

EFFICIENCY AND PRODUCTIVITY ANALYSIS – STOCHASTIC APPROACHES

Instructors

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Course Description

The course on stochastic approaches to efficiency and productivity analysis will introduce the participants to the analytical concepts in economics and econometrics which constitute the basis of stochastic frontier analysis. Based on these foundations, we will discuss various specifications of econometric frontier models and their applications in agricultural economics. The stochastic frontier approach, in conjunction with the microeconomic theory of the firm, provides firm-specific estimates of efficiency and best-practice models for improving performance. The learning objectives address both conceptual and methodological issues in order to help in bridging the gap between theory and practice. To accomplish this objective, theory and method sessions will be followed by concrete examples of empirical applications and practical exercises. Upon completion of this course, students will understand the underlying theory and become familiar with selected software packages to initiate their own research project using parametric approaches to modeling efficiency and productivity.

This course on stochastic approaches to efficiency measurement can be complemented by a course on deterministic approaches. Both courses are based on one week block courses. Students may enroll for either the deterministic or parametric course, or both courses. Students are encouraged to take both parts, although each part is independent.

Course Outline - Topics

I. Foundations of Stochastic Frontier Analysis SFA

- Primal and dual perspectives to efficiency and productivity measurement
- Definitions of technical, allocative and scale efficiency
- Econometric foundations of SFA
- Testing in SFA based on maximum likelihood estimations
- Use of production, cost, and distance frontier functions

II. Potential of panel data for efficiency estimation and explaining technical efficiency

- Profit function perspective
- Econometric models using panel data in estimation of primal and dual functions
- One-stage and two-stage estimations of stochastic frontier model

III. Conceptual and specification view on productivity growth measurement, relation to efficiency

- Productivity growth definition
- Decomposition with inefficiency
- Specification of sources of inefficiency and productivity growth

V. Extensions of parametric approaches

- Dynamic characterization of efficiency
- Latent class models
- Risk effect analysis

Teaching methods

Lectures (60 %), exercises (20 %), group work (20 %);

Credit points

3

Requirements

Microeconomic theory at the graduate level such as the treatment in H. Varian, *Microeconomic Analysis*, W.W. Norton. Econometric theory and applications at the graduate level to include topics in Maximum Likelihood Estimation and System Estimation are required and some exposure to panel data econometrics is desirable. Participation in the course to “efficiency and productivity analysis – deterministic approach” is recommended.

Suggested readings

COELLI, T., RAO, P., BATTESE, G. (1998): *An introduction to efficiency and productivity analysis*, Kluwer Academic Publishers, Boston/Dordrecht/London.

KUMBHAKAR, S., LOVELL, C.A.K. (2000), *Stochastic Frontier Analysis*, Cambridge University Press.

Software

Frontier 4.1, LIMDEP, OxMetrics

Organisation and time

The course is organised as a one-week (5 full days) block module. It will be held preferably in Göttingen.

Language

English