Infratrain 2014

Efficiency Analysis of Municipal Services & Infrastructure

06.10.2014 – 10.10.2014

Program

Venue: TU Berlin (Room H 3008)

Instructors:

Prof. Dr. Peter Bogetoft

Co- Trainers:

Dr. Astrid Cullmann, Dr. Maria Nieswand, Stefan Seifert, Caroline Stiel, Dr. Michael Zschille,

Outline

This course has a focus on efficiency and productivity of public and private infrastructure companies in the field of electricity and water. These companies operate under an increased pressure to reduce costs with intensive competitive and regulatory pressures. This course provides an overview of theory-based empirical methods to understand the particular decision making behavior of municipal infrastructure companies:

- Concept of rational inefficiency and the interaction between local authorities and firms,
- Assessment of the effects of mergers on efficiency and cost reduction potentials,
- Investment behavior of the companies under incentive regulation.

Besides reviewing production theory and general principles of efficiency analysis, this course focuses on the theoretical concept of rational inefficiency and its empirical application. Furthermore, state of the art econometric methods and advanced methods of efficiency analysis are introduced and applied to firm level panel data as well as municipality data. Participants should have a thorough knowledge of microeconometrics, nonparametric and parametric efficiency analysis and the software R.

Trainer: Prof. Dr. Peter Bogetoft, Copenhagen Business School and Yale School of Management. His research includes decision and game theory, contract theory and regulation, performance evaluation and benchmarking. It ranges from pure theory, over empirical testing of theory, to normative applications in regulation, contract design and decision support. He has been involved in a series of projects with industry and governmental bodies in many European countries, in particular with respect to regulation and benchmarking.

Day 1 – Monday 06.10.2014

14.00 – 15.30 Lecture 1 + Exercise: Analysis of industry structures I (Michael Zschille)

- Structural considerations play an important role in the regulation of network industries. After a brief introductory overview over water industries in selected countries, we focus on empirical approaches to the measurement of scale and integration economies as well as gains from horizontal mergers.

- Complementary Literature:
  - Saal, D.S., Arocena, P., Maziotis, A. and Triebs, T. (2011) Scale and scope economies and the efficient configuration of the water industry: a survey of the literature. Review of Network Economies 12/1, pp. 93-129.
  - Fraquelli, G., Piacenza, M. and Vannoni, D. (2004) Scope and scale economies in multi-utilities: evidence from gas, water and electricity combinations. Applied Economics 36/18, pp. 2045-2057.
  - Erbetta, F. and Rappuoli, L. (2008) Optimal scale in the Italian gas distribution industry using data envelopment analysis. Omega 36/2, pp. 325-336.
  - Cooper, W.W., Seiford, L.M. and Tone, K. (2007) Chapter 14: Economies of scope and capacity utilization. In: Data Envelopment Analysis. Second Edition. Springer Science+Business Media, LLC.

16.00 – 17.30 Lecture 2 + Exercise: Analysis of industry structures II (Michael Zschille)

- Based on the concept of scale and integration economies, we focus on empirical approaches to the analysis of horizontal mergers.

- Complementary Literature:
  - Bogetoft, P. and Wang, D. (2005) Estimating the potential gains from mergers. Journal of Productivity Analysis 23/2, pp. 145-171.
  - Lovell, C.A.K. (2003) The decomposition of Malmquist productivity indexes. Journal of Productivity Analysis 20/3, pp. 437-458.

18.30 – open end Own group work

- Application of scale and integration economies as well as gains from horizontal mergers in R.

Day 2 – Tuesday 07.10.2014

9.00 – 10.30 **Lecture 3 + Exercise: Rational Inefficiency and Applications to Banks, Water Works and other area (Peter Bogetoft)**

- Complementary Literature:
  - Bogetoft, P. und Hougaard, J.L. (2003): Rational inefficiencies. Journal of Productivity Analysis 20(3), 243-271.

10.45 – 12.15 **Seminar 1: Rational Inefficiency in the German Public Electricity Distribution Sector + Research Ideas (Maria Nieswand, Pio Baake, Lilo Wagner)**

- Complementary Literature:
  - Cazals, C., Florens, J.-P., and Simar, L. (2002). Nonparametric frontier estimation: A robust approach. In: Journal of Econometrics, 106(1):1-25.
  - De Witte, K. and Kortelainen, M. (2013). What explains the performance of students in a heterogeneous environment? Conditional efficiency estimation with continuous and discrete environmental variables. In: Applied Economics, 45(17):2401-2412.
  - Bădin, L. & Daraio, C., and Simar, L. (2012). How to measure the impact of environmental factors in a nonparametric production model. In: European Journal of Operational Research, Vol. 223(3): 818 833.
  - Bădin, L. & Daraio, C., and Simar, L. (2014). Explaining inefficiency in nonparametric production models: The state of the art. In: Annals of Operations Research, Vol. 214(1): 5-30.

14.00 – 15.30 **Seminar 2: Benchmarking Municipalities and Public Companies (Maria Nieswand, Stefan Seifert)**

- Complementary Literature:
  - De Borger, B. and Kerstens, K. (1996a). Cost efficiency of Belgian local governments: A comparative analysis of FDH, DEA, and econometric approaches. Regional Science and Urban Economics, 26(2), 145-170.
  - De Borger, B. and Kerstens, K. (1996b). Radial and non-radial measures of technical efficiency: An empirical illustration for Belgian local governments using an FDH reference technology. Journal of Productivity Analysis, 7(1), 41-62.
  - De Borger, B. and Kerstens, K. (2000). What is known about municipal efficiency? the Belgian case and beyond. In Blank, J. L. T., editor, Public provision and performance, pages 299-330. North-Holland, Amsterdam.
  - De Borger, B., Kerstens, K., Moesen, W., and Vanneste, J. (1994). Explaining differences in productive efficiency: An application to Belgian municipalities. Public Choice, 80(3-4), 339-358.
  - Balaguer-Coll, M. T., Prior, D., and Tortosa-Ausina, E. (2013). Output complexity, environmental conditions, and the efficiency of municipalities., Journal of Productivity Analysis, 39(3), 303-324.

16.00 – 17.30 **Own group work (Rational Inefficiency and Municipalities)**

Day 3 – Wednesday 08.10.2014

9.00 – 10.30 **Seminar 3: Multi-Utilities in Germany – Analysis of FDZ Data - Ownership and Productivity (Caroline Stiel)**

- Sector overview multi-utilities in Germany: industry structure, firm strategy and production process of German multi-utilities after liberalization
- Application: research project 'Measuring productivity of German multi-utilities'
- Introduction to FDZ data
- How to analyze ownership in FDZ data with R

10.45 – 12.15 **Seminar 4: Sector Overview - Electricity Distribution - Investment, Efficiency, Ownership (Astrid Cullmann, Maria Nieswand)**

- Sector overview electricity distribution companies in Germany
- Introduction on how to analyze investment behavior of electricity distribution companies (impact of implementation of incentive regulation on investment behavior)
- Modelling Investment behavior and efficiency

- Complementary Literature:

  - Poudineh, R. Jamasb, T. (2013) Investment and Efficiency under Incentive Regulation: The Case of the Norwegian Electricity Distribution Networks
  - Cambini, C. & Rondi, L. (2010) Incentive regulation and investment: evidence from European energy utilities, Journal of Regulatory Economics, 2010, 38, 1-26
  - Guthrie, G. Regulating Infrastructure (2006): The impact on risk and investment Journal of Economic Literature, 2006, 44, 925-972.

14.00 – 15.30 **Seminar 5: Student Presentations I**

- **Helena & Lisa:** Current Research Project (title tba)
- **Michael & Phillipp:** Current regulatory TSO Benchmarking practice
- **Sébastian:** Incentives for investments: Comparing EU electricity TSO regulatory regimes

16.00 – 17.30 **Seminar 6: Research Ideas for Group Work**

Potential research topics:

- Electricity distribution with FDZ data, ownership structure, investment

- Water distribution companies with FDZ data, ownership structure, rational inefficiency with municipal data
- Norwegian data of electricity distribution companies, investment and efficiency
- FLW estimation, application to gas distribution companies (BDEW data)
- Municipality benchmarking with German data

18.30 – open end **Own Group Work (Start with INFRATRAIN Research Project)**

Day 4 – Thursday 09.10.2014

9:00– 10.30 Seminar 7: Student Presentations II

- **Julia, Luise & Helene:** Capital Structure and Regulation: Do Ownership and Regulatory Independence Matter
- **Awdesch:** Semiparametric Estimation of Determinants of Inefficiency with Application to Financing Constraints
- **Gerrit:** Quality frontier of electricity distribution: Supply security, best practices, and underground cabling in Finland

10.45 – 12.15 **Own Group Work (INFRATRAIN Research Project)**

14.00 – 18.00 **INFRADAY Conference**

Day 5 – Friday 10.10.2014

9.00 – 10.30 **Own Group Work (INFRATRAIN Research Project)**

10.45 – 12.15 **Own Group Work (INFRATRAIN Research Project)**

14.00 – 16.00 **FINAL PRESENTATION**