ECPR Winter School on Methods and Techniques
Course Description Form

Course title

B17. Statistical Modelling of the Spatial Theory of Voting

Instructor details

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Short Bio

Paul W. Thurner is Professor of Political Science at the University of Munich (LMU), Germany. He directs the Chair for Empirical Political Science and Policy Analysis. His main research interest is the statistical analysis of political choice behaviour (electoral choices, strategies of negotiation, network choices). Since more than fifteen years he provides knowledge transfer workshops on Applied Discrete Choice Modelling (Conditional Logit, Nested Logit, Random Utility Models) and on Applied Political Network Analysis.

Short outline

This course introduces to the theory and to the statistical analysis of the spatial theory of voting. Starting with Downs' seminal work, we delineate core assumptions and the conceptual development until most recent publications. The appropriate translation of these appoaches into a statistical model requires the application of so-called conditional logit models – practicing these models will be the core objective of this course.

Long outline

The spatial theory of voting has become increasingly important and influential, both for our understanding of the mechanics of party competition and of individual choice behaviour, respectively. This course introduces to the theory and to the statistical analysis of the spatial theory of voting. We delineate core assumptions and the conceptual development until most recent publications. Special attention will be given to the systematic translation of the respective assumptions and hypotheses into the statistical models.

Since the seminal work of Harold Hotelling (1929), Duncan Black (1958) and Anthony Downs (1957), spatial models of voting have been the dominant paradigm in positive political theory. In such models, policy options are represented by points in a finite-dimensional vector space. Each voter has a utility function on this space, which is commonly assumed to be a decreasing function of the Euclidean distance from the voter's ideal point. The spatial conceptualization of politics allows us to visualize easily a substantial number of classes of examples. The most important result from this body of work is Black's Median Voter Theorem. Its key assumptions are that policies are defined along a single dimension and voters have single-peaked preferences. This equilibrium result is in general restricted to two-candidate, simple majority elections. Meanwhile, a series of empirical applications for multi-party competition have been proposed. This progress will be highlighted. Additionally, the course will also refer to main competitors in the field of electoral research, like saliency theory and cleavage theory. It will be shown that these different approaches can be combined in a theoretically as well as statistically consistent way.

The orientation of this introduction will be both theoretical as well as practical. A major theoretical advantage of this theory is that systematically connects demand side and supply side of the electoral competition. This implies a statistical challenge insofar, as we have to account for candidates' and parties' positions and other attributes – beyond the usually used attributes of voters (sex, age, income etc). The appropriate statistical models for such contexts are so-called conditional logit or probit models as originally proposed by nobel laureate Daniel McFadden (Berkeley). The same logic forms the statistical basis of panel fixed-effects models. Conditional logit models are meanwhile the work horse in consumer research, transportation economics, and for the determination of the demand for environmental and public goods. Thus, they qualify for political scientists assuming voters to direct demands to politicians and administrations.

Conditional logit and probit models permit the researcher to use attributes of the choice alternatives as independent variables. A prominent example in electoral research is the position-taking efforts of parties/candidates on issues. In the context of the Downsian spatial theory of voting it is assumed that voters react to these positions by calculating the distance of their own position to the parties' position. Comparing over all distances to all parties the voters are conceived to choose the party with the least distance. In the probabilistic setting of the discrete choice models, we can reformulate this expectation as follows: the lower the distance of voter i to a party j's position in an issue k, the higher the probability that the voter chooses this party. Thus, contrary to case-specific variables like sex and age which are constant for a case, these variables vary across choice alternatives. We call them, therefore, alternative-specific variables.

When attributes of the alternatives are part of the theoretical model, theorizing as well as data handling and specification is more complex. On the theoretical side, we will outline the underlying random utility approach in order to to capitalize on the enormous flexibility of these models. Their power lies especially in the consistent decision-theoretical foundation of the statistical model. Therefore, we familiarize attendants with the specific terminology and assumptions. We demonstrate, how to derive substantially interesting questions and hypotheses from this approach for electoral research in general, and for the spatial theory of voting more specifically. E.g., it will be shown how issue and / or idelogical distances (left-right dimensions) can be specified in different ways: issue-by-issue, quadratic or non-quadratic, city-block, euclidean, saliency-weighted or unweighted etc.

We will also highlight features of these models so far rather neglected by the electoral research community – e.g. nested multinomial logit models, specification of alternative-specific issue and ideological distances etc. Finally, we will give an outlook to the potentials

of advanced models like random coefficient (mixed logit) and rank-ordered logit models (for cases where respondents indicate a rank-order of alternatives).

As data handling is more demanding, we will spend sufficient time for acquainting participants with setting up data in the required way and to program their own hypotheses. Starting with binary logit and probit in a rather short warm-up part, we quickly turn to multinomial regression MNL) considering individual voter attributes only. An in-depth understanding of the MNL is a prerequisite of the conditional logit model. We will provide, both a formal as well as an intuitive outline of these models. During the two weeks, lectures and exercises in the lab will be combined - with a clear partition of lectures in the morning and of exercises in the afternoon. We demonstrate the application of these models with Stata 12 (basic R routines will be also available for attendants). Therefore, Long/Freese (2006) is a good starting point for the preparation of the exercise sessions – but will be expanded substantially. Special attention will be given to the verbal interpretation (odds ratios, average marginals, elasticieties) and visualization (conditional probability plots). Easy-to-imitate routines will be provided.

Basic knowledge of regression analysis and Stata is requiredParticipants are suggested to use their own laptops with the suggested software. Additionally, there will be extensive opportunities for students to present, discuss and develop their own projects and data sets.

5. Day-to-day schedule

	Topic(s)	Details [NB : incl. timing of lecture v/s lab or fieldwork etc. hours]
Day 1	The Spatial Theory of Voting: a Short Overview	Lecture / Introduction to Data Sets and Software
Day 2	Random Utility and the Logit and Probit Model (Binary and Multinomial)	Lecture and Exercises, Stata Applications
Day 3	Modeling Ideological and Issue Distances: The Conditional Logit Model	Lecture and Exercises, Stata Applications
Day 4	Accounting for Non-Policy Factors in the Spatial Theory	Lecture and Exercises, Stata Applications
Day 5	Special Features: Nested and Mixed Logit, Alternative-Specific Issue Distances, Rank-Ordered Logit etc.	Lecture and Exercises, Stata Applications

Day-to-day reading list

	Readings (please read at least the compulsory reading for the scheduled day)
Day 1	Downs 1957, Davis/Hinich/Ordeshook 1970, Enelow/Hinich 1994, Dow 2004, Alvarez/Nagler 1998, Thurner 2000, Adams/Merrill/Grofman 2005
Day 2	Long / Freese, 2006: 129- 182, 223-293, Stata Manual: 'Margins'
Day 3	Long / Freese 2006: 293- 339, Thurner 2000, King et al. 2000, Stata Manual: 'Margins'
Day 4	Long/Freese 2006: Thurner 2000, Adams/Merrill/Grofman 2005, Stata Manual: 'Margins'
Day 5	Glasgow 2001, Heiss 200, Shikano/Herrmann/Thurner 2009, Thurner/Mauerer/Debus 2012, Stata Manual: 'Margins'

Requested prior knowledge

Basic knowledge of methodology and statistics is required. Additionally, basic knowledge of Stata and/or R should be available.

Software used

Stata 12

Literature

Adams, James; Merrill, Samuel; Grofman, Bernard, 2005: A unified theory of party competition. A cross-national analysis integrating spatial and behavioral factors. Cambridge: Cambridge Univ. Press.

Agresti, Alan, 2002: Categorical data analysis. 2. ed., New York: Wiley-Interscience.

Alvarez, R. Michael, und Jonathan Nagler, 1998: When politics and models collide: Estimating models of multiparty elections' American Journal of Political Science 42(1): 55-96.

Ben-Akiva, M. und S.R. Lerman, 1985, Discrete Choice Analysis: Theory and Application to Travel Demand. Cambridge und London: The MIT Press.

Borooah, Vani K., 2002, Logit and Probit. Ordered and Multinomial Models. Thousand Oaks: Sage. (QASS 138).

Coughlin, P.J., 1992. Probabilistic Voting Theory. Cambridge University Press, Cambridge.

Davis, O., Hinich, M.J., Ordeshook, P.C., 1970: An expository development of a mathematical model of the electoral process. American Political Science Review 64, 426–448.

Dow, J.K; Endersby, J.W, 2004: Multinomial probit and multinomial logit: a comparison of choice models for voting research. In: Electoral Studies 23 (1), S. 107-122.

Downs, A., 1957. An Economic Theory of Democracy. Harper & Row, New York.

Enelow, J.M., Hinich, M.J., 1984. The Spatial Theory of Voting. Cambridge University Press, Cambridge.

Glasgow, Garrett (2001): Mixed logit models for multiparty elections. Political Analysis 9 (2): 116-136.

Greene, William H., 2008: Econometric Analysis. 6. ed., Upper Sadle River, NJ: Prentice Hall.

Greene, William H., David A. Hensher, 2010: Modeling Ordered Choices. A Primer. Cambridge / New York: Cambridge University Press.

Heiss, Florian, 2002: Structural choice analysis with nested logit models. Stata Journal 2(3):: 227-252.

Hensher, David A., John M. Rose, William H. Greene, 2005: Applied Choice Analysis. A Primer. Cambridge: Cambridge University Press.

Hotelling, H., 1929. Stability and competition. The Economic Journal XXXI, 41–57.

King,G.,M. Tomz, and J.Wittenberg, 2000: Making the most of statistical analyses: Improving interpretation and presentation. *American Journal of PoliticalScience* 44:347–61.

Maddala, G.S., 1983. Limited-dependent and Qualitative Variables in Econometrics. Cambridge University Press, Cambridge.

Manski, C.F., 1977. The structure of random utility models. Theory and Decision 8, 229–254.McFadden, D., 1974. Conditional logit analysis of qualitative choice behaviour. In: Zarembka, P. (Ed.) Frontiers in Econometrics. Academic Press, New York.

McFadden, D. & K. Train. 2000. Mixed MNL models of discrete response. *Journal of Applied Econometrics* 15:447–470.

McFadden, D., 1981. Econometric models of probabilistic choice. In: Manski, C., McFadden, D. (Eds.) Structural Analysis of Discrete Data. MIT Press, Cambridge, MA.

McFadden, D., 1984. Econometric analysis of qualitative response models. In: Griliches, Z., Intriligaor, M.D. (Eds.) Handbook of Econometrics, vol. II. North-Holland, Amsterdam.

Mueller, D., 2003. Public Choice III. Cambridge University Press, Cambridge.

Persson, Torsten, Guido Tabellini, 2000: Political Economiccs. Explaining Economic Policy. Cambridge: MIT Press.

Shikano, Suzumu, Michael Herrmann, Paul W. Thurner, 2009: Strategic voting under proportional representation: Threshold insurance in German Elections. *West European Politics* 32,3: 630-652.

Thurner, Paul W., 1998: Wählen als rationale Entscheidung. Die Modellierung von Politikreaktionen im Mehrparteiensystem. Munich: Oldenbourg. (*Scientia Nova*).

Thurner, Paul W., 2000: The empirical application of the spatial theory of voting in Multiparty Systems with Random Utility Models. *Electoral Studies* 19,4: 493-517.

Thurner, Paul W., Angelika Eymann, 2000: Policy-Specific alienation and indifference in the calculus of voting: A simultaneous model of party choice and abstention. *Public Choice* 102: 51-77.

Thurner/Mauerer/Debus, 2011: Party-Varying issue voting: The case of Germany 1987-2009. (MS. University of Munich)

Train, K., 1986. Qualitative Choice Analysis: Theory, Econometrics, and an Application to Automobile Demand. MIT Press, Cambridge, MA.

Train, Kenneth, 2009: Discrete Choice Methods with Simulation. Cambridge / New York: Cambridge University Press.

Tutz, Gerhard, 2012: Regression for Categorical Data. Cambridge / New York: Cambridge University Press.

Lecture room requirement

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