Organized by:

Faculty of Economics & Business
PADJADJARAN UNIVERSITY

In Collaboration with:

WAGENINGEN UR
For quality of life

THEORY AND PRACTICE OF EFFICIENCY & PRODUCTIVITY MEASUREMENT: STATIC & DYNAMIC ANALYSIS

Subal Kumbhakar, Hung-Jen Wang,

Spiro Stefanou, Alfons Oude Lansink

4-8 and 11-15 January 2016

Course organised by the Faculty of Economics and Business, Universitas Padjadjaran, Indonesia

In collaboration with
WAGENINGEN UNIVERSITY, the Netherlands

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Introduction & objectives of the course

Productivity growth entails changes in scale, efficiency gains and technological change. Innovations are needed to keep pushing the competitive envelope, and efficiency gains are needed to ensure that implemented technologies achieve their potential. Conventional economic approaches assume that all firms operate rationally and efficiently. This summer course, however, challenges this assumption and presents concepts, models and tools needed to analyze and quantify the levels of inefficiency and productivity at a point in time and their movement over time.

The summer course is designed to bridge the gap between theory and practice. It is organized into distinct parts: "Parametric, Static Approaches" (Week 1) and "Dynamic Approaches (parametric and non-parametric)" (Week 2). Participants may enrol for either week 1 or 2, or both weeks. Although each week is independent, participants are encouraged to take both weeks.

Week 1 (4 - 8 January 2016): Parametric Efficiency and Productivity Analysis

Instructors:
Professor Subal C. Kumbhakar, Binghamton University
Professor Hung-Jen Wang, National Taiwan University

Teacher Assistant:
Maman Setiawan, Universitas Padjadjaran

Participants will be introduced to a set of parametric models for efficiency and productivity estimation with applications that illustrate the use of each of the models. The applications will include production, cost, distance functions, etc. Special emphasis will be given to modeling and estimating production/cost efficiency models using the stochastic frontier (SF) approach. Stata programs will be used in the computer LAB sessions. By the end of the class participants will be able to undertake research projects on the efficiency and productivity measurement. Many of the course materials are based on "A Practioner's Guide to Stochastic Frontier Analysis Using Stata" (Cambridge University Press, 2015).

Week 2 (11– 15 January 2016): Dynamic Efficiency and Productivity Analysis

Instructors:
Professor Spiro Stefanou, University of Florida
Professor Alfons Oude Lansink, Wageningen University

Teacher Assistant:
Maman Setiawan, Universitas Padjadjaran

The dynamic efficiency course presents nonparametric approaches (e.g. Data Envelopment Analysis) to measuring efficiency and productivity. These concepts are extended to measuring dynamic efficiency and productivity both parametrically and non-parametrically. The sources of economic dynamics include: i) economic forces (e.g., adjustment costs and financial constraints), ii) technological characteristics (e.g., physical/biological nature of production, and vintage investment/stock non-convexities like we see with lumpy investment), and iii) cognitive capacity (e.g., learning to adapt to new asset levels).

Course activities

The course consists of theory and method sessions in the morning followed by an afternoon practicum session. The practicum will include applications of the theory, computer analyses with actual data sets, and interpretations in practice. Applications to various economic sectors will be considered such as agriculture, banking and finance, chain management, health, electrical power generation, and sports. Extensions of these models will be addressed that measure the efficiency of value chains, characterize the dynamic linkages in decision making, and introduce hybrid nonparametric-parametric approaches.

Objectives

Participants will learn the theories concerning efficiency and productivity measurement and will develop proficiency with software to facilitate the initiation of their own research in efficiency and productivity measurement. The course deals with both conceptual and methodological issues.

In particular, participants will understand the following from either course:

- Sources of efficiency from the perspective of technical feasibility, allocating scarce resource among competing ends, and the firm scale of operations;
- The input and output perspectives of technical and allocative efficiency;
- Characterizations of efficiency and productivity growth from a primal, dual and distance function perspectives;
- Decomposition of productivity growth that explicitly accounts for the presence of inefficiency;
- Use DEA models to measure technical, allocative, and scale efficiency levels and productivity growth;
- Characterize definitions of variables of interest to be employed (goods and services; inputs, outputs, environmental, nonmarket goods/services);
- Assess the appropriate use of parametric and nonparametric approaches given the data and problem setting (understanding the advantages and disadvantages of both perspectives);
- Use these approaches to articulate the forces driving efficiency gains and productivity growth;
- Use these approaches for benchmarking, identifying best practice and role models to plan for performance enhancement/gains;

The Dynamic Analysis course will further cover:

- Delineation of variable and quasi-fixed factors and their treatment in efficiency and productivity (Dynamic Course);
- Use econometric approaches to address efficiency and productivity change measurement over time (Dynamic Course).

Target group

The course is oriented toward faculty members, government agencies, researchers, postgraduate students, practitioners, and others with background in any field of economics.

Assumed prior knowledge

Microeconomic theory at the graduate level such as the treatment in H. Varian, Microeconomic Analysis, W.W. Norton. Completion of a course in dynamic optimization is strongly recommended. 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.

For the participants who wants to review some basic concepts about the productivity and efficiency as well as the software used for the summer courses, the organizer will probably set a half-day tutorial, one day before the summer course.

Course Materials

Subal C. Kumbhakar and C. A. Knox Lovell, "Stochastic Frontier Analysis", Cambridge University Press, 2000. (Parametric and Dynamic Course) Reading materials on dynamic production analysis prepared by the authors will be sent to participants in advance of course.

Subal C. Kumbhakar, Hung-Jen Wang, and Alan Horncastle, "A Practitioner's Guide to Stochastic Frontier Analysis Using Stata", Cambridge University Press, 2015.
http://www.cambridge.org/zw/academic/subjects/economics/econometrics-statistics-and-mathematical-economics/practitioners-guide-stochastic-frontier-analysis-using-stata

Christopher F. Parmeter and Subal C. Kumbhakar (2014), "Efficiency Analysis: A Primer on Recent Advances", Foundations and Trends® in Econometrics: Vol. 7: No. 3–4, pp 191-385. http://www.nowpublishers.com/articles/foundations-and-trends-in-econometrics/ECO-023

Participants should make sure they have these books before the course starts (books are not included in participation fee). Articles and other accompanying materials will be distributed during the course.

Language

The course will be taught in English.

Software

Software in the computer lab will be used to solve empirical data sets. (R and/or Stata will be used)

Duration

Two full weeks comprising 2 distinct parts each of which can be taken separately. Each course will involve daily sessions, with a 3-hour theory session in the morning and a 3-hour practicum session in the afternoon.

Course fees

The course fee for each week is €550 (Rp. 5 million for Indonesian citizen). For those registering for both weeks the course fees are €900 (Rp. 9 million for Indonesian citizen). The course fee does not include books. It includes additional training material, coffee/tea break, lunches and an informal dinner.

Outline of the Course in Hours (Only for Postgraduate Students)

For each week of the summer course, participants who needs credits (ECTS) will have to make a take home exam, which in turn makes them eligible to obtain the amount of 3 credits (according to ECTS). That means a work load of 84 hours for each part of the summer course and in total 168 hours of preparation, attendance and exam.

Schedule

Parametric Efficiency & Productivity Analysis Course Schedule and Plan, January 4-8, 2016

Day	Lecture	Practicum
1	Objective: Notions of efficiency from a primal perspective will be introduced and the use of both the primal and distance function perspectives will be discussed. The emphasis will be on technical efficiency in a single output framework. (a) Introduction (b) Cross-Sectional Methods i. Distribution Free Methods ii. Maximum Likelihood Methods (d) Estimating Firm-Specific Inefficiency i. Confidence Intervals ii. Tests of Correct Distributional Form	• Basics of Stata. • Estimation/Inference of Cross-Sectional SF models.
2	Objective: Introduce determinants of inefficiency and model testing. (a) Determinants of Inefficiency i. The Scaling Property ii. Mean versus Variance Effects (b) Skewness i. Tests of Skewness ii. The Wrong Skew Problem (c) Model specification tests (d) Measurement of Technical Change	• Estimation of SF models with inefficiency determinants. • Model Testings.
3	Objective: Introduce panel SF models and system methods on SF modeling. (a) Panel Data Methods i. Distribution Free Methods ii. Maximum Likelihood Estimation iii. Time Constant Variables (b) System Methods: Introduction	• System Estimation/Inference of panel SF models.
4	Objective: Introduce SF cost system models and some alternative models. (a) Cost System Issues i. Input/Output Oriented Inefficiency ii. Fixed Inputs iii. Greene Problem (b) Alternative SF models (mixture models/Zero Inefficiency SF)	• Estimation of SF cost system models.
5	Objectives: Multiple outputs, Distance functions, TFP and profitability decomposition, and applications of the stochastic frontier models in other fields. (a)Multiple output technology i. Transformation function models ii. Distance function models (input and output distance functions) (b)TFP and profitability decomposition i.Decomposition using production function ii. Decomposition using cost function iii.Decomposition using input and output distance functions	• TFP decomposition • two-tier frontier estimation

	(c) Applications of the stochastic frontier models in other fields. Estimation of Non/semiparametric SF models in R and Stata – LAB session (Afternoon). i. wage discrimination (labor market) ii. financing constraints (financial market) iii. IPO underpayment (capital market) iv. two-tier frontiers, etc.	

Dynamic Efficiency & Productivity Analysis Schedule and Plan, January 11-15, 2016

Day	Lecture	Practicum
1	Establishing Production Technologies • Nonparametric representation of technology (SES) ○ Axioms ○ Constructing cost and profit maximization as LP problem • Radial Distance Functions (SES) ○ Input distance functions ○ Output distance functions ○ Duality between input distance functions and Cost function ○ Duality between output distance functions and Revenue function • Directional Distance Functions (AOL) ○ Definition and properties ○ Translation ○ Duality between Directional Distance function and Cost and Profit functions	Introduction to R for nonparametric analysis Computational approaches to DEA ○ Constructing nonparametric benchmark technologies ○ Generating cost and profit maximization problems for actual data using nonparametric technology framework ○ Generating the nonparametric distance functions for actual cases
2	Characterizing Dynamic Production and Efficiency • Overview (SES) • Defining Dynamic Production Possibility Sets (SES) • Congestion & Weak Disposability (SES) • Dynamic Optimization (SES) • Technical Efficiency measures (AOL) ○ Graphically piece-wise linear technology ○ Radial & Directional Distance measures Representing Dynamic Production Possibilities • Input Requirement Set (SES) • Measuring the boundaries with DEA (SES)	Starting Dynamic DEA Application: NY Dairy Farm panel; US electric utility firms panel
3	Representing Dynamic Production Possibilities • Cost Efficiency (AOL) • Dynamic Duality with the directional input distance function (AOL) • Decomposition of cost efficiency (allocative & technical) (AOL) • Efficiency of variable and quasi-fixed factors of production (AOL) Dynamic Econometric Approaches • Stochastic Frontier Estimation (SES) • Dynamic Directional Distance (SES) • Dynamic Dual Approaches (SES)	Operationalizing efficiency concept measurement with Dynamic DEA Application: Variety of panel data sets. Parametric estimation of dynamic stochastic frontiers, dynamic shadow cost function system Application: Using panel of dairy farms; electric utility panel
4	Productivity Growth (SES) • Defining TFP Growth under dynamic adjustment (SES) • TFP growth decompositions (SES) • Nonparametric Approaches (AOL) • Parametric Approaches to: (SES) ○ Dynamic duality ○ Dynamic directional distance function	TFP Growth estimates using econometric estimation of ○ Dynamic Dual system with efficiency ○ Dynamic Directional Distance Function with efficiency Application: EU country-level panel of food manufacturing

5	Some New Directions & Discussion New Directions: (SES/AOL) • Evolution of Efficiency (advanced) • Incorporating real options and dynamic efficiency Open Questions (SES/AOL) • Parametric v. Nonparametric • Structural Modeling v. Technical Modeling • Where is the literature going?	

Location

The sessions will be held in building "Training Centre UNPAD", Jl. Ir. H. Juanda No.4 Bandung, Indonesia. The exact rooms will be announced later.
Morning sessions:
9.00-12.00 Lecture room {to be determined}
Afternoon sessions:
13.30-17.00 Computer room {to be determined}

Registration

Registration is possible electronically via the FEB UNPAD courses page:
http://ssc2016.feb.unpad.ac.id/registration
The maximum number of participants is set at 30, the minimum at 20.

Please make sure that you provide the most recent contact details so that in case of any changes you will be notified promptly. After your internet registration you will receive a short notification that your name has been registered. At least two weeks before the course you will receive a confirmation about the location and the schedule. You will also be sent an invoice to the e-mail address indicated in the registration form.

Please e-mail to maman.setiawan@fe.unpad.ac.id and ade.maulana@fe.unpad.ac.id in case you have not received the second confirmation two weeks before the course.

Cancellations

Cancellations may be made free of charge until 1 month before the start of the course. A cancellation fee of 100 % applies if participants cancel the course less than 1 month prior to the course. The organisers have the right to cancel the course not later than 1 month before the course starts. The participants will be notified of any changes at their e-mail addresses.

Further information

If you require further information about the course content, then please contact the course organiser Maman Setiawan at: maman.setiawan@fe.unpad.ac.id

More information on UNPAD can be found at: http://ssc2016.feb.unpad.ac.id

For details about the logistics, accommodation, registration, fees, study materials, etc. please contact
Ade Maulana
Phone: +6281224594120
ade.maulana@fe.unpad.ac.id

Contact addresses:

Magister Ilmu Ekonomi
Universitas Padjadjaran
Jl. Cimandiri No. 6 Bandung
Jawa Barat
Indonesia

Useful information on accommodation for participants from outside Bandung

Our training centre also provides the hotel accomodation:
Training Centre UNPAD (*Costs to be determined*)
Jl. Ir. H. Djuanda (Dago) No. 4 Bandung

Hotels

Citarum Hotel:
30 euro for a room (including breakfast)
http://www.citarum-hotel.com

Holiday Inn Hotel: 64 Euro per room for two people (including breakfast)
http://www.holidayinn.com/hotels/gb/en/bandung

Serela Hotel: 55 euro per room for two people (including breakfast)
http://serelahotel.com/riau-bandung/

Amaris Hotel Cimanuk: 40 euro for a room for two people (including breakfast).
http://amarishotel.com/amaris-cimanuk

Progo Hotel: 25 Euro for a room (including breakfast)
http://www.hotelprogo.com/

Palais Dago Hotel:
35 euro for a 2 people room (including breakfast)
http://thepalaisdago.com

Dago Hotel:
40 euro for 2 people room (including breakfast)
http://royaldago.hargahotel.com/

Hyatt Hotel:
75 euro for two people room (including breakfast)
http://bandung.regency.hyatt.com/en/hotel/home.html

Santika Hotel:
80 Euro for two people room (including breakfast)
http://www.santika.com/santika-bandung

Luxton Hotel:
75 Euro for two people room (including breakfast)
http://theluxton.com/bandung/

From Soekarno-Hatta (CGK) Airport to Universitas Padjadjaran (UNPAD)

At the Airport you can buy a bus ticket after the arrival gate at first floor. Just follow the sign of "shuttle bus" to the left after the arrival gate and buy the ticket of PRIMAJASA BUS at the bus counter. The cost is Rp. 120.000 or is estimated about $10. The bus is scheduled every 30 minutes with a direct destination to Bandung. The trip from the airport to Bandung takes you about 3 (three) hours.

After arriving at the pool of Primajasa bus you have to take a taxy, this will cost Rp. 80000 or about $7. The taxy is already managed by the Primajasa Bus at the pool. This will take you about 35 (minutes) to Training Centre UNPAD Bandung.

From Husein-Sastranegara (BDO) Airport to Universitas Padjadjaran

Husein-Sastranegara airport is the small airport located in Bandung. After arriving at the airport, you have to take a taxy which you can find at the taxy counter. This will cost you about Rp. 75.000,- or about $ 7 with an estimated time of 25 minutes to reach the Training Centre UNPAD Bandung.