

C&RP 821: REGIONAL PLANNING STUDIO

Time: Tuesday/Thursday, 9:30-11:30 a.m.
Place: 274 Brown Hall
Credit: 5 hours
Call No.: 04136-1

COURSE DESCRIPTION

This is a "project" oriented course, that will enable the students to analyze the socio-economic structure and trends of Ohio's coal producing region, and to assess the regional economic impacts of the 1990 Clean Air Act Amendments (CAAA). Indeed, the 1990 CAAA requires Ohio electric utilities to drastically reduce their SO₂ emissions by the year 2000. Because these utilities have been the major consumers of Ohio's high-sulfur coal, the widespread compliance strategy involving shifting to out-of-state low-sulfur coals has impacted the economic and social structure of many of Ohio's 24 coal-producing counties. The public policy problem is then how to balance the cost minimization goal of the electric utility industry with the high social costs of unemployment and community disruption. Gathering and analyzing data pertaining to these issues is the basic goal of the studio, which will be structured into several individual/team subprojects involving the implementation of various economic analysis and quantitative methods, and the extensive use of the computer to analyze large-scale data bases.

COURSE METHOD

Information pertinent to the project is provided to the students through lectures and readings. All the materials included in the reference list are available in closed reserve at the Science and Engineering Library. Additional material will be provided as needed.

Students will be grouped into teams, and each team will be responsible for carrying out a specific subproject. However, the methodological approaches to be used will be discussed and decided by all students and the instructor in class. Large-scale data bases have been prepared by the instructor and are available on magnetic tapes that can be accessed on the IBM 3081 Mainframe. Information will also be provided regarding access to the Censuses of Population and Housing and County Business Patterns, CD-ROMs, and the WWW. Students are encouraged to use the SAS statistical package but other packages (e.g., spreadsheets) may also be considered, in consultation with the instructor. The instructor will provide an introduction to the SAS package and will be available throughout the course to help the students with their programming. Students interested in using linear programming will be able to use the GAMS package.

The following research themes are envisioned:

- 1) Analysis of Ohio's electric utilities
 - a) Statistical analysis of monthly fuel purchases by Ohio's electric utilities, using data from the Federal Energy Regulatory Commission (FERC) Form 423 for the years 1993 through 1997, to assess trends in fuel (coal, oil, natural gas) amounts, costs, and qualities (sulfur content, ash content, Btu value). Models may be estimated with regression analysis to explain relationships between fuel market shares, costs, and qualities. These files can be downloaded from the EIA (Energy Information Administration) Web site.
 - b) Statistical analysis of monthly power generation by Ohio's power plants, using data from the Energy Information Administration (EIA) Form 759 for the years 1992 through 1997, leading to forecasts of future power needs in Ohio. These files can be downloaded from the EIA Web site.

c) Analysis of the Clean Air Act Database, downloadable from the EIA Web site, to analyze the compliance strategies of the Ohio power plants.

d) Development of a linear programming model for an electric utility to minimize its fuel purchases and pollution emissions control costs, using Ohio data and the GAMS package.

2) Analysis of Ohio coal mining activities

Statistical analysis of coal production patterns at individual mines in Ohio, to relate output (tons of coal per year) with labor and other production inputs. Using data available from the Ohio Department of Natural Resources. Data files will be prepared, and models of coal mining production will be estimated.

3) Analysis of air quality and acidification

Analysis of NO_x and SO₂ concentration data from the EPA AIRSData Web site, and acidity data (sulfates, nitrates, pH) data from the NADP (National Atmospheric Deposition Program). Assessment of spatial variations and temporal trends.

4) Analysis of the socio-economic structure of Ohio's coal region

This subproject will make use of data from the 1990 Census of Population and Housing to analyze the demographic characteristics of the population in the coal-producing counties (e.g., age structure, education, labor occupation, income), as well as the characteristics of the housing stock (size, age, value, equipment).

4) Analysis of employment impacts

Various employment impact assessment methodologies, such as the economic base model, the shift-share model, and the input-output model, will be considered. The data available include the County Business Patterns files for Ohio and the whole U.S., as well as the 1992 National Input-Output tables.

Each student team will have the responsibility to read thoroughly the reserve materials (an possibly other pieces) pertaining to its specific subproject, and make in-class presentations of this material for the benefit of all students. Discussions will then take place among all students with regard to choice of methodology and implementation of the approach.

COURSE SCHEDULE

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| Week 1 | Instructor's presentation of the studio: issues, data bases, general research framework, computer programming |
| Weeks 2-5 | Elaboration of research methodologies through readings and class discussions. Data gathering, and preliminary analyses |
| Weeks 6-8 | Data analyses--Model developments--Policy analyses |
| Week 9 | Presentation of results in class |
| Week 10 | Submission of team research reports |

GRADING

Students will be graded as follows:

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| Oral Presentation of research progress | 25% |
| Class discussions | 25% |
| Final reports | 50% |

READINGS (on closed reserve at the Science and Engineering Library)

1. Coal - General

Energy Information Administration, 1996. Coal Industry Annual 1995, Report DOE/EIA-0584 (95), U.S. Department of Energy, Washington, D.C., October.

_____, 1995. Energy Policy Act Transportation Rate Study: Interim Report on Coal Transportation, Report DOE/EIA-0597, U.S. Department of Energy, Washington, D.C., October.

_____, 1995. Longwall Mining, Report DOE/EIA-TR-0588, U.S. Department of Energy, Washington, D.C., March.

_____, 1996. U.S. Coal Reserves: A Review and Update, Report DOE/EIA-0529(95), U.S. Department of Energy, Washington, D.C., August.

2. Coal - Ohio

Energy Ventures Analysis, Inc., 1991. Forecast of Availability and Prices of Alternative Coals to the Gavin Power Plant. Report prepared for the Public Utilities Commission of Ohio, April.

1994 Report on Ohio Mineral Industries. Department of Natural Resources, State of Ohio, Columbus, Ohio, 1005.

3. The 1990 CAAA

Energy Information Administration, 1994. Acid Rain Compliance Strategies for the Clean Air Act Amendments of 1990, Report DOE/EIA-0582, U.S. Department of Energy, Washington, D.C., March.

Energy Information Administration, 1995. Electricity Generation and Environmental Externalities: Case Studies, Report DOE/EIA-0598, U.S. Department of Energy, Washington, D.C., September.

Argonne National Laboratory, 1993. Examination of Utility Phase I Compliance Choices and State Reactions to Title IV of the Clean Air Act Amendments of 1990, Report ANL/DIS/TM-2, Argonne, IL, November.

Argonne National Laboratory, 1994. Synergies and Conflicts in Multimedia Pollution Control Related to Utility Compliance with Title IV of the Clean Air Act Amendments of 1990, Report ANL/DIS/TM-3, Argonne, IL, January.

Molburg, J.C., 1993. "The Utility Industry Response to Title IV: Generation Mix, Fuel Choice, Emissions and Costs," Air and Waste, 43: 180-186.

4. Energy and Coal Regional Models

Lakshmanan, T.R., and R. Bolton, 1986. "Regional Energy and Environmental Analysis," in Handbook of Regional and Urban Economics, Vol. I (ed. P. Nijkamp), Elsevier Science Publishers.

Schlottman, A., 1976. "A Regional Analysis of Air Quality Standards, Coal Conversion, and the Steam-Electric Coal Market," Journal of Regional Science 16, 3: 375-387.

Yang, C.W., 1990. "An Evaluation of the Maxwell-Boltzmann Entropy Model of the Appalachian Steam Coal Market," Review of Regional Studies 20, 1:21-29.

Solomon, B.D., and J.J. Pyrdol, 1986. "Delineating Coal Market Regions," Economic Geography, 62, 2:109-124.

5. Coal Mines Econometric Models

Kruvant, W.J., C.E. Moody, Jr., and P.L. Valentine, 1982. "Sources of Productivity Decline in U.S. Coal Mining, 1972-1977," The Energy Journal 3, 3:53-70.

Sider, H., 1983. "Safety and Productivity in Underground Coal Mining," Review of Economics and Statistics 65, 2: 225-233.

Berger, M.C., and J.E. Garen, 1990. "Heterogeneous Producers in an Extractive Industry - Factor Demand in Underground Coal Mining," Resources and Energy 12, 4:295-310.

6. Economic Impact Analysis

6.1 General

Richardson, H.W., 1985. "Input-Output and Economic Base Multipliers: Looking Backward and Forward," Journal of Regional Service 25, 4: 607-60.

6.2 Economic Base Models

Isserman, A.M., 1977. "The Location Quotient Approach to Estimating Regional Economic Impacts," Journal of the American Institute of Planners 43: 33-41.

_____, 1980. "Estimating Export Activity in a Regional Economy: A Theoretical and Empirical Analysis of Alternative Methods," International Regional Science Review 5, 2: 155-84.

Hinojosa, R.C., and A.J. Rios, 1991. "Constructing Economic Base Models for Developing Countries: Lessons from a Case Study in Panama," International Regional Science Review 14, 2: 149-62.

6.3 Input-Output Models

Cochrane, S.G., 1990. "Input-Output Linkages in a Frontier Region of Indonesia," International Regional Science Review 13, 1 & 2: 183-203.

Robison, M.H., and J.R. Miller, 1991. "Central Place Theory and Inter-Community Input-Output Analysis," Papers in Regional Science 70, 4: 399-417.

6.4 Shift-Share Models

Stevens, B.H., and C.L. Moore, 1980. "A Critical Review of the Literature on Shift-Share as a Forecasting Technique," Journal of Regional Science 20 4: 419-37.

Fothergill, S., and G. Gudgin, 1979. "In Defence of Shift-Share," Regional Studies, 16, 309-319.

Beck, R.J., and W.M. Herr, 1990. "Employment Linkages from a Modified Shift-Share Analysis: An Illinois Example," The Review of Regional Studies 20, 3: 38-45.

Barff, R.A., and P.L. Knight, III, 1988. "Dynamic Shift-Share Analysis," Growth and Change, Spring, pp. 1-10.