CAUSAL ANALYSIS/ADVANCED MODELING IN TIME SERIES
Polit Sci 786
14445-0
TUESDAY AND THURSDAY
3:30-5:18
FALL 1997

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This course introduces students to time series methods and to the applications of these methods in political science. After a brief review of the calculus of finite differences and of certain estimation techniques, we study stationary ARMA models. We learn not only how to construct such models but also how to use them in political forecasting and in policy analysis. Time series regression then is reviewed; small-scale simultaneous equation set-ups are included in this survey. From here we proceed to a look at important topics in time series analysis including simulation method, pooling cross-sectional and time series data, "reduced form" methods (granger causality and vector autogression), unit root test and error correction models, and finally, fractional integration and other state-of-the-art time series methods.

Texts

Students should purchase the following book. It is available at campus bookstores.

Pindyck, R.S. and D.L. Rubenfeld, Econometric Models and Economic Forecasts Third Edition. NY: McGraw-Hill, 1991. ISBN: 0-07-050098-3

Enders, Walter, RATS handbook for Econometric Time Series New York: John Wiley & Sons, Inc. 1996. ISBN: 0-471-14894-6

Students are strongly urged to purchase as well:

Hamilton, J.D. Time series Analysis Princeton, NJ: Princeton University Press, 1994.

The Hamilton book will be supplemental reading in most weeks. Since it is one of the most up-to-date texts on the topic, it is important that students eventually own it.

Other books which will be used during the course include:

Chatfield, C., The Analysis of Time Series: An Introduction New York: Chapman and Hall, Fourth Edition, 1989.

Goldberg, S., Introduction to Difference Equations New York: John Wiley and Sons, Inc., 1958.

Gottman, R.E., Time Series Analysis: A Comprehensive Guide for Social Scientists NY: Cambridge University Press, 1981.

Huckfeldt, R. Robert, C.W. Kohfeld, and T.W. Likens, Dynamic Modeling: An Introduction Beverly Hills, Ca.: Sage, 1982.

McCleary, R. and R.A. Hay, Jr., Applied Time Series Analysis for the Social Sciences Beverly Hills, Ca.: Sage, 1980.

Copies of required articles are available from Cop-Ez in the basement of Bricker Hall (#060).

Requirements and Expectations

Students are expected to do all the assigned reading and to attend all classes. Students are expected to complete one problem set, one article critique, and write three relatively short (8-10 pages) data analysis papers. Assignments will be docked one full letter grade for each week that the assignment is overdue. Students are urged to use their own time series data for the papers. More specifically, it is hoped that students can not only master time series methods in the course, but also perform their own research over the course of the quarter, hopefully with the goal of submitting the paper for presentation at a conference or for publication. The instructor will work closely with students to ensure that this happens, while maintaining high expectations.

Regression Analysis and Time Series (RATS) is the statistical package that will be used. The RATS Handbook (available for purchase) and the RATS manual (available for 2 hour checkout from the 3rd floor lab) will be very useful for completing the data analysis assignments.

COURSE OUTLINE

This is tentative, and will be adjusted according to individual class needs.

I. Introduction and overview of some important methodological debates.

II. Linear difference equations and the corresponding models of political processes.

III. Nonlinear difference equations, models of this variety, and the principles of nonlinear estimations.

IV. ARIMA Models, Part One: Stationarity, integration and differencing; the autocovariance, autocorrelation and partial autocorrelatio functions.

V. ARIMA Models, Part Two: Building Arima models--model identification and estimation; applications.

VI. ARIMA Models, Part Three: Seasonality and forecasting.

VII. Intervention Analysis--Policy evaluation with ARIMA models.

VIII. Time series regression, Part One: Principles.

IX. Time series regression, Part Two: Simultaneous Equation set-ups.

X. Topic: Simulation and calibration.

XI. Topic: Pooling cross-sectional and time series data.

XII. Topic: "Reduced form" method, Granger Causality and VAR.

XIII. Topic: Unit Roots, Cointegration, and the Error Correction Model.

XIV. Review and retrospectives.

COURSE OUTLINE AND READING ASSIGNMENTS

I. Introduction and Overview

REQUIRED

Brunner, R.D. and K. Liepelt, "Data Analysis, Process Analysis and System Change" American [Midwest] Journal of Political Science 17, 1972: 538-569

Freeman, J. "The Searches I: Specification Uncertainty in the Study of Macropolitics" Ms., pps. 1-25 only.

Summers, L. "The Illusion of Empirical Macroeconomic" Scandinavian Journal of Economics 93(2), 1991: 121-148.

Recommended

Chatfield, Chapter 1.

Gottman, Chapters 1-6.

II. Linear Difference Equations and Some Formal Models of Political Processes

REQUIRED

Goldberg, Chapters 1-2.

Huckfeldt, et al., Chapters 1,2, and 4.

Sprague, H. "One Party Dominance in legislatures" Legislative Studies Quarterly 6(2), 1981: 259-285.

Recommended

Cortes, F., A. Przeworski, and J. Sprague, System Analysis for Social Scientists New York: J Wiley & Sons, 1974.

Hamilton, Chapters 1-2.

III. Nonlinear Difference Equations; Nonlinear Estimation

REQUIRED

Huckfeldt, Chapters 3, 5, 6.

Pindyck and Rubenfeld, Sections 5.1 and 9.5.

Przeworski, A. and J. Sprague, Paper Stones: A History of Electoral Socialism Chicago: U. of Chicago Press, 1986: Prologue. Chapter 3, and Appendix (pps. 1-11, 57-99, 187-201).

Richards, D. "A Chaotic Model of Power Concentration in the International System," International Studies Quarterly 37, 1993: 55-72.

Zinnes, D.A. and R.G. Muncaster, "The Dynamics of Hostile Activity and The Prediction of War" Journal of Conflict Resolution 28(2), 1984: 187-229.

Recommended

Freeman, J. and D. Snidal, "Diffusion, Development and Democratization in Western Europe" Canadian Journal of Political Science 15(2), 1982: 299-329.

Goldberg, Chapter 3.

Goldberg, S. and R. Quandt, Nonlinear Methods in Econometrics Amsterdam: North-Holland, Chapters 1-2.

Hamilton, Chapter 5.

IV. ARIMA Models, Part One

REQUIRED

McCeary and Hay, Chapter 2.

Pindyck and Rubenfeld, Chapters 14, 15, 16.

Recommended

Chatfield, Chapters 2-3.

Freeman, J. and J. Stimson, "Decomposition, Causal Inference, and Theory Building" Paper presented at the 1994 Meeting of the Political Methodology Society, Madison, Wisconsin.

Gottman, Chapters 7-9.

Hamilton, Chapter 3.

V. ARIMA Models, Part Two

REQUIRED

McCeary and Hay, Chapters 3,6.

Pindyck and Rubenfeld, Chapter 17.

Li, R. P., "A Dynamic Comparative Analysis of Presidential and House Elections" American Journal of Political Science [AJPS] 20(4), 1976: 670-691.
Quinn, D. P. and R. Jacobson, "Industrial Policy Through Restrictions on Capital Flows" AJPS 33(3), 1989: 700-736.

Recommended

Chatfield, Chapter 4.

Gottman, Chapters 10-14, 19-20, 22.

Hamilton, Chapter 3.

Li, R. P. and W.R. Thompson, "The Stochastic Process of Alliance Formation Behavior" APSR 72(4), 1978: 1288-1303.

VI. ARIMA Models, Part Three: Seasonality and Forecasting

REQUIRED

McCeary and Hay, chapter 3 (re-read).

Pindyck and Rubenfeld, Chapter 18.

Campbell, J. and T Mann, "Forecasting the 1992 Presidential Election: A User's Guide to the Models" The Brookings Review Fall, 1992: 22-27.

Greene, J. P., " Forewarned Before Forecast: Presidential Election Forecasting Models and the 1992 Election" PS: Political Science and Politics 26, 1993: 17-21.

Campbell, J., "Weather Forecasters Should be so Accurate: A Response to 'Forewarned Before Forecast'" PS, 1993: 165-66.

"Forecasting the 1992 Presidential Election." Articles by Abramowitz, Alvarez and Loynd, Campbell, Erikson and Wlezien, Hill, Lewis-Beck and Rice, Sigelman, Beck, and Forsythe, et al. The Political Methodologist 5(2), 1994: 2-23.

Recommended

Chatfield, Chapter 5.

Gottman, Chapter 21.

Hamilton, Chapter 4.

VII. Intervention Analysis and Policy Evaluation with ARIMA Models

REQUIRED

McCeary and Hay, Chapter 4.

Hibbs, D. "Political Parties and Macroeconomic Performance" American Political Science Review [APSR] 71: 1467-1479.

Alt, J. "Political Parties, World Demand, and Unemployment" APSR 79(4), 1986: 1016-1040.

Recommended

Box, G.E.P. and G.C. Tiao, "Intervention Analysis with Applications to Economic and Environmental Problems" Journal of the American Statistical Association 70, 1975: 70-79.

Rasler, Karen, "War, Accommodation, and Violence in the United States, 1890-1970" APSR 80, 1986: 921-945.

Rasler, K. and W. Thompson, "War and Economic Growth of the Major Powers" AJPS 29(3), 1985: 513-538.

Wood, B. Dan, "Principles, Bureaucrats, and Responsiveness in Clean Air Enforcements" APSR 82(1), 1988: 213-236.

Wood, B. Dan and R. W. Waterman, The Dynamics of Control of Bureaucracy" APSR 85(3), 1991: 801-828.

Yantek, T., "Polity and Economy Under Extreme Economic Conditions: A Comparative Study of the Reagan and Thatcher Experiences" AJPS 32(1), 1988: 196-216.

VIII. Time Series Regression, Part One: Principles

REQUIRED

Hamilton, Chapter 8.

Pindyck and Rubenfeld, Sections 6.2 and 9.1.

Beck, N., "Comparing Dynamic Specifications: The Case of Presidential Approval" Political Analysis 3, J Stimson, editor, 1991: 51-88.

Box-Steffensmeier, J. and T. Lin, "A Dynamic Model of Campaign Spending in Congressional Campaigns" Political Analysis 6, J Freeman editor, forthcoming.

Recommended

Beck, N., "Estimating Dynamic Models is not Merely a Matter of Technique" Political

Methodology 11(1-2), 1985: 71-90.

Hibbs, D., "Problems of Statistical Estimation and Causal Inference in Time Series Regression Models" Sociological Methodology 1973-74, Chapter 10 (especially 252-307).

Grier, K. B., "On the Existence of a Political Monetary Cycle" AJPS 33(2), 1989: 376-389.

IX. Time Series Regression, Part Two: Simultaneous Equations

REQUIRED

Hamilton, Chapter 9.

Pindyck and Rubenfeld, Chapter 11.

Domke et al., "The Illusion of Choice: Defense in Advanced Industrial Democracies" APSR 77, 1983: 19-35.

Recommended

Jacobsen, G., "The Effects of Campaign Spending in Congressional Elections" APSR 72, 1978: 469-491.

X. Simulation and Calibration

REQUIRED

Pindyck and Rubenfeld, Chapters 12-13.

Freeman, J. "Toward A Computable Political Economic Equilibrium Model" Paper presented at the 1995 APSA Meeting, Chicago.

Huckfeldt, R. and C. Kohfeld, Race and the Decline of Class in American Politics. Chicago: University of Illinois Press, 1989, Selections.

Brady, H. (forthcoming) "Knowledge, Strategy, and Momentum in Presidential Primaries" Political Analysis 5, J. Freeman, editor, Ann Arbor: University of Michigan Press: 1-38.

Jackson, J. (forthcoming) "Political Methodology: An Overview" A New Handbook of Political Science Oxford: Oxford University Press.

XI. Pooling Cross-Sectional and Time Series Data

<u>**REQUIRED**</u>

Beck, N. and J. Katz (forthcoming), “Nuisance vs. Substance: Specifying and Estimating Time Series-Cross Section Models” <u>Political Analysis</u> 6, J. Freeman, editor, Ann Arbor: University of Michigan Press.

-------(forthcoming), “What to do (and not to do) With Time Series-Cross-Section Data” <u>APSR.</u>

Burkhardt, R. and M. Lewis-Beck, “Comparative Democracy: The Economic Development Thesis” <u>APSR</u> 88, 1994: 903-910.

Stimson, J., “Regression in Time and Space” <u>AJPS</u> Nov., 1985.

<u>**Recommended**</u>

Alvarez, M., P. Lange, and G. Grant, “Government Partisanship, Labor Organizations and Macroeconomic Performance” <u>APSR</u> 85(2), 1991: 539-556.

Hicks, A. and D. Swank, “Politics, Institutions and Welfare Spending in Industrialized Democracies” <u>APSR</u> 86(3), 1993: 658-674.

Mebane, W., “Problems of Time and Causality in Survey Cross Section” <u>Political Analysis</u> vII, J. Stimson, editor, 1991: 75-96.

Swank, D., “Politics and Structural Dependence of the State in Democratic Capitalist Nations” <u>APSR</u> 86(1), 1992: 38-54.

Zuc, G. and W. Thompson, “The Post-Coup Military Spending Question: A Pooled Cross-Sectional Time Series Analysis” <u>APSR</u> 76: 60-74.

XII. "Reduced Form" Methods

REQUIRED
Hamilton, Chapters 10-11.

Freeman, J., "Granger Causality and the Time Series Analysis of Political Relationships" AJPS, 1983: 327-358.

---------, J. Williams, and T. Lin, "Vector Autoregression and the Study of Politics" AJPS 1989: 842-877.

Freeman and Alt, "The Politics of Public and Private Investment in Britain" The Comparative Political of the Welfare State Hicks and Janoski eds., NY Cambridge Press, 1994: 136-168.

Recommended

Goldstein, J. and J. Freeman, Three Way Street: Strategic Reciprocity in World Politics Chicago: University of Chicago Press, 1990.

Williams, J., "The Political Manipulation of the Macroeconomic Policy" APSR 84(3), 1990: 767-795.

XIII. Unit Roots, Cointegration, and Error Correction Models

REQUIRED

Ostrom, C. W. and R. M. Smith, "Error Correction, Attitude Persistence and Executive Rewards and Punishments: A Behavioral Theory of the Presidential Approval" Political Analysis 4, J. Freeman editor, Ann Arbor: University of Michigan Press, 1993: 127-184.

Durr, R., "An Essay on Cointegration and Error Correction Models" Ibid.: 185-228.

Williams, J., "What Goes Around, Comes Around: Unit Root Tests and Cointegration" Ibib.: 229-236.

Beck, N., "The Methodology of Cointegration" Ibib.: 237-248.

Smith, R., "Error Correction, Attractions and Cointegration" Ibib.: 249-254.

Durr, R., "Of Forest and Trees" Ibib.: 255-258.

Recommended

Hamilton, Chapters 15-20.

Durr, R., “What Moves Policy Sentiments?” APSR 87(1): 158-172.

XIV. Review and Retrospectives

REQUIRED

Re-Read materials from Week I