzed in order to comprehend the mechanisms of legitimation and the focus has been the role of welfare regimes. We argue that opinions on economic inequality may also reveal what makes individual opinions differ from the public opinion, thus, may inform us about the determinants of social cohesion. For this purpose we focus on dispersion of opinions by establishing a joint multilevel mean-dispersion model and scrutinize the impact of educational systems as a hitherto neglected factor that may affect public opinion and social cohesion. We show that, besides individuals' level of education, the institutional characteristics of educational systems, too, have a substantial impact on social cohesion. The strongly tracked educational systems increase the dispersions in the opinions on fairness of economic inequalities and thus appear to be detrimental for social cohesion. The vocational orientation of educational systems, on the other hand, seems to have the opposite effect: it diminishes the dispersion in public opinion on economic inequalities.

Author and presenter

Woolf, Katherine; University College London

Title

The hidden medical school: How social networks relate to learning

Abstract

In the UK, medical students are segregated from other university students. They have their own student union, bar, sports clubs and societies, and are encouraged to form social ties with other medics, partly because medical schools perceive it to facilitate learning and teamwork. However recently UK medical schools have expanded hugely: rather than having 100 students per year most now have 300-400. It is unknown how this expansion affects the social networks within medical schools. We mapped the social network in one cohort of at UCL medical school to find out how it related to demographic factors and subsequent exam performance. We also compared it to network data from a cohort of St Mary's medical students collected 21 years earlier.

Method. In Term 1 of 2009/10, all Year 2 UCL medical students were given a list of the students in their year and asked to indicate those they knew best. St Mary's network data were collected in 1988 using a similar method. UCL students' ethnicity, sex, tutor group (to which they were randomly allocated in Year 1 of medical school), Year 1 campus (one of three) and Year 1 and Year 2 Term 3 exam grades were collected from student records. These data were not available for St Mary's students.

Analysis. All ties assumed to be symmetric. The UCL social network in Year 2 Term 1 was described in terms of the distance (using Dijkstra's algorithm) between each dyad, from 1 (closest) to 5 (furthest). Matlab was used to assess the influence of background variables on Dijkstra distance and on Year 2 Term 3 exam performance across all possible dyads using multiple regression. Statistical significance was assessed by comparing those b estimates with the b^* estimates calculated using 10,000 random permutations of the dependent variable matrix using a quadratic reassignment procedure. All hypotheses were one-tailed, and are reported as the number of permutations out of 10,000 in which the (random) coefficients (b^*) were larger than the actual coefficients (b). Ethnicity

was classified in terms of membership of the six largest ethnic groups (Ethnic6), as well as in terms of white vs non-white (Ethnic2).

Results. 215/334 (64%) UCL students and 82/98 (84%) St Mary's students completed the questionnaires. The mean degree for both networks was very similar (17 and 15, respectively).

Predictors of the UCL social network: Dyads of the same sex were closer ($p < .0001$). Despite Ethnic2 and Ethnic6 being strongly correlated, there were independent effects of each (Ethnic2 $p = .0023$; Ethnic6 $p = .0007$), suggesting clustering within main ethnic groups, and additional clustering of non-whites with other non-whites. Students in the same tutor group ($p < .0001$), and on the same campus in Year 1 ($p < .0001$) were closer in the network.

Predictors of Year 2 UCL performance: Year 2 Term 3 exam score was correlated with Year 1 exam score. Dyads which had a smaller Dijkstra distance (measured 6 months previously) were more similar in their Year 2 Term 3 after taking into account Year 1 exam score ($p = .0212$). Year 2 Term 3 performance was not related to sex, ethnicity, tutor group or campus after taking Dijkstra distance into account.

Discussion. In both networks the mean degree was very similar. The UCL social network showed homophily, especially in terms of ethnicity, as is typically found. However, random allocation of students to tutor groups also influenced friendships and, most importantly, friendships influenced subsequent exam scores.