Group for Analysis of Performance in Economics and Management

Groupe d' Analyse de la Performance en Economie et Management

EWEPA IX
CONFERENCE PROGRAM

Wednesday, June 29, 2005

09:00-10:30	Registration, Coffee	Boulevard du Jardin Botanique, 43
10:30-11:00	Opening Remarks	
11:00-13:00	Keynote Address: Antonio Estache, World Bank Institute	
13:00-14:15	Lunch	*Jardin de Botanique*
14:15-16:15	Parallel sessions	Rue de Marais, 109
16:15-16:45	Coffee Break (third floor)	
16:45-18:45	Parallel sessions	

Thursday, June 30, 2005 – Friday, July 1, 2005

09:00-10:30	Parallel sessions	Rue de Marais, 109
10:30-11:00	Coffee Break (third floor)	
11:00-13:00	Parallel sessions	
13:00-14:15	Lunch	*Jardin de Botanique*
14:15-16:15	Parallel sessions	Rue de Marais, 109
16:15-16:45	Coffee Break (third floor)	
16:45-18:45	Parallel sessions	

Thursday, June 30, 2005

19:45	Transport to Conference Dinner	Boulevard Pacheco
20:00-23:00	Conference Dinner	Tram Museum

Saturday, July 2, 2005

09:00-19:00	Young Researchers' Workshop (see separate schedule)	Rue de Marais, 109

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Wednesday, June 29, 2005 **14:15-16:15**

Session 1-A **Advanced Parametric Approaches** **Room - 100** Chairman: *P. Wilson* Estimation and Inference in Stochastic Frontier Models *Paul W. Wilson - Leopold Simar* On Estimating the Mixed Effects Model *Alois Kneip - Wonho Song - Robin C. Sickles* Endogeneity Problems in the Estimation Of Multi-Output Technologies *Carlos Arias- David Roibás* Estimation of Technical and Allocative Inefficiency in a Translog Cost System: *Mike Tsionas - Subal Kumbhakar*	Session 1-B **Transportation and infrastructure** **Room - 101** Chairman: *M. Filippini* The Cost of Allocative Efficiency for Multioutput Cargo *Ana Rodríguez-Álvarez - Beatriz Tovar De La Fé - Lourdes Trujillo* Efficiency Measurement in Network Industries: Application to the Swiss Railway Companies *Mehdi Farsi - Massimo Filippini - William Greene* The Efficiency and Effectiveness Measurements for Worldwide Railway System in An Unified Framework *Ming-Miin Yu - Erwin T. J. Lin*
Session 1-C **Production under uncertainty** **Room - 300** Chairman: R *Chambers* Disentangling Risk and Inefficiency Using State-Contingent Frontiers *Chris O'donnell* Cost-based Asset Pricing and the Estimation of Stochastic Technologies *And The Estimation Of Stochastic Technologies"* Frontier analysis and non-linear pricing for quality in supply-chain relationships *Angelo Zago - Robert G. Chambers* Contingent price duality in a multi-output state-contingent production model *Walter Briec - Laurent Cavaignac*	Session 1-D **Agriculture** **Room - 301** Chairman: *A. Oude Lansing* Multi-Output Technical Efficiency for Hillside Farm Households in Central America Using Stochastic Distance Functions and DEA Methods *Daniel Solis - Boris Bravo-Ureta - Ricardo Quiroga* U.S. Dairy Farm Cost Efficiency *Loren Tauer - Ashok Mishra* "The Effects of Political Violence on Farm Household Efficiency: the Case of Colombia *Maria A. Gonzalez - Rigoberto Lopez* Structural change in transition: A role for organizational legitimacy? Evidence from Czech Agriculture *Jarmila Curtiss, Bernhard Brümmer, Tomas Medonos, Rob D. Weaver*

Wednesday, June 29, 2005 **16:45-18:45**

Session 2-A **Advanced Parametric Approaches** **Room - 100** Chairman: *S. Perelman* On the generation of a regular multiple-inputs multiple-outputs technology using parametric output distance functions *Sergio Perelman - Daniel Santín* Semiparametric Stochastic Frontier Models with Varying Coefficients:A Local Likelihood Approach *Kien Tran - Mike Tsionas - Giannis Karagiannis* Estimation of Technical and Allocative Inefficiency using a System-Wide Local Maximum Likelihood Approach *Efthymios G. Tsionas - Kien C. Tran - Giannis Karagiannis* A Robust Estimator for Performance Modeling *Guan Zhengfei - Alfons Oude Lansink*	Session 2-B **Transportation and infrastructure** **Room - 101** Chairman: *TBA* Efficiency benchmarking of Railway Infrastructure: a DEA approach *Bart Roets - Johan Christiaens* Economies of scope in European railways - an efficiency analysis *Heike Wetzel - Christian Growitsch* Market Size and Contract Design:What Determines Efficiency and Productivity in Urban Transit Systems? *Alvaro Costa - Ana Faria - Et Al.* Technical Efficiency Versus Rail Reforms: the case of Western European Railways *Cesar Rivera-Trujillo*
Session 2-C **Axiomatic Theory** **Room - 300** Chairman: *R. Färe* On the Minimum Extrapolation Principle of Data Envelopment Analysis *Timo Kuosmanen* "Linearly interpolated FDH efficiency score for nonconvex frontiers *Leopold Simar - Seok-Oh Jeong* Axiomatic Foundations of Efficiency Measurement on Free-Disposal-Hull Technologies *William Schworm - Robert Russell*	Session 2-D **Agriculture** **Room - 301** Chairman: *L Tauer* A Shadow Cost Function Model of the Dairy Sector in the United States *Roberto Mosheim - Knox Lovell* A Directional Distance Function Approach to Dynamic Efficiency: An Application to the Dutch Glasshouse Horticulture *Elvira Silva - Alfons Oude Lansing* Quality production and quality indicators in intermediate products *Angelo Zago* Do the ban on use of anti-microbial growth promoter impact on technical change and the efficiency of slaughter-pig production *Lartey Lawson - Lars Otto - Peter Vig Jensen - Et Al.*

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Thursday, June 30, 2005 **9:00-10:30**

Session 3-A **Energy and Regulation (Invited)** **Room - 100** Chairman: *P. Bogetoft* The role of the policy framework for the effectiveness of benchmarking in regulatory proceedings *Philip Burns* Restructuring and Efficiency in the U.S. Electric Power Sector *Michael Pollitt - John Kwoka* Model Specification Games in DEA Yardstick Regimes *Per Agrell - Peter Bogetoft - Mathias Lorenz*	Session 3-B **Health** **Room - 101** Chairman: *G. Granderson* “Absorption of innovations and the relationship between innovations and productivity in Dutch Hospital Industry *Jos Blank - Bart Van Hulst* Hospitals Affiliations; and Efficiency *Gerald Granderson - Ila Alam* Estimating structural efficiency of the public standard hospital sector in Austria: 1999-2002 *Margit Sommersguter-Reichmann*
Session 3-C **Growth and Dynamics** **Room - 300** Chairman: *A. Alvarez* Productivity growth under uncertainty: an application to Spanish dairy farms *Alan Wall - Luis Orea* Economic Growth with Inefficiency *Luis Orea - Antonio Álvarez* Measuring and Improving System Efficiency during Transition Periods *Warren Vaneman - Kostas Triantis*	Session 3-D **Advanced Non-parametric Approaches** **Room - 301** Chairman: *F Førsund* A Fully Nonparametric Stochastic Frontier Model for Panel Data: A Practical Approach *Daniel J. Henderson - Léopold Simar* Calculation of Scale Elasticities in Dea Models: *Finn Førsund - Lennart Hjalmarsson - Vladimir Krivonozhko - Et Al.* “Conditional Nonparametric Frontier Models for Convex and Non Convex Technologies: a Unifying Approach *Cinzia Daraio - Léopold Simar*

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Thursday, June 30, 2005 **11:00-13:00**

Session 4-A **Energy and Regulation (Invited)** **Room - 100** Chairman: *S. Kittelsen* Using the market at a cost: A note on how the implementation green certificates lead to market inefficiencies *Thomas Sundqvist And Mats Nilsson* Mergers in Norwegian Electricity Distribution: An Efficiency Enhancing Exercise? *Thor Erik Grammeltvedt - Peter Bogetoft* DEA Based Yardstick Regulation: Implementation and New Challenges *Peter Bogetoft - Per Agrell - Dag Fjeld Edvardsen* Productivity and deregulation of Norwegian Electricity utilities *Sverre A.C. Kittelsen - Dag Fjeld Edvardsen - Finn R Førsund - Et Al.*	Session 4-B **Health** **Room - 101** Chairman: *M Asmild* Assessing the efficiencies of hospitals that provide health services research and teaching *Marcos Estellita Lins - Maria Stella Lobo - Angela Cristina Moreira Da Silva - Et Al.* Decomposition of cost changes in Dutch homes for the mentally disabled *Evelien Eggink - Jedid-Jah Jonker - Michiel Ras* Police Reallocation Models *Mette Asmild - Joseph C. Paradi - Jesus Tadeo Pastor Ciurana*
Session 4-C **Growth and Dynamics** **Room - 300** Chairman: *K. Fox* Allocative Efficiency and Decomposition of Productivity Change *Jiro Nemoto - Mika Goto* Malmquist indexes using a Geometric Distance Function (GDF) *Maria Portela - Emmanuel Thanassoulis* On the Anatomy of Productivity Growth: A Decomposition of the Fisher Ideal TFP Index *Timo Kuosmanen - Timo Sipiläinen* A Decomposition of the Malmquist Productivity Index: Returns to Scale and Technical Progress with Imperfect Competition *Kevin Fox - W. Erwin Diewert*	Session 4-D **Advanced Non-parametric Approaches** **Room - 301** Chairman: *P Korhonen* Finding Unique Weights for Efficient Units in Data Envelopment Analysis *Pekka Korhonen - Rolf Färe* Profit efficiency analysis with absolute and uniform shadow prices *Laurens Cherchye - Mika Kortelainen - Timo Kuosmanen - Et Al.* New formulations of DEA and FDH models *Hervé Leleu*

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Thursday, June 30, 2005 **14:15-16:15**

Session 5-A **Energy and Regulation (Invited)** **Room - 100** Chairman: *T Coelli*	Session 5-B **Health** **Room - 101** Chairman: *G Ferrier*
Quality of service technical efficiency and economies of scale - An analysis of European electricity distribution utilities *Christian Growitsch - Tooraj Jamasb - Michael Pollitt* "Model Development for a Pan-Nordic Incentive Regulation for Electricity Distribution *Helle Gronli* The productivity of water and wastewater services in Australia *Tim Coelli*	The long run productivity of primary care in Finland *Juha Aaltonen - Maija-Liisa Järviö - Kalevi Luoma - Et Al.* Peer Effects and Productivity: The Role of Competition and Safety Net Hospitals on Performance *Gary Ferrier - Vivian Valdmanis* A Parametric Decomposition of the Output-Oriented Malmquist Productivity Index for Public Hospitals in Greece *Roxani Karagiannis - Michalis Hatziprokopiou* Estimation of Information Asymmetries in Housing Markets: A Two-Tier Stochastic Frontier Approach *Christopher Parmeter - Subal Kumbhakar*
Session 5-C **Empirical Productivity** **Room - 300** Chairman: *A Hesmati*	Session 5-D **Ecological Efficiency** **Room - 301** Chairman: *A Hailu*
Growth and convergence in the EU: relative contributions of physical and human capital accumulation *Mªmar Salinas-Jiménez - Inmaculada Alvarez-Ayuso - Mª Jesus Delgado-Rodriguez* Contributions of ICT to Chinese Economic Growth *Almas Heshmati -* Productivity technological spillovers and human capital. An analysis on Italian firm data. *Vania Sena - Sergio Destefanis* Linking Investment Bursts and Productivity: An Empirical Investigation in US. Food Manufacturing *Spiro Stefanou - Pinar Celikkol*	Measuring eco-efficiency of production: A frontier approach *Mika Kortelainen - Timo Kuosmanen* Nitrate Pollution Control Policy and its impact on Farms" Performance: A Nonparametric Approach *Isabelle Piot-Lepetit - Monique Le Moing* The Cost Implications of Waste Minimisation: Factor Demand Competitiveness and Policy Implications *Wendy Chapple - Catherine Morrison Paul - Richard Harris* Productive efficiency models for environmental performance measurement: a literature review *Ludwig Lauwers - Hilde Wustenberghs - Lieve De Cock*

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Thursday, June 30, 2005 **16:45-18:45**

Session 6-A **Energy and Regulation** **Room - 100** Chairman: *P Arocena*	Session 6-B **Parametric Applications** **Room - 101** Chairman: *U Jensens*
Environmental Externalities and Regulation Constrained Cost productivity Growth in the U.S. Electric Utility Industry *Diego Prior - Gerald Granderson* Measuring the Efficiency and Returns to Scale of Publicly Owned Electricity Distribution Systems in the United States: An INput Distance Function Approach *David Saal* Economies of Scope and Diversification in the Electricity Industry: A Non Parametric Frontier Approach. *Pablo Arocena* Decomposition of Cost Efficiency and its Application to Japan-US Electric Utilities Comparisons *Miki Tsutsui - Kaoru Tone*	Where have all the data gone? Stochastic production frontiers with multiply imputed German establishment data *Uwe Jensen - Susanne Raessler* Economics and Olympics: An Efficiency Analysis *Alexander Rathke - Ulrich Woitek* Efficiency and Convergence in Developing Countries *Camilla Mastromarco*
Session 6-C **Empirical Productivity** **Room - 300** Chairman: *JP Boussemart*	Session 6-D **Invited Modeling Session** **Room - 301** Chairman: *S Stefanou*
A Re-examination of the technological catching-up hypothesis across and OECD industries *Jean-Philippe Boussemart - Walter Briec - Isabelle Cadoret - Et Al.* Productivity Analysis of Market and Environmental Regulations in China *Shunsuke Managi - S. Kaneko* The effects of TFP and its components on inequality *Rogerio Cesar Souza - Fernando Garcia - Jorge Oliveira Pires* On the Relative Innovation and Productivity Performance of Domestic and Foreign-Owned Enterprises: A Cross-Country Analysis *Hans Lööf - Bernd Ebersberger*	Special Session - Public Inputs and Dynamic Producer Behavior: Endogenous Growth in U.S. Agriculture *Alejandro Onofri - Lilyan Fulginiti* Special session - Price-Induced Technical Progress in 80 years of US Agriculture *Quirino Paris* Special session - paper 3 *Steven Buccola* "Special session - U.S. Productivity in Agriculture and R&D" Rolf Färe - Shawna Grosskopf - Dimitri Margaritis *Hans Lööf - Bernd Ebersberger*

Friday, July 1, 2005 **9:00-10:30**

Session 7-A **Macro-level Applications** **Room - 100** Chairman: *M Henry* Impact of Trade Area Environment on Bank's Comparative Advantages *Aude Hubrecht - Leleu Hervé* Allocative Efficiency Measurement Revisited--Do We Really Need Input Prices? *Oleg Badunenko - Michael Fritsch - Andreas Stephan* The Importance of Inward and Outward FDI for Productivity Growth in the UK *Nigel Driffield - Michael Henry - James Love*	Session 7-B **Bootstrapping** **Room - 101** Chairman: *R Sickles* The use of bootstrapped Malmquist indices to reassess productivity change findings: Application to a sample of Polish farms *Laure Latruffe - Kelvin Balcombe - Sophia Davidova* Relative Efficiency of Service Centres of Sickness Funds: A DEA-Bootstrap Approach *Matthias Staat* A Two-Stage Efficiency Analysis of Portuguese Municipalities *Paulo Daniel Vieira - Elvira Silva*
Session 7-C **Ecological Efficiency** **Room - 300** Chairman: *L Lauwers* The Analysis of Eco-efficiency in an Input-Output Framework *Mikulas Luptacik - Bernhard Boehm* Environmental Bads and Nonparametric Modelling: Clearing some confusions *Atakelty Hailu*	Session 7-D **University and Education** **Room - 301** Chairman: *C Daraio* Research Peformance of Chinese Universities after a Decade of Reform: An Application of DEA *Ying Chu Ng - Sung-Ko Li* Efficiency Evaluation of Polytechnic Higher Education Institutions with Considering Output Quality and Institutional Characteristics *Tsu-Tan Fu - Yun-Shone Lu* Substitution effects in multi-output production. Evidence from Italian universities *Cinzia Daraio - Andrea Bonaccorsi - Leopold Simar*

Friday, July 1, 2005 **11:00-13:00**

Session 8-A **Software** — **Room - 100**	Session 8-B **Banking and Finance** — **Room - 101**
Chairman: *P. Vanden Eeckaut* 'Just DEA It!': A New DEA Software and Its Possibilities for Applied Researcher *Eugene Morgunov - Valentin Zelenyuk* FEAR 1.0: A Software Package for Frontier Efficiency Analysis with R *Paul W. Wilson* PIM - Performance Improvement Management Software *Emmanuel Thanassoulis* OnFront 3 *Pontus Roos*	Chairman: *A Lozano Vivas* Rationalising Inefficiency: A Study of Canadian Bank Branches *Mette Asmild - Peter Bogetoft - Jens Leth Hougaard* Searching for obstacles to further banking integration in Europe *Ana Lozano-Vivas - Jesus T. Pastor*
Session 8-C **Non-parametric Applications** — **Room - 300**	Session 8-D **University and Education** — **Room - 301**
Chairman: *B Golany* The assessment of retailing efficiency using Network DEA *Clara Vaz - Ana Camanho* Searching for an Optimal Technical Efficiency Measure *Sung-Ko Li* Modifications of the algorithms for visualization of the multidimensional frontier in DEA and efficiency analysis of Russian banks *Vladimir Krivonozhko - Oleg Utkin - Michail Safin - Et Al.* Constructing Balanced Portfolios of R&D Projects: A DEA Approac *Boaz Golany - Harel Eilat - Avraham Shtub*	Chairman: *Wendy Chapple* Assessing the Relative Performance of University Technology Transfer Offices in The U.K Using Multiple Output Stochastic Distance Functions *Andy Lockett - Wendy Chapple - Mike Wright - Et Al.* Educational Efficiency in Belgian schools: A Parametric Distance Function Approach at Student Level *Sergio Perelman - Daniel Santín* Measuring public sector performance and productivity *Philip Stevens - Mary O'mahony* Faculty Research Productivity and Promotion: Testing the Behavioral Reinforcement Theory *Flora F. Tien*

Friday, July 1, 2005 **14:15-16:15**

Session 9-A **Empirical Industrial Organization** **Room - 100**
Chairman: *Sung-ko Li*

Shadow price of capital and underinvestment in cooperatives and conventional firms
Vania Sena - Ornella Maietta

Institutional reforms now and benefits tomorrow: how far is tomorrow?
Pierre-Guillaume Méon - Khalid Sekkat - Laurent Weill

Market Fragmentation and Structural Efficiency in China
Sung-Ko Li - Yuk-Shing Cheng

A Comparison of Productivity in public and private industrial enterprises in India
Ram Mohan - Subhash Ray

Session 9-B **Banking and Finance** **Room - 101**
Chairman: *K Kerstens*

Mean-Variance-Skewness Portfolio Performance Gauging: A General Shortage Function and Dual Approach
Walter Briec - Kristiaan Kerstens - Octave Jokung

Mutual Fund Performance and Persistence in Taiwan:A Non-Parametric Approach
Chi-Sheng Hsu - Ching-Yao Lia

Session 9-C **Fisheries** **Room - 300**
Chairman: *H Fried*

Estimating the Stock of Red Seabream in the Strait of Gibralter: A DEA?Malmquist Analysis
David Castilla Espino - Harold Fried - Juan Jose Garcia Del Hoyo - Et Al.

Estimating Fishing Capacity of Red Seabream Fishery in the Strait of Gibraltar: Parametric and Non-parametric Approaches
David Castilla Espino

Dea versus Econometric Estimation of Efficiency In Fisheries: A Review
Lamprakis Avdelas - Christos Floros

Modelling inefficiency in the product mix:
Frank Asche - Kristin Helene Roll - Ragnar Tveteras

Session 9-D **Non-parametric Applications** **Room - 301**
Chairman: *E Grifell Tatje*

Efficiency and Risk
Gary Ferrier

Productivity at the Post
Emili Grifell-Tatjé - C. A. Knox Lovell

Confident-DEA: A New Methodology Genetic Algorithm Based; For Dealing with Imprecise Data in Data Envelopment Analysis
Said Gattoufi

Minimum Distance and Efficiency Assessment with DEA Models
Inmaculada Sirvent - Juan Aparicio - Jose Luis Ruiz

Friday, July 1, 2005 **16:45-18:45**

Session 10-A	Session 10-B
Session 10-A **Micro-level Applications** **Room - 100** Chairman: *V Zelenyuk* Management Characteristics Collaboration and Innovation Performance in the UK *Andy Cosh - Xiaolan Fu - Alan Hughes* Corporate Governance and Firm's Efficiency: The Case of a Transitional Country Ukraine *Vitaliy Zheka - Valentin Zelenyuk* Population Aging and firm level productivity *Bernhard Mahlberg - Alexia Fürnkranz-Prskawetz - Vegard Skirbekk* Productivity, Efficiency and Financial Performance of the United States Dairy Sector: A Frontier Approach *Richard Nehring, Loren Tauer, Erik O'donoghue, Carmen Sandretto*	Session 10-B **Banking and Finance** **Room - 101** Chairman: *S Grosskopf* Efficiency and market power in Spanish banking *Rolf Färe - Shawna Grosskopf - Emili Tortosa-Ausina* Capital Adequacy Risk Management; Efficiency and Productivity in Taiwan"s Banking Industry *Cliff J. Huang - Ming-Hsiang Huang* Bank Concentration and Performance in the Single European Market *Barbara Casu - Claudia Girardone* Generalised Malmquist Productivity Measurement in the Banking Systems of Two Emerging Economies *Meryem Duygun Fethi - Mohamed Shaaban - Thomas G. Weyman-Jones*
Session 10-C **Innovative nonparametric applications** **Room - 300** Chairman: *J Paradi* Water Use Shadow Prices and the Canadian Business Sector Productivity Performance *Tarek Harchaoui - Kais Dachraoui* The Use of DEA in the Measurement of Software Development Efficiency: A Quality Focused Approach *Joseph Paradi - Dwight Schmidt* Efficiency Flooding - Black-Box Frontiers and Implications *Johannes Sauer - Pd Dr. Heinz Hockmann* A Comparison between Direct and Indirect Measures of Efficiency *Roxana Ciumara*	Session 10-D **Returns to Scale** **Room - 301** Chairman: *V Podinovski* Global returns to scale in efficiency analysis *Victor Podinovski* Estimation Excess Capital Technical and Allocative Inefficiency *Hung-Jen Wang - Subal Kumbhakar* Returns to Scale in DEA with non-discretionary inputs and outputs. *Ole Olesen - Niels Christian Petersen* Direct and Indirect Measures of Capacity Utilization: A Nonparametric Analysis of U.S. Manufacturing *Subhash Ray - Kankana Mukherjee - Yanna Wu*

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Saturday, July 2, 2005 — **YOUNG RESEARCHERS' WORKSHOP** — **09:00-17:45**

Keynote address 09:00-10:30 — **Room - 300**

The Residual: On Monitoring and Benchmarking Firms, Industries and Economies with Respect to Productivity
Bert M. Balk

Coffee Break 10:30-11:00 (Third floor, rue de Marais 109)

Session PCW2 14:15-15:45 — **Room - 300**

Production strategy market competitiveness and the normative use of DEA
Eleonore De le Court - Per Agrell

Estimation of Environmental Efficiencies and Shadow Prices of Pollutants: A Cross-Country Approach
Mykhaylo Salnykov - Valentin Zelenyuk

A Bias Corrected Nonparametric Envelopment Estimator of Frontiers
Luiza Badin - Leopold Simar

Coffee Break 15:45-16:15 (Third floor, rue de Marais 109)

Session PCW1 11:00-13:00 — **Room - 300**

Does Foreign Presence Boost the Efficiency of Domestic Firms?
Pierre Mohnen - Victoria Kravtsova

Do banking crises enhance efficiency? A case study of 1994 Turkish and 1997 Indonesian Crises
Julien Reynaud - Rofikoh Rohkim

Hölder index Technical Progress; and Efficiency Change
Comes Christine - Briec Walter

Directional Hicks Neutralities
Briec Walter - Chambers Robert - Färe Rolf - Et Al.

Lunch 13:00-14:15 (Third floor, rue de Marais 109)

Session PCW3 16:15-17:45 — **Room - 300**

A Dimensional Decomposition Approach to Identifying Efficient Units in Large-Scale DEA Models
Pyry-Antti Siitari - Pekka J. Korhonen

Estimating the Productivity of Public Infrastructure Using Maximum Entropy Econometrics
Jorge Rodriguez - Esteban Fernandez - Antonio Álvarez - Carlos Arias

Modelling the Efficiency of European Insurance Companies: A Stochastic Frontier Analysis
Dev Vencappa - Paul Fenn - Stephen Diacon - et al.

Closing reception 17:45-19:00 (Third floor, rue de Marais 109)

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BOOK of ABSTRACTS

Ninth European Workshop on Efficiency and Productivity Analysis

Brussels, June 29 – July 2, 2005

"Efficiency Analysis for Policy Making"

The Long Run Productivity Of Primary Care In Finland

Aaltonen; Juha - Järviö; Maija-Liisa - Luoma; Kalevi - Et Al.

Session 5-B Health
Thursday, June 30, 2005 14:15-16:15 Room B

This paper studies the development of productivity and efficiency in primary health care of Finnish health centres from 1988 to 2003, with special emphasis on selection of proper weights for output measures over time. Given that only approximate national wide data are available on unit prices of different outputs, the DEA methods is used to produce optimal weighting structure for each health centre. However, in the long run it is necessary to give bounds within which theoretical marginal rates of substitution between outputs are allowed to vary. We report annual AR-DEA results over period 1988 -2003, with comparable productivity indices. The data consisted annually 195-221 health centres, covering about 70 percent of the Finnish population. We utilised different kinds of visits as output measures for outpatient care: visits to physician, dental visits, visits to other health care personnel and home nursing visits. Short term acute inpatient care was measured in discharges. Long term chronic care and non acute short term care was measured in bed days. Resources were measured by gross operating costs of the health centres. The data are extensively checked for the consistency. Using the panel feature of the data we have followed the productivity improvement of each unit that was at least in one year assigned as fully efficient.

Model Specification Games In DEA Yardstick Regimes

Agrell, Per - Bogetoft; Peter - Lorenz; Mathias

Session 3-A Energy and Regulation (Invited)
Thursday, June 30, 2005 9:00-10:30 Room A

Asymmetric information concerning the underlying technology for a regulated industry is a major obstacle for the development and implemen- tation of yardstick regimes based on production frontiers. Under collective regimes, such as industrywide price-caps, regulated firms have strong incen- tives to collude to withhold information about the true frontier. The regula- tor, fearing stalled investments and collapsing quality standards, implements a minimal extrapolation policy with low rent extraction. The informational rent that results from a too lax regime is then silently split among efficient and inefficient agents in mergers. We present a dynamic framework for cooperative model development and implementation under which the efficient agents con- tribute to model refinement in exchange for a fair reallocation of industry rents. The strategy is derived from a two-period game where the regulator initially launches a conservative model and commits not to lower overall expenditure in the second period. The firms are invited to refine the model for the second period, in which case they will be subject to a DEA yardstick regime. The behavioral di¤erences between efficient and inefficient agents incite the former to reveal the technological information.

Substitutability And Complementarity Between Production Factors In The Spanish Food Industry

Alarcón, Silverio

Poster Session
Thursday, June 30, 2005

Firm panel data sets over the period 1993 to 2002 are used to estimate translog production functions with labor, capital and material inputs for 9 Spanish food industries. To tackle the endogeneity of the regressors, generalized method of moments estimations are employed. The specification tests reject the instrument variables only for 1 out of 9 estimates. The remaining 8 industries show evidence of homogeneity and constant returns to scale. Substitutability and complementarity between production factors in response to price changes are studied through Allen and Morishima elasticities. Substitutability between labor and capital , as well as labor and materials, and complementarity between capital and materials are the most characteristic relationships and are found in 5 out of 8 industries.

Growth And Convergence In The EU: Relative Contributions Of Physical And Human Capital Accumulation

Alvarez-Ayuso; Inmaculada - Delgado-Rodriguez; Mª Jesus

Session 5-C Empirical Productivity
Thursday, June 30, 2005 14:15-16:15 Room C

The aim of this paper is to analyse labour productivity growth and convergence in the EU between 1980 and 1997. Adopting a production frontier approach, labour productivity growth is broken down into components attributable to efficiency change, technological progress and capital accumulation. Non-parametric techniques of linear programming (Data Envelopment Analysis) are used to estimate a common production frontier and TFP is decomposed by means of Malmquist productivity indices. With regard to capital accumulation, we analyse the contribution of private capital to labour productivity growth and, additionally, we consider both a broad measure of physical capital -introducing public capital as an additional input- and human capital accumulation. Focusing on this decomposition, our results show that physical and human capital accumulation appear to be the major source of labour productivity growth in the EU during the 80's and 90's. When only physical capital accumulation is considered, labour productivity growth is explained by both capital deepening and TFP growth. However, part of the estimated TFP growth is in fact due to human capital accumulation. Thus, when the human capital variable is introduced in the analysis we observe that the contribution of TFP tend to be negative, reflecting a significant problem in terms of TFP for the European economies.

Endogeneity Problems In The Estimation Of Multi-Output Technologies

Arias, Carlos - Roibás; David

Session 1-A Advanced Parametric Approaches
Wednesday, June 29, 2005 14:15-16:15 Room A

Empirical representations of multi-output technologies use either quantities or ratios of outputs as explanatory variables. These specifications raise questions about the existence of endogeneity problems in the estimation of these technologies. There are two contributions in the present paper. First, by carefully distinguishing between planned and observed output we clarify the problems of endogeneity in the estimation of multioutput technologies. Precisely, we are able to characterize the unlikely conditions under which distance functions can be estimated by plain least squares. In any other circumstances, instrumental variables are required for consistent estimation. Second, we develop a transformation function which incorporates a global efficiency term and we use Monte Carlo simulation in order to compare the relative performance of both primal approaches to the technology: transformation and distance functions. Particularly, we analyze the role played by different degrees of correlation among output disturbances. We find that under different degrees of correlation between outputs the techniques used to correct endogeneity problems are more effective in the transformation function than in the distance function, so the transformation function dominates the distance function on empirical performance.

Economies Of Scope And Diversification In The Electricity Industry: A Non Parametric Frontier Approach.

Arocena, Pablo

Session 6-A Energy and Regulation
Thursday, June 30, 2005 16:45-18:45 Room A

Over the last decade the electricity industry has undergone major liberalising reforms worldwide. Privatisation and substantial regulatory reforms were implemented with the aim of introducing competition in electricity markets. However, in many countries the pro-competitive potential of these reforms has been largely undermined by the high level of market concentration and vertical integration of electric utilities. Further, substantial market power of incumbents often makes difficult new entry. Hence, some regulators seeks to promote competition through policies of market restructuring. Basically, these policies implies the splitting up of existing firms in order to achieve a more competitive market structure, which means the reduction of both horizontal and vertical disintegration. However, such a restructuring of the electric power industry raises questions about the possible sacrifice of scale and vertical economies. Incumbents claims the existence of strong scope and scale economies, because of technological interdependency between stages, the use of common inputs, the need for stage coordination and the market transaction costs. In other words, high integration economies would make inefficient the supply of power by means of smaller and/or specialized firms.

Modelling Inefficiency In The Product Mix:

Asche, Frank - Roll; Kristin Helene - Tveteras; Ragnar

Session 9-C Fisheries
Friday, July 1, 2005 14:15-16:15 Room C

Whether one models inefficiency as output or input oriented depend on what is the endogenous variables for the industry in question. In fisheries, the outputs are often endogenous while the capital (vessel) and other input factors are often treated as fixed. Hence, when investigating efficiency, one has used production functions, requiring that outputs are aggregated to a single output. However, following Squires a large literature indicates that most fisheries should be modelled as multi output technologies. We are in this paper modelling economic inefficiency in a revenue function setting. As it is the outputs that are endogenous, the efficiency measures must be output oriented. Using a revenue function allow us to decompose economic inefficiency into its technical and allocative components. As such, we focus on inefficiency of the output level and the allocative inefficiency caused by an inefficient product mix. In a fishery, efficiency is traditionally modelled through a production function. However by using a production function to describe the underlying technology, it is only possible to get estimates of technical efficiency. Based on a dual approaches all type of inefficiency can be estimated through additional parameters, and firm-specific technical inefficiency as well as output and firm-specific allocative inefficiency, can be identified.

Rationalising Inefficiency: A Study Of Canadian Bank Branches

Asmild, Mette - Bogetoft; Peter - Hougaard; Jens Leth

Session 8-B Banking and Finance
Friday, July 1, 2005 11:00-13:00 Room B

Many studies have attempted to explain inefficiency, for instance by bounded rationality, ignorance, lack of incentives or motivation etc. However, the presence of inefficiency remains conflicting with the neo-classical idea of economic rationality. This paper shows how the outcomes of Data Envelopment Analysis-type efficiency models can be rationalised. The allocation of inefficient resources as compared to both economically and technically efficient benchmarks can be understood utilising the theoretical framework suggested in Bogetoft and Hougaard (2003). To illustrate the concepts we consider a data set of Canadian bank branches. The empirical results are encouraging since what appears to be inefficiency in some branches can be argued to be rational choices of reosurce allocation.

Police Reallocation Models

Asmild, Mette - Paradi; Joseph C. - Pastor; Ciurana - Jesus Tadeo

Session 4-B Health
Thursday, June 30, 2005 11:00-13:00 Room B

From a central planners point of view, an overall objective of the allocation of resources (inputs) to units can be to make all units efficient. This can be accomplished by reducing inputs for inefficient units and potentially increasing inputs for super-efficient units. However, such reallocations can be done in many different ways. The choice between alternative reallocations depends on the policy objectives of the central management. In this paper we present several different reallocation models that could be relevant for the central management in an empirical case of staff allocation to police units. We consider both reallocations between units but within separate functions, reallocations between functions within units and finally reallocations between both functions and units.

Dea Versus Econometric Estimation Of Efficiency In Fisheries: A Review

Avdelas, Lamprakis - Floros; Christos

Session 9-C Fisheries
Friday, July 1, 2005 14:15-16:15 Room C

In this paper we discuss the pros and cons of Data Envelopment analysis (DEA) and econometric methods for estimating efficiency in fisheries. Only limited attempts to estimate DEA, stochastic DEA and stochastic production frontiers (SPF) have been developed and applied to fishing industries (Kirkley, Squires and Strand 1995, 1998; Coglan, Pascoe and Mardle 1998; Pascoe, Anderson and de Wilde 2001). The aim of this paper is threefold. The first intention is to present a review of the theoretical concept underlying the efficiency of fisheries activity. The next intention is to present an overview of quantitative procedures, which can be, used within the framework of DEA and SPF in fisheries under Frontier 4.1, LIMDEP and GAMS software packages. Third, we present a method for deriving a stock index from fisheries data that does not involve any restrictive assumptions regarding the relationship between catch, effort and stock size. In this case, DEA is preferred to SPF. These methods are strongly recommended to fisheries managers dealing with efficiency.

A Bias Corrected Nonparametric Envelopment Estimator Of Frontiers

Badin, Luiza - Simar; Leopold

Post-Conference
Saturday, July 2, 2005 14:15-15:45 Room A

In productivity analysis, the efficiency scores of economic producers are evaluated by measuring their distance toward a production frontier. This frontier is defined as the set of the most efficient alternatives among all possible combinations in the input-output space, and it has to be estimated from a random sample of firms. The nonparametric envelopment estimators rely on the assumption that all the observations fall on the same side of the frontier. Therefore any deviation from the frontier is due only to inefficiency. The Free Disposal Hull (FDH) estimator of the attainable set, introduced by Deprins, Simar and Tulkens (1984), is the smallest free disposal set covering all the observations. However, by construction, the FDH estimator is an inward-biased estimator of its theoretical correspondent. In this paper we consider the univariate extreme values representation of the FDH estimators and we propose a bias corrected estimator for the efficient frontier or for the efficiency scores, based on order statistics and closely related to FDH. The presentation is based on a probabilistic formulation of the model where the input-output pairs are realizations of independent random variables drawn from a joint distribution whose support is the production attainable set. The bias corrected estimator shares the asymptotic properties of the FDH estimator.

Allocative Efficiency Measurement Revisited--Do We Really Need Input Prices?

Badunenko, Oleg - Fritsch; Michael - Stephan; Andreas

Session 7-A Macro-level Applications
Friday, July 1, 2005 9:00-10:30 Room A

The traditional approach to measuring allocative efficiency is based on input prices, which are rarely known at the firm level. This paper puts forward a new approach, which proves that the Farrell output--oriented distance to the frontier in the profit--technical efficiency space indicates allocative efficiency. We apply this new approach to a unique panel of about 35.000 firms from the German Cost Structure Census. The results show that the heterogeneity of German manufacturing firms with regard to allocative efficiency is considerable, and that the potential benefits from improving allocative efficiency are noteworthy. Most strikingly, we find that smaller firms are on average more allocatively efficient than larger ones.

Absorption Of Innovations And The Relationship Between Innovations And Productivity In Dutch Hospital Industry

Blank, Jos - Van Hulst; Bart

Session 3-B Health
Thursday, June 30, 2005 9:00-10:30 Room B

The hospital industry is currently the subject of a great public interest because expenditures on hospital care are large, have increased significantly over the past 20 years, and are expected to continue to increase in the future because of the ageing of the population. New technologies, medical as well as organizational, may push up cost further or may downsize cost depending on the nature of the innovation. The main policy question is how we can sustain adequate hospital care at affordable prices in the future. Insights in the dispersion and the consequences of innovations are therefore necessary. In this paper we discuss three important aspects of innovations. : How do we measure innovations? Which determinants do affect the dispersion of innovations? How do innovations affect cost and productivity? We measure innovation status by the number of innovations and an alternative innovation index, in which different innovations are weighted by rarity (see e.g., Baker and Spetz 1999). We distinguish 7 types of innovation: multidisciplinary diagnostics, technical quality, nurse consulting hours, chain care, logistic optimalisation, transferred care and ICT. We distinguish a set of 15 determinants possibly affecting the absorption of innovations. The relationship between determinants and innovation status is investigated by using non-linear estimation technique.

DEA Based Yardstick Regulation: Implementation And New Challenges

Bogetoft, Peter - Agrell; Per - Edvardsen; Dag Fjeld

Session 4-A Energy and Regulation (Invited)
Thursday, June 30, 2005 11:00-13:00 Room A

The aim of this paper is to discuss the implementation of DEA based yardstick competition. The specific setting is electricity distribution in the Nordic countries and the focus is on some of the new practical and theoretical challenges that arise when theory is put to work. We discuss the transition from CPI-X based regulation to a dynamic yardstick model, how the underlying cost model shall be specified, how to including the yardstick elements in the financial reporting etc. Also, we investigate how to integrate recent advances in the benchmarking methodology, including bias correction based on bootstrapping, and how the new methods relate to the underlying theory of DEA based yardstick competition.

A Re-Examination Of The Technological Catching-Up Hypothesis Across And OECD Industries

Boussemart, Jean-Philippe - Briec; Walter - Cadoret; Isabelle - Et Al.

Session 6-C Empirical Productivity
Thursday, June 30, 2005 16:45-18:45 Room C

This study re-examines the catching-up hypothesis at the industry level across the main OECD leading countries, using panel data econometric models involving technological gap indicators calculated with a nonparametric distance function suggested by Färe et al. (1994). The results show that there is statistical evidence of a catching-up process at the industry level. Moreover, both tradables and nontradables sectors exhibit catching-up effects and technology adoption from abroad. This result complements the finding by Bernard and Jones (1996 a,b), Gouyette and Perelman (1997) and Hansson and Henrekson (1997) that there is no (or even a slow) catching-up effect in the manufacturing sector. Moreover, social capability indicators evaluated for each country show that 'Non Europe' and 'Center Europe' tradables sectors have a rather similar degree of inefficiency while 'North-Europe' countries are less efficient for both tradables and nontradables. Lastly, both the cross country and the cross sectors dispersions of inefficiency levels are smaller for tradables sectors than for nontradables.

Contingent Price Duality In A Multi-Output State-Contingent Production Model

Briec; Walter - Cavaignac; Laurent

Session 1-C Production under uncertainty
Wednesday, June 29, 2005 14:15-16:15 Room C

In this paper we use the Arrow and Debreu early proof that economic problems under uncertainty can be analyzed exactly the same way that economic problems under certainty usually are, once the appropriate state-space contingent model has been set. Indeed, each state-contingent good in a given state of nature may be considered as a specific good. The main interest in this approach is that it allows to treat the production of a state-contingent good as it usually is done in a standard and certain multi-output production model. Hence, each state-contingent output may be increased independently from the other. This approach fundamentally differs from the well-known "parametrized distribution approach" which indexes the production of a given output in each state of nature on a control variable. Consequently, for this kind of model, the output level in every state of nature depends on the control variable level. The state contingent approach that we adopt is more flexible but inherits a considerable drawback from its flexibility : a single output production model becomes a multi-output model when presented in terms of state-contingent outputs. Therefore, as we focus on a finite number of outputs M and on a finite number of states of nature S we will deal with SxM state-contingent outputs.

Mean-Variance-Skewness Portfolio Performance Gauging: A General Shortage Function And Dual Approach

Briec; Walter - Kerstens; Kristiaan - Jokung; Octave

Session 9-B Banking and Finance
Friday, July 1, 2005 14:15-16:15 Room B

This paper proposes a nonparametric efficiency measurement approach for the static portfolio selection problem in mean-variance-skewness space. A shortage function is defined that looks for possible increases in return and skewness and decreases in variance. Global optimality is guaranteed for the resulting optimal portfolios. We also establish a link to a proper indirect mean-variance-skewness utility function. For computational reasons, the optimal portfolios resulting from this dual approach are only locally optimal. This framework permits to differentiate between portfolio efficiency and allocative efficiency, and a convexity efficiency component related to the difference between the primal, non-convex approach and the dual, convex approach. Furthermore, in principle, information can be retrieved about the revealed risk aversion and prudence of investors. An empirical section on a small sample of assets serves as an illustration.

Special Session

Buccola, Steven

Session 6-D Invited Modeling Session
Thursday, June 30, 2005 16:45-18:45 Room D

The Role Of The Policy Framework For The Effectiveness Of Benchmarking In Regulatory Proceedings

Burns, Philip

Session 3-A Energy and Regulation (Invited)
Thursday, June 30, 2005 9:00-10:30 Room A

Regulation is an information problem. In this paper we show that benchmarking can have an important role to play in extracting information and providing effective incentives. However, the effectiveness of this role depends both on the credibility of the regulator to undertake a comparative efficiency analysis, and the impact of the benchmarking on the value of the firm. These are affected by the objectives of the regulator and the methodology used to set the price control and provide efficiency incentives. In Britain the value of benchmarking in the regulation of electricity distribution networks is relatively low, and may even have been distortionary. In Austria, where the value is expected to increase over time, cost reduction incentives have so far mainly derived from benchmarking as a tool to inform about company efficiency in the expectation that a formal incentive regulation mechanism would be introduced. In the Netherlands, the impact on value is high because it sets the price differentials from which a yardstick competition model for electricity distributors is implemented. This in turn both sharpens incentives for the businesses to reveal information at the time of the benchmarking and also provides a stimulus for the regulator to properly account for firm-specific effects.

Estimating Fishing Capacity Of Red Seabream Fishery In The Strait Of Gibraltar: Parametric And Non-Parametric Approaches

Castilla Espino, David

Session 9-C Fisheries
Friday, July 1, 2005 14:15-16:15 Room C

Red seabream (Pagellus bogaraveo, Brünnich, 1768) is a delicious fish, particularly appreciated in Southern Spain. It is one of the most expensive fish sold in the Andalusia fish public exchanges. The high price is due to high demand and to the decline in harvesting levels. Within subdivision IX of ICES area (South west of Spain and Portugal), the Andalusian "voracera" fleet that exploit this fish stock in the Strait of Gibraltar accounted for more than the 50% of red seabream landings, making it one of the most important red seabream fleets in Europe. Moreover, this fleet accounts for a large percentage of full time total employment in the ports of Algeciras and Tarifa. In particular, Tarifa is one of 33 zones in Europe where dependency on fishing is higher than 10% (European Commission 1999). Landings in subdivision IX of ICES area have progressively decreased since 1985, especially sharply in 1998, as a consequence of unsustainable exploitation of the fish stock. Poorly defined property rights combined with high profits have attracted the entry of new vessels. The high mobility and flexibility of vessels allow essentially open access to the fishery. In 1998, it was evident that the fishery was overexploited and two recovery plans aimed at sustainability were implemented in periods 1999-2002 and 2003-2005.

Estimating The Stock Of Red Seabream In The Strait Of Gibralter: A DEA?Malmquist Analysis

Castilla Espino; David - Fried; Harold - Garcia Del Hoyo; Juan Jose - Et Al.

Session 9-C Fisheries
Friday, July 1, 2005 14:15-16:15 Room C

The Red Seabream is a valuable fish that is important to port regions of Southern Spain. It is the most expensive fish species in the region, and commercial fishing accounts for more than 10% of employment in some costal villages. This fish is a traditional food fare on Christmas. At one time, Red Seabream was also important to Northern Spain and other Eastern Atlantic regions, but these stocks were virtually depleted due to over fishing ten years ago and have yet to recover. It is critical that the stock in Southern Spain be properly managed to avoid a similar fate. To accomplish this, it is necessary to understand the stock levels and dynamics of the fishery. This paper investigates stock levels over time using DEA/Malmquist techniques. In order to isolate the change in the latent variable fish stocks we exploit the knowledge that over a four year period technology in this fishery was constant. Under this condition the technology change component of the Malmquist productivity index can be interpreted to represent changes in the fish stock rather than changes in technology. In particular, technological regress (progress) suggests a decrease (an expansion) in the stock of the fishery. If technology is constant, we assume that monthly reductions in the Malmquist index are due to reductions in stocks from the beginning of the fishing season.

Bank Concentration And Performance In The Single European Market

Casu; Barbara - Girardone; Claudia

Session 10-B Banking and Finance
Friday, July 1, 2005 16:45-18:45 Room B

The deregulation of financial services in the European Union, together with the establishment of the Economic and Monetary Union, aimed at the creation of a level-playing-field in the provision of banking services across the EU. The plan was to remove entry barriers and to foster competition in national banking markets. However, one of the effects of the regulatory changes was to spur a trend towards consolidation, resulting in the recent wave of mergers and acquisitions. To investigate the impact of increased consolidation on the competitive conditions of EU banking markets, we employ both structural (concentration ratios) and non-structural (Panzar-Rosse statistic) concentration measures. In addition, we examine whether different sizes of banks affect competitive conditions differently. Using bank level balance sheet data for the major EU banking markets, in the decade following the introduction of the Single Banking License (1993- 2003), this paper also develops a model of bank profitability that controls for differences in efficiency estimates, competitive conditions, institutional structures and banks' overall riskiness, proxied by the volatility of earnings and financial capital.

The Effects Of TFP And Its Components On Inequality

Cesar Souza, Rogerio - Garcia; Fernando - Oliveira Pires; Jorge

Session 6-C Empirical Productivity
Thursday, June 30, 2005 16:45-18:45 Room C

The paper presents a new and alternative approach within the empirical literature dealing with inequality. It investigates to what extent the dynamics of income inequality is affected by the changes in the Total Factor Productivity (TFP) and its components: technical efficiency, technical progress, allocative efficiency and scale efficiency. The basic idea is that asset allocation and use, as well as production organization, directly influence personal and functional income distribution in countries. Starting with the Stochastic Frontier Analysis, we apply the TFP decomposition suggested by Bauer (1990) and Kumbhakar (2000), for a sample of 38 countries, during the 1970-2000 period. Then, we estimate the direct effects of technical efficiency, allocative efficiency, technical progress, and economies of scale on income inequality of the countries. The results show that allocative, technical and scale efficiencies are positively correlated with Gini. This means that variables associated to the performance of capital channel income to this productivity factor. Technological progress, in turn, works on the entire economies, with direct effects on labor productivity and wages, resulting in a more equitable income distribution. This largely explains why countries such as Brazil, Chile and Mexico still suffer from high levels of income inequality, in spite of economic growth.

Cost-Based Asset Pricing And The Estimation Of Stochastic Technologies

Chambers, Robert

Session 1-C Production under uncertainty
Wednesday, June 29, 2005 14:15-16:15 Room C

Firms facing stochastic technologies and competitive asset markets will optimally remove any arbitrages between the two. Empirically this results in a moment restriction on the joint distributions of stochastic output, returns, capital stock, investment, and prices. This moment restriction can be used to estimate a cost function representation of the firm''s stochastic technology. The method is applied to aggregate US data on output, returns, capital stock, and investment.

The Cost Implications Of Waste Minimisation: Factor Demand Competitiveness And Policy Implications

Chapple, Wendy - Morrison Paul; Catherine - Harris; Richard

Session 5-D Ecological Efficiency
Thursday, June 30, 2005 14:15-16:15 Room D

The issue of waste generation and its environmental implications raises important questions about firms' responsibilities. Waste reduction from either regulations or voluntary action is costly to firms, whether accomplished by "end of pipe" waste management or process solutions involving changes in input use. We evaluate county-level patterns of production costs and waste generation in U.K. manufacturing, using a cost function approach that includes waste as a "bad output." Using a Leontief quadratic cost function, we estimate overall, input-specific, and marginal production costs of waste reduction, through shadow value, input demand, and marginal production cost elasticities. Of particular interest are the i) substitution effects between inputs and the implications for future Capital/ Labour ratios and ii) cost implications of waste reduction and the implications for competitiveness of UK manufacturing industries. For most counties we find significant costs associated with waste reduction, which arise from increased intermediate materials use but lower labour and capital demand. Therefore we disaggregate the inputs further to analyse whether there has been a substitution effect from raw to more processed materials in the production process, thus leading to these trends in input demand.

Assessing The Relative Performance Of University Technology Transfer Offices In The U.K Using Mulitple Output Stochastic Distance Functions

Chapple; Wendy - Wright; Mike - Siegel; Donald

Session 8-D University and Education
Friday, July 1, 2005 11:00-13:00 Room D

Universities have been increasingly viewed as engines of economic growth and as creators of intellectual property (IP). IP, through successful commercialization, in theory leads to technological change and productivity growth. Successful IP creation and exploitation can also lead to financial gains for the university. Universities, therefore, are increasingly looking towards maximising the returns from IP through the commercialisation of their research outputs. Traditionally within the technology transfer literature, commercialisation success has been measured by a single measure of licensing activity, either in the form of licensing income, number of licenses, or creation of university spin-out companies (that is companies established as a vehicle to exploit IP). This paper advances previous work to assess the performance of university technology transfer offices, by using stochastic multiple output distance functions. The traditional focus on a single output will arguably only provide a partial analysis of university technology transfer performance. We argue that multiple output measures are more appropriate than the single measures in assessing university efficiency, due to high levels of heterogeneity in the strategies of UK university technology transfer offices.

Nonradial Directional Efficiency Measure For Linearized FDH Technologies: An Application To Tunisian Public Cardiologic Wards At Patient Level

Chokri, Arfa - Hervé; Leleu - Habiba; Ben Romdhane

Poster Session
Wednesday, June 29, 2005

The public sector in Tunisia should be subject to performance review, instead of going with increasingly the hospital finance, currently pursed. We provide in this paper, an empirical efficiency measure of Tunisian public cardiologic wards at patient level. The motivation is to contribute to better assessment of technical inefficiency, largely indicated in Tunisian's Public hospitals. This is achieved by estimating a nonradial directional distance function for linearized FDH technologies; we develop this model, with a tractable mathematical programming structure, according to the Färe-Lovell definition of the technical efficiency. The economic foundation of the FDH methodology assumes that the input-output vectors measured accurately, give a good representation of the production technology. The linearized FDH model leads to a set of duality results that we use in this applied work. The directional distance function allows for a contraction of inputs. Given policymakers general interest in reducing inputs or saving costs, the directional input distance function is a natural way of modelling the production process and the measurement of input oriented efficiency. Our methods are designed to measure technical inefficiency at the patient level. The data come from two sources for the year 2002: a hospital morbidity and mortality survey completed by data on the billing system.

Conditional Nonparametric Frontier Models For Convex And Non Convex Technologies: A Unifying Approach

Cinzia ; Daraio - Simar, Léopold

Session 3-D Advanced Non-parametric Approaches
Thursday, June 30, 2005 9:00-10:30 Room D

Efficiency and productivity literature primarily focused on the measurement of decision making units (DMUs)" performance. In recent decades there has been a growing interest for the logical step ahead: the explanation of DMUs productivity differentials. As a matter of fact, the impact of external-environmental factors on the efficiency of producers is a relevant issue related to the explanations of efficiency, the identification of economic conditions that create inefficiency, and finally to the improvement of managerial performance. These factors are neither inputs nor outputs under the control of the producer, but can affect the performance of the production process. In literature, two main approaches have been developed. In the 'one-stage' approach the environmental variables are directly included in the linear programming formulation along with the inputs and outputs. Its main disadvantage is that it requires the classification of environmental factor as an input or an output prior to the analysis. In the 'two-stage' approach the technical efficiency, computed in a standard way, is used as dependent variable in a second-stage regression. The main shortcoming of the two-stage approach, as pointed out in Simar and Wilson (2003), is that the efficiency estimates are serially correlated in a complicated way and that the first stage efficiency scores are biased.

A Comparison Between Direct And Indirect Measures Of Efficiency

Ciumara, Roxana

Session 10-C Innovative nonparametric applications
Friday, July 1, 2005 16:45-18:45 Room C

In this paper we compare direct and indirect measures of efficiency through their properties. We will prove that, in certain conditions, the inverse of the indirect measure of technical efficiency output orientated satisfies the same properties as the measure of cost efficiency. Moreover, the inverse of technical gain - defined as the ratio of indirect to direct measure of technical efficiency output orientated - has the same properties as the measure of allocative efficiency. For a data set from the Romanian Textile Industry, we compute the direct and indirect measures of technical efficiency, the allocative and cost efficiency. The results obtained confirmed our expectations. Then, we derive the indirect measure of technical efficiency output orientated when some inputs are considered fixed and we compare them to the scores found by solving a DEA - type problem in which the same inputs are kept fixed.

The Productivity Of Water And Wastewater Services In Australia

Coelli, Tim

Session 5-A Energy and Regulation (Invited)
Thursday, June 30, 2005 14:15-16:15 Room A

Various government-owned businesses supply water and wastewater services to Australian residents. With the advent of recent competition and regulatory reforms in infrastructure industries in Australia, more and more of these businesses are now facing new types of incentive-based regulatory regimes. This has led to a desire for more information on the performance of these businesses, both relative to each other and over time. In this study we use panel data on the 18 largest Australian water services businesses, observed over an eight-year period from 1995/6 to 2002/3, to measure the relative efficiency and productivity growth of these businesses. Econometric estimates of translog cost and distance functions are used to obtain these measures. The analysis also provides estimates of scale and scope economies, which are of interest when discussing mergers and the long-term structure of this industry.

Hölder Index Technical Progress; And Efficiency Change

Comes, Christine - Walter; Briec

Post-Conference
Saturday, July 2, 2005 11:00-13:00 Room A

Recently, Chambers, Färe and Grosskopf introduced what they call the 'Luenberger productivity indicator'. This productivity indicator is based on the shortage function, a recent concept due to Luenberger and introduced in productivity measurement by Chambers, Chung and Färe (1996). The 'shortage function' allows simultaneously a reduction of the input and an increase in the output. In this paper we introduce the Hölder productivity index, based on the metric distance function (also called distance function). Along this line we show that the Luenberger productivity index is encompassed as a special case by our analysis. Our index corresponds to a generalization of the graph of the traditional Malmquist index and is expressed in terms of an arithmetic mean and not of a geometric mean. Moreover we provide an economic interpretation of our productivity index through an arithmetic mean of the profit function. Finally, mathematical programs based upon the duality concept allow us to compute the Hölder distance function and the Hölder productivity index. This chapter is built in the following way. In a first section, we recall the definitions and assumptions necessary to the demonstration of the principal results. We then present, the index of productivity of Hölder, built starting from the metric distance. In a third section, we have results of duality.

Management Characteristics Collaboration And Innovation Performance In The Uk

Cosh; Andy - Fu; Xiaolan - Hughes; Alan

Session 10-A Micro-level Applications
Friday, July 1, 2005 16:45-18:45 Room A

This paper explores the impact of management characteristics and patterns of collaboration on a firm¡¯s innovation performance in transforming innovation resources into commercially successful outputs. These questions are investigated using a recent firm level survey database for 465 innovative British small and medium enterprises (SMEs) over the 1998 and 2001 period. Both Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) are employed to benchmark a firm¡¯s innovative efficiency against best practice. Quality and variety of innovations are taken into account by combining Principal Component Analysis (PCA) with DEA. We find evidence suggesting that innovative efficiency of SMEs is significantly affected by their management characteristics and collaboration behaviour. Collaboration, organisational flexibility, formality in management systems and incentive schemes are found to contribute significantly to a firm¡¯s innovative efficiency. Managerial share-ownership also shows some positive effect. The importance of these effects, however, varies across different sectors. Innovative efficiency in high-tech SMEs could be significantly enhanced by collaboration, formal management structure and training; and that in medium- and low-tech SMEs is significantly associated with managerial ownership, incentive schemes and organisational flexibility.

Market Size And Contract Design:What Determines Efficiency And Productivity In Urban Transit Systems?

Costa; Alvaro - FARIA; ANA - Faria; Ana - Et Al.

Session 2-B Transportation and infrastructure
Wednesday, June 29, 2005 16:45-18:45 Room B

A recent key topic in the study of urban transit systems relates the determinants of their performance. Among the major factors that may explain differences across systems are market organization, contract design, degree and nature of regulatory regime, as well as the characteristics of the network being served (Borger, Kerstens and Costa, 2002). This paper contributes to this literature by providing evidence on the urban public transport sector by using a panel of Portuguese major operators over the period 1996 to 2002. In particular we investigate whether market size and contract design are relevant in explaining firms' performance. Moreover, our data allows us to discriminate between two performance indicators, namely efficiency and effectiveness. In order to evaluate firms' performance we construct best practice production frontier and Malmquist indexes over a seven year period using data envelopment analysis. As such, we are able to investigate what have been the main drivers of efficiency and productivity growth in Portuguese urban transit systems.

Structural Change In Transition: A Role For Organizational Legitimacy? Evidence From Czech Agriculture

Curtiss, Jarmila - Brümmer, Bernhard - Medonos, Tomas - Weaver, Rob D.

Session 1-D Agriculture
Wednesday, June 29, 2005 14:15-16:15 Room D

The processes of market liberalization and restoration of property rights in post-communist countries of Central and Eastern Europe were expected to result in economic incentives that would stimulate economic restructuring and improved economic performance. Nonetheless, empirical efficiency analyses have shown that ten or more years after the economic system change, a substantial proportion of firms continue to show inefficiencies and weak economic performance. In studies of structural change, this observation has often been ascribed to the delirious effect of an imperfect and incomplete institutional environment as it has implied significant heterogeneity across the economic conditions faced by firms. However, little consideration has received an alternative view on the organizational effect of institutional environment, the neo-institutional approach to organizational theory. It suggests that institutions can influence the firms' choice of organization form. Firm's may choose a form that allows efficient management and production of private goods or one which is inefficient in this respect if access to external resources can be secured through social or public approval and support associated with an image of organizational legitimacy. We consider this approach as particularly relevant in a transition setting where many non-economic values and norms are an element of the firm.

Substitution Effects In Multi-Output Production. Evidence From Italian Universities

Daraio, Cinzia - Bonaccorsi; Andrea - Simar; Leopold

Session 7-D University and Education
Friday, July 1, 2005 9:00-10:30 Room D

The production of universities is intrinsically a multi-input multi-output activity. This creates a number of challenging theoretical and empirical problems. In this paper we apply recently developed techniques to original datasets, in order to shed light to some controversial issues in economics and policy of science, higher education, and innovation. The problem of relations between various forms of outputs is extremely relevant from the point of view of decision makers and policy makers. First of all, the relation between teaching and research activity may be subject to trade-off effects largely explored in the economics of education and higher education literature (e.g., Graves, Marchand and Thompson, 1982; Cohn, Rhine and Santos, 1989). In principle, substitution and complementarity effects may be equally present. For example, a large number of students may provide universities additional resources that can be employed in research, generating positive effects (e.g., Gautier and Wauthy, 2004). On the other hand, a heavy teaching duty may subtract time and intellectual energy to university professors. So far, most of the evidence has been obtained either in a standard regression framework or using multi-product functions. We will obtain estimates that have a clear interpretation at various points of the interval of size of the outputs or of the total unit of production.

Production Strategy Market Competitiveness And The Normative Use Of Dea

De Le Court; Eleonore - AGRELL; Per

Post-Conference
Saturday, July 2, 2005 14:15-15:45 Room A

Frontier analysis has two major objectives. First it provides a performance assessment by means of a distance measure up to the efficiency frontier. Second it provides qualitative information about the performance improvement orientation of an inefficient decision making unit (DMU) by projection onto the frontier. In classic DEA models the projection is done by minimization of the distance (often radial) between the DMU and the frontier. However, unless the underlying market is perfectly competitive, the improvement direction may not be rationally optimal. Industrial organization and management literature usually assume that the specialization and number of firms in a given market are results of a competitive analysis to achieve either differentiation or operational superiority (efficiency). This paper extends these ideas to the projection direction choice by including measures of competitive pressure into the frontier information. The number and the positioning of firms present in a region are measures of the competitive environment around the frontier, in addition to the firms constituting the reference/projection point. The methodology is essentially based on the dual output weights, assuming globally competitive input markets.

Do Estimated Technical Inefficiencies Reflect Differences In Technologies?

Del Corral Cuervo, Julio - Álvarez Pinilla, Antonio

Poster Session
Thursday, June 30, 2005

In his well known exchange with Leibenstein, Stigler (1966) argued that estimated differences in technical efficiency could be due to firms having different technologies. However, his remark about the importance of this type of unobservable heterogeneity has largely passed unnoticed in empirical research in the field of productive efficiency. By unobservable heterogeneity we mean the differences across observations that are not reflected (measured) in the sample. When this information is not important, it can be accommodated in the error term. The important question is how deal with situations when these differences are important, since their omission from the model may yield biased estimates of the parameters of the model. Two types of unobservable heterogeneity can be found in practice. The first one refers to the omission of relevant variables from the model (input quality is a common example of this type of heterogeneity). The second one refers to the underlying technology, i.e., the firms may come from populations characterized by different technological parameters.

Technical Efficiency Of Swiss Public Schools

Diagne, Djily

Poster Session
Friday, July 1, 2005

In this paper, we use the non-parametric method of DEA to measure the technical efficiency of secondary schools in French-speaking Switzerland. The results show considerable performance differences across schools and cantons. Technical efficiency is on average 85%. However, once account is taken of the socio-economic background of pupils, average efficiency increases to 94%. We also examine the determinants of efficiency using several alternative methods. The findings reveal that socio-economic environment of pupils and the status of the teacher are significantly associated with technical efficiency of schools. The results about teachers' experience and education are inconclusive.

Accounting For Technical Quality And Environmental Efficiency In The Olive Oil Industry

DIOS-PALOMARES, Rafaela - De Haro-Bailón; Tomás - Martínez-Paz; José Miguel

Poster Session
Wednesday, June 29, 2005

In this work we present a study on the olive oil industry sector in the South of Spain. Three main aspects have been considered, such as technical efficiency, product quality and the environmental effects of the production process. These are essential variables for the actual sector development, being the basis of the necessary repositioning strategy of olive oil in national and international markets. Despite a rapid growth in olive oil consumption in recent years, the actual situation of this sector requires as to reach an autonomous economic performance in order to became European Community Help independent. To achieve this, the olive oil industry must be technically efficient and offer a high quality product with a competitive market price. It is also important to avoid bad environmental effects. Quality has been estimated by mean of an index (QI) that collects aspects such as extra virgin olive oil proportion on the total production, critical points and traceability. Respect for the environment is evaluated by building the EI index that includes bad impacts on soil, water, and air, also taking into account noise and neighbourhood disturbances. Both indices have been calculated applying Delphi methodology. We have performed a multioutput DEA frontier analysis on the basis of direct information on a 150 olive oil industries sample.

The Importance Of Inward And Outward FDI For Productivity Growth In The Uk

Driffield; Nigel - Henry; Michael - Love; James

Session 7-A Macro-level Applications
Friday, July 1, 2005 9:00-10:30 Room A

Abstract There is increasing theoretical and empirical evidence that foreign direct investment (FDI) may be motivated not by the desire to exploit some competitive advantage possessed by multinationals, but to access the technology of host economy firms (see Cantwell and Janne, 1999; Serapio and Dalton, 1999; Kogut and Chang, 1991; Fosfuri and Motta, 1999). We extend this developing literature in several ways. First, following van Pottelsberghe de la Potterie and Lichtenberg (2001) we incorporate the importance of outward as well as inward FDI as a source of productivity growth. However, whereas the latter two authors infer motivation ex post from the spillover effects of inward and outward FDI respectively, we infer motivation ex ante. Second, we extend recent work by Driffield and Love (2002, 2003) and Driffield and De Propris (2005) to include, not only the notion of technology sourcing FDI, but also to consider other motives for FDI as an explanation for the heterogeneous effects of FDI on UK productivity. In those papers the authors make the distinction between technology exploiting FDI (TEFDI) and technology sourcing FDI (TSFDI), using R&D intensity differentials between host and source sectors as the means of ascribing motives.

Decomposition Of Cost Changes In Dutch Homes For The Mentally Disabled

Eggink, Evelien - Jonker; Jedid-Jah - Ras; Michiel

Session 4-B Health
Thursday, June 30, 2005 11:00-13:00 Room B

The costs of Dutch homes for the mentally disabled have risen substantially during the last decades. The number of mentally disabled is growing and the care for the mentally disabled changes because of changing ideas on the quality of care. In addition there are many mergers, closures and new start-ups, changing the number of institutions as well as their size and scope rapidly. In this paper the background of the cost increase in the homes for mentally disabled is analysed. For the empirical analysis a panel of Dutch homes for the mentally disabled is used covering the period 1984-1998 and a stochastic parametric frontier cost model is employed. The cost increase in the sector appears to be caused in part by increasing prices and changes in the macro level of production. The contributions of these changes are straightforward to calculate. In addition the costs per product may change. A stochastic parametric frontier cost model is used to assess and decompose the contribution of the costs per product in the cost increase. The impact of changes in the size and composition of production at the micro level are analysed as well as the usual productivity change and its decomposition into technical change and efficiency components.

Constructing Balanced Portfolios Of R&D Projects: A DEA Approac

Eilat; Harel - Shtub; Avraham

Session 8-C Non-parametric Applications
Friday, July 1, 2005 11:00-13:00 Room C

We propose and demonstrate a methodology for the construction and analysis of efficient, effective and balanced portfolios of R&D projects with interactions. The methodology is based on an extended Data Envelopment Analysis (DEA) model that quantifies some the qualitative concepts embedded in the Balanced Score Card (BSC) approach. The methodology includes a resource allocation scheme, an evaluation of individual projects, screening of projects based on their relative values and on portfolio requirements, and finally a construction and evaluation of portfolios. The DEA-BSC model is employed in two versions, first to evaluate individual R&D projects, and then to evaluate alternative R&D portfolios. To generate portfolio alternatives, we apply a branch-and-bound algorithm, and use an accumulation function that accounts for possible interactions among projects. The entire methodology is illustrated via an example in the context of a governmental agency charged with selecting technological projects.

Measuring Productivity When Grids Merge

Ek, Arvid Göran

Session 4-A Energy and Regulation (Invited)
Thursday, June 30, 2005 11:00-13:00 Room A

The measuring of productivity development in an industry when firms are merging will give different results if the firms (observations) are excluded from the panel when they merge into another firm relative to the proposed method of making an ex ante merging which can be used as benchmark for the panel in the next productivity measurement. The proposed method is presented with a simple example explaining the basic concept behind the method. An empirical study is done with data on the electricity distribution grids in Sweden. The grids in Sweden are rapidly merging with regard both to the ownership and internally to the number of price (accounting) areas within each firm. The panel of observations is therefore successively reduced. The merging process is expected to result in productivity gains but in the same time will the benchmark information be reduced.

U.S. Productivity In Agriculture And R&D

Färe, Rolf - Grosskopf; Shawna - Margaritis, Dimitri

Session 6-D Invited Modeling Session
Thursday, June 30, 2005 16:45-18:45 Room D

In this paper we analyze the impact of research and development (R& D) on productivity in the U.S. agricultural sector. Based on an extensive time series data, we estimate productivity using a Bennet-Bowley productivity index. This productivity indicator may be derived from the Luenberger productivity indicator which is in turn defined in terms of directional technology distance functions. These distance functions simultaneously credit expansions of outputs and contractions of inputs. Thus they are appropriate measures of total factor productivity in a profit maximization setting. The Bennet-Bowley productivity indicator is an extremely useful research tool for dealing with the particular requirements of our task: namely, to construct a TFP measure for a multiple-multiple input technology. The data set includes two outputs, livestock and crops as well as four inputs including machinery, labor, fertilizer and land. The other part of our inquiry is to investigate the e ect of research and development on the pattern of productivity growth. Here we employ time series techniques to relate our productivity series and time series data on R& D in U.S. agriculture . We find that: 1) we cannot reject the presence of a cointegrating relationship between the two series, 2) we cannot reject the hypothesis that R&D does not Granger cause productivity change, and these series are related, and 3) productivity responds positively between four and ten periods after an R&D shock.

Efficiency And Market Power In Spanish Banking

Färe; Rolf - Grosskopf; Shawna - Tortosa-Ausina; Emili

Session 10-B Banking and Finance
Friday, July 1, 2005 16:45-18:45 Room B

Some recent studies have been investigating the existence of market power in the Spanish banking industry. Although results are mixed, the evidence suggests some commercial banks and savings banks benefit from monopoly rents. Some other studies [Berger and Hannan, Review of Economics and Statistics LXXX (1998) 454--465] have also found strong evidence suggesting that banks in more concentrated markets exhibit lower cost efficiency. Our study merges these two groups of findings by exploring how cost and revenue efficiency measures for Spanish banks are related to the so-called return to the dollar (RD), whose advantage over other profitability measures lies on it being a ratio---in contrast to the additive structure associated with profit. This relationship is explored by considering nonparametric and semi-parametric techniques, a set of techniques which is more consistent with those employed to measure efficiency in the first stage of the analysis. Results show that banks'' efficiency is differently related to the return to the dollar according to different circumstances. Specifically, for those firms whose revenues are lower than their costs, the relationship is positive. However, it turns to be negative for those banks with revenues above costs, suggesting that the ``quiet life'''' might be a reality for those banks exerting market power.

Efficiency Measurement In Network Industries: Application To The Swiss Railway Companies

Farsi, Mehdi - Filippini; Massimo - Greene; William

Session 1-B Transportation and infrastructure
Wednesday, June 29, 2005 14:15-16:15 Room B

In 1996, following an alarming growth in government subsidies for railway transport in Switzerland, the federal government introduced a series of regulatory reforms. In particular, the subsidization of regional railway companies that was previously based on a full deficit coverage, has been replaced by an ex-ante fixed payment system. However, given that these subsidies are determined through a long series of negotiations and bargaining between railway companies and the corresponding cantonal governments, companies might use their local monopoly power to maintain high subsidies. Therefore, it is generally believed that the fixed payment system should be supported by a benchmarking practice to induce companies to minimize their costs. Benchmarking methods are mainly based on models of efficiency measurement. However, the reliability of such models in network industries has been often questioned. Network industries are characterized by a high degree of heterogeneity, much of which is network-specific and unobserved. The unaccounted-for heterogeneity can create bias in the inefficiency estimates. This paper examines the performance of several panel data models to measure cost and scale efficiency in network industries.

Efficiency And Risk

Ferrier, Gary

Session 9-D Non-parametric Applications
Friday, July 1, 2005 14:15-16:15 Room D

A common assumption of economic and finance theory is that firms are risk neutral. While firms may be risk neutral, firms' managers (i.e., decision makers) may not be risk neutral. The (usually implicit) assumption of risk neutrality is likely to bias measures of efficiency since the assumption results in the omission of risk preferences from the model. A small number of previous efficiency studies using stochastic frontiers have included risk preferences (e.g., Hughes and Mester, RESTAT, 1998). A recent paper by Kumbhakar (AJAE, 2002) has directly specified and estimated risk preferences, production risk, and technical inefficiency for a stochastic frontier model. This paper uses a recently developed technique to simultaneously calculate measures of risk aversion and technical efficiency within a DEA framework. In particular, the method is applied to a sample of U.S. Bank Holding Companies (BHCs) operating from 1994-2001. Results from a model that ignores risk and from the model that simultaneously calculates risk aversion and efficiency are contrasted. The empirical relationship between the calculated risk and efficiency measure is examined as well. Finally, the risk aversion measure calculated by the DEA model is contrasted with standard financial measures of risk to determine whether managers' risk aversion is reflected in firms' market performance.

Peer Effects And Productivity: The Role Of Competition And Safety Net Hospitals On Performance

Ferrier, Gary - Valdmanis; Vivian

Session 5-B Health
Thursday, June 30, 2005 14:15-16:15 Room B

Numerous papers have used frontier methods to measure and examine the productivity of firms operating in a host of different industries. To the best of our knowledge, however, there does not exist any research addressing the issue of how a firm's productivity is related to that of its peers. This paper seeks to address this hole in the literature. Microeconomic theory suggests that competition among firms forces each of them to operate efficiently if they hope to survive in the marketplace. Even in markets that are less than perfectly competitive firms are likely to adjust their performance in light of the performance of their peers. One reason for doing so may be the need to attract capital; another reason may be the "bragging rights" that are associated with superior performance. On the other hand, in less than competitive markets firms may adopt the "quiet life" described by Hicks, operating only as efficiently as required by the pressure placed upon them by the performance of their peers. At any rate, it would seem that evaluating firms' performances in relation to that of their peers is a worthwhile endeavor. In particular, we examine the relationship among the performance of a sample of hospitals operating in large US urban markets over the period 1993-2002.

Generalised Malmquist Productivity Measurement In The Banking Systems Of Two Emerging Economies

Fethi, Meryem Duygun - Shaaban; Mohamed - Weyman-Jones; Thomas G.

Session 10-B Banking and Finance
Friday, July 1, 2005 16:45-18:45 Room B

Banking systems in emerging and developing economies hold the key to economic growth and productivity change at the macroeconomic level. As financial globalisation proceeds, many emerging economies are reforming their banking systems through the process of liberalisation, privatisation and deregulation, especially where state-owned banks have previously been dominant. The purpose of this paper is to measure productivity change and its decomposition into efficiency change, technical change and scale effects in the banking systems of two emerging economies as liberalisation and privatisation occurred. We specify a generalised parametric Malmquist approach using the distance function, Orea (2002). This can be applied to both output and input distance functions and this permits us to consider a range of appropriate models of the banking production process. Within this approach, we have the ability to explore a number of different stochastic specifications of the inefficiency distribution, including time varying inefficiency, heteroscedastic in efficiency conditional on exogenous determinants, (Wang & Schmidt, 2001). The sample we work with covers two different but related emerging economies, Turkey and Egypt. Both have undergone significant regulatory, ownership and market structure changes in the last ten to fifteen years.

Calculation Of Scale Elasticities In Dea Models:

Førsund, Finn - Hjalmarsson; Lennart - Krivonozhko; Vladimir - Utkin; Oleg

Session 3-D Advanced Non-parametric Approaches
Thursday, June 30, 2005 9:00-10:30 Room D

In DEA the qualitative characterisation of returns to scale has occupied many researchers the last decade. However, public policy purposes seem to be better served by numerical information, e.g. how important is the deviation from the competitive market condition that the scale elasticity must be equal or less than one? Following an indirect approach of using efficiency scores and shadow value on the convexity constraint the numerical value of the scale elasticity for radial projections of inefficient points to the frontier can be calculated (provided they are interior points and the facet is fully dimensional). The purpose of the paper is to provide a more powerful and general method using a direct approach to numerically evaluate the scale elasticity at any point on the DEA surface. The approach is based on cutting through the general multidimensional faceted DEA frontier with a two-dimensional plane in any direction from the origin, and calculating the scale elasticities for any point along the intersection of the planes and the frontier. For vertices or points on edges between facets the numerical method gives the scale elasticity based on a right-hand or left-hand derivative in a proportional direction from the origin, corresponding to the basic definition of scale elasticity. A comparison of the indirect and direct approach based on real data is provided.

A Decomposition Of The Malmquist Productivity Index: Returns To Scale And Technical Progress With Imperfect Competition

Fox, Kevin - Diewert; W. Erwin

Session 4-C Growth and Dynamics
Thursday, June 30, 2005 11:00-13:00 Room C

An extension of the framework of Caves, Christensen and Diewert (1982) is considered. This yields a decomposition of the Malmquist productivity index into technical progress and returns to scale components.

Public Inputs And Dynamic Producer Behavior: Endogenous Growth In U.S. Agriculture"

Fulginiti, Lilyan

Session 6-D Invited Modeling Session
Thursday, June 30, 2005 16:45-18:45 Room D

Neoclassical models of growth (Solow, Ramsey) have been widely criticized because they cannot explain productivity changes. According to these models, growth is exogenously given by an unexplained rate of technical change. As a response, endogenous growth theories prove that continuous growth is possible if there exist non-rival inputs of production (i.e., inputs that can be used by many firms at the same time or by the same firm repeatedly without additional cost). In these models, two necessary conditions for endogenous growth are: increasing returns to scale over all inputs, and positive impacts of non-rival inputs on the returns to investment. The main contribution of this study is to introduce a dynamic model of productivity measurement that incorporates public goods (non-rival by definition) as external factors to the firms. It also rationalizes the provision of public inputs by a benevolent social planner that internalizes the effects of them. Estimable functions that allow testing the necessary conditions for endogenous growth are obtained.

Confident-DEA: A New Methodology Genetic Algorithm Based; For Dealing With Imprecise Data In Data Envelopment Analysis

Gattoufi, Said

Session 9-D Non-parametric Applications
Friday, July 1, 2005 14:15-16:15 Room D

This paper proposes a theoretical contribution to the DEA-literature by suggesting an extension we call Confident-DEA approach. The proposed approach involves a bi-level convex optimization model, and hence NP-hard, to which a solution method is suggested. Confident-DEA constitutes a generalization of DEA for dealing with imprecise data and hence allows prediction. Complementing the methodology proposed by Cooper et al (1999) which provides single valued efficiency measures, Confident-DEA provides a range of values for the efficiency measures, e.g. an efficiency confidence interval, reflecting the imprecision in data. For the case of bounded data, a theorem defining the bounds of the efficiency confidence interval is provided. For the general case of imprecise data, that is a mixture of ordinal and cardinal data, a Genetic-Algorithm-based metaheuristic is used to determine the upper and lower bounds defining the efficiency confidence interval. In both cases, a Monte-Carlo type simulation is used to determine the distribution of the efficiency measures, taking into account the distribution of the bounded imprecise data over their corresponding intervals. Previous DEA work dealing with imprecise data implicitly assumed a uniform distribution. Confident-DEA, on the other hand, allows for any type of distribution and hence expands the scope of the analysis.

The Effects Of Political Violence On Farm Household Efficiency: The Case Of Colombia

Gonzalez, Maria A. - Lopez; Rigoberto

Session 1-D Agriculture
Wednesday, June 29, 2005 14:15-16:15 Room D

Many researchers have focused on the impact of adoption of new technologies as the means to increase productivity. However, in many situations, more efficient use of current technology could increase production without requiring additional inputs or introducing new technologies. As importantly, violence and insecurity in the developing world can hinder efficiency and indeed can result in large efficiency loss. Therefore, it is important to quantify the shortfalls in efficiency and the factors underlying these shortfalls, including institutional factors. Political violence is a fact of life in much of the developing world, especially in many countries in Latin America, Sub-Saharan Africa, the Middle East, and Asia. One of the well-established premises in economics and political science is that political violence leads to slower or negative economic growth. Yet nearly all studies of efficiency of farm households ignore the importance of political violence in their analyses (even in countries like Colombia where political violence is rampant) while studies of the economic effects of political violence are conducted at the national level without a micro insight into the effects on farm households, which are particularly vulnerable to political violence. Colombia provides a useful case study for the analysis of the impact of political violence on farm household efficiency.

Mergers In Norwegian Electricity Distribution: An Efficiency Enhancing Exercise?

Grammeltvedt, Thor Erik - Bogetoft; Peter

Session 4-A Energy and Regulation (Invited)
Thursday, June 30, 2005 11:00-13:00 Room A

Abstract: In this paper, we investigate if the mergers of Norwegian electricity distribution companies in the period 1995-2001 can be rationalized as a cost saving exercise – or whether they should be explained by other factors, including the regulatory regime. We use Data Envelopment Analysis to estimate the potential production economic gains from mergers ex ante, and we decompose the gains into potential gains from learning best practice and from better economies of scale and scope. Moreover, we compare with post merger efficiencies to identify extraordinary costs and benefits from the mergers. Our primary focus is on the production economic aspects of mergers, but we supplement with a few observations on strategic implications. We study the regulated revenues and efficiency improvement requirements before and after the mergers to quantify possible gains from "playing the regulation". We find that mergers lead to a change in input mix which may be associated with potential production economic gains, in particular the possibility to save on labor and service costs. We find some evidence that this change may be associated with a more rapid technological progress or catch up among merged companies, but this result may also be explained by some limitations in the existing analytical instruments.

Hospitals Affiliations; And Efficiency

Granderson, Gerald - Alam; Ila

Session 3-B Health
Thursday, June 30, 2005 9:00-10:30 Room B

This paper examines the effects of hospital ownership type, teaching objective, affiliation in an organization (alliance, network, system), and hospital contracts with HMOs and PPOs, on cost efficiency. With ownership type, possible differences in management goals among non-profit and government hospitals may contribute to differences in cost efficiency. We separate non-profit non-government hospitals into church operated versus "other" hospitals (primarily church affiliated and community hospitals) to determine if different types of non-profit hospitals behave dissimilarly. With location, rural hospitals, compared to urban hospitals, tend to deliver more primary than highly specialized care, and may treat a less complex mix and smaller range (distribution) of cases. This study allows for differences in location (urban and rural). With teaching objective, teaching hospitals may handle a more complex and wider distribution of cases compared to non-teaching hospitals. Major teaching hospitals may have different objectives, compared to minor teaching and non-teaching hospitals, with respect to the quality of education provided in teaching students. We separate teaching hospitals into major teaching and minor teaching hospitals to determine if different teaching objective affects cost efficiency.

Productivity At The Post

Grifell-Tatjé, Emili - Lovell; C. A. Knox

Session 9-D Non-parametric Applications
Friday, July 1, 2005 14:15-16:15 Room D

We study economic and financial performance of the United States Postal Services (USPS) after the 1971 reorganization from government (Postal Reorganization Act) using data from 1963 to 2002. The literature on the measuring of productivity and, especially, that which has the identification of the explanatory causes or effects of the productive variation as its goal has grown enormously from the eighties onwards. In contrast, the literature which has the study of the analysis of the distribution of the productive gains achieved by the company as its objective, has tended to disappear. It is essential, for any policymaker, to have information on the levels of efficiency reached as well as of the distribution of the productivity gains (losses) among stakeholders. In this paper we study the USPS analysing both: the variation and the distribution of the productive gains. We propose a methodological approach which has as background Davis (1955) and the Belgium and French literature of the sixties and seventies.

Model Development For A Pan-Nordic Incentive Regulation For Electricity Distribution

Gronli, Helle

Session 5-A Energy and Regulation (Invited)
Thursday, June 30, 2005 14:15-16:15 Room A

The Nordic wholesale electricity market has been fully integrated since Denmark joined Nordpool as a Nordic Power Exchange price area in 1999. The cooperation between Denmark, Finland, Norway and Sweden has been rather tight when it comes to promoting fair competition in a common Nordic market since the deregulation of the different countries' electricity markets. However, in the area of regulating the electricity grid companies, the coordination has been less prevalent. The four countries have chosen rather fundamentally different regulatory ideologies: Denmark and Norway have ex ante regulation, while Finland and Sweden currently has ex post regulation. The use of efficiency models in the regulation also varies, both with regards to approach and use in the regulation. For instance, Finland and Norway both use a DEA model, Denmark uses a regression type of model and Sweden an optimal grid model supplemented by DEA. Nordenergi, the Association of Nordic utilities, believes several gains could be achieved through a harmonization of the regulatory principles in the Nordic countries. Therefore, Nordenergi has commissioned a project investigating the issues of a Pan-Nordic regulation model and a Pan-Nordic efficiency model as part of a common regulatory design.

Quality Of Service Technical Efficiency And Economies Of Scale - An Analysis Of European Electricity Distribution Utilities

Growitsch, Christian - Jamasb; Tooraj - Pollitt; Michael

Session 5-A Energy and Regulation (Invited)
Thursday, June 30, 2005 14:15-16:15 Room A

Although quality of service is of major economic significance in most network industries, it is generally not reflected in technical and scale efficiency analysis. In this paper, we apply stochastic frontier analysis to estimate technical and scale efficiency using a sample of about 500 electricity distribution utilities from eight European countries. We then extent the scope of analysis by incorporating quality of service using multi-output translog input distance function models. We find that introducing the quality dimension into the analysis affects estimated efficiency significantly. In particular, smaller utilities seem to benefit from incorporating quality. We also examine the effect of quality of service on efficient firm size. Our findings emphasise that quality of service should be an integrated part of efficiency analysis and incentive regulation regimes.

Environmental Bads And Nonparametric Modelling: Clearing Some Confusions

Hailu, Atakelty

Session 7-C Ecological Efficiency
Friday, July 1, 2005 9:00-10:30 Room C

There has been a growing interest in the measurement of productivity performance in ways that take environmental performance into account. An increasing number of business firms are recognizing the pecuniary and non-pecuniary benefits of improved environmental management and the effective signalling of the same to stakeholders. Socio-economic analysts have also been looking for measures of performance that take into account the environmental effects of economic activity. Both parametric and nonparametric techniques have been used to incorporate undesirable outputs in productivity measurement over the last fifteen years. However, there still remains some confusion regarding the correct manner in which undesirable outputs should be included in DEA models. This paper evaluates the appropriateness of alternative disposability assumptions and clarifies some confusions in the literature including those relating to the normative aspects of pollution abatement.

Water Use Shadow Prices And The Canadian Business Sector Productivity Performance

Harchaoui, Tarek - Dachraoui; Kais

Session 10-C Innovative nonparametric applications
Friday, July 1, 2005 16:45-18:45 Room C

This paper develops a production framework that allows for self-supplied water intake, an unpriced 'natural' input. The framework is then exploited to estimate the corresponding water shadow prices and to assess the extent to which water impacts on the multifactor productivity performance of the Canadian business sector's industries. Accounting for water intake leaves the aggregate business sector's multifactor productivity growth virtually unchanged over the 1981-1996 period, but it increases the productivity performance of the largest water-using industries by 0.7 percentage points on average. The shadow price of water intake amounts to $0.73 cubic metre and varies significantly across industries, thereby reflecting different willingness to pay. While the introduction of water recirculation, a kind of water recycling, does not alter in a significant way most of these results, it reduces the shadow price estimate to $0.55 cubic metre and improves its reliability particularly for the largest water-using industries. Water is found to be a substitute to capital and labour inputs, suggesting that more of these inputs are required to bring about savings in water use.

A Fully Nonparametric Stochastic Frontier Model For Panel Data: A Practical Approach

Henderson, Daniel J. - Simar; Léopold

Session 3-D Advanced Non-parametric Approaches
Thursday, June 30, 2005 9:00-10:30 Room D

In this paper we estimate the production frontier and technical efficiency fully nonparametrically by exploiting recent advances in kernel regression estimation of categorical data. Specifically, we model firm (unordered) and time (ordered) categorical variables directly into the conditional mean. This approach allows us to smooth the firm and time specific effects, which formally entered the model linearly. Our setup allows for more flexible and accurate estimates of the production frontier and technical efficiency. We apply these techniques to a data set examining labor efficiencies of 17 railway companies over a period of 14 years. Not only are our results for the elasticites more economically intuitive than the parametric and semi-parametric procedures (which are special cases of our procedure), we obtain different rankings in terms of labor efficiencies.

Contributions Of ICT To Chinese Economic Growth

Heshmati; Almas

Session 5-C Empirical Productivity
Thursday, June 30, 2005 14:15-16:15 Room C

The view about systematic irrationality of investors and managers in investment with reference to ICT with no effects of productivity growth is called productivity paradox. Research suggest that ICT return in developed nations is significant and positive, but not in developing countries. This paper challenges the above conclusion by examining the contribution of information and communication technology to Chinese economic growth. We will provide some empirical evidence that China has reaped in ICT investment, specifically, the aim is firstly to research on relationship between TFP and ICT capital by using Chinese data. Secondly, provide estimation of the returns or lack of returns to IT investment with sensitiveness analysis, by using different depreciation rate and income share of capital. Thirdly, discuss the policy implications for the Chinese ICT development and investment patterns. Finally, we suggest guidelines for future research in general and also in the China case. The results are of great interest by adding to our understanding of how ICT affects growth in an economic development context.

Mutual Fund Performance And Persistence In Taiwan:A Non-Parametric Approach

Hsu, Chi-Sheng - Lia; Ching-Yao

Session 9-B Banking and Finance
Friday, July 1, 2005 14:15-16:15 Room B

This paper applies a non-parametric, linear-programming technique, called data envelopment analysis (DEA), to measure performances of Taiwan domestic equity funds during the period of 1999 to 2003. Unlike the traditional Sharpe ratio, the DEA enables us to consider the transaction costs (loads, expense ratios, and turnover ratios) and excess returns simultaneously. The results of Pearson correlation and Spearman''s rank correlation tests show that technical efficiencies (TEs) estimated by DEA are significantly positively correlated with Sharpe ratios. To test the performance persistence, we first divide the sample funds into the low efficiency (0-25th percentile), middle efficiency (26th-75th percentile), and high efficiency (76th-100th percentile) groups according to their ranking on TE value and Sharpe ratio, respectively. The ANOVA analyses and t-tests indicate there are significant differences in mean performances across groups. Then, based on the previous one-, two-, and three-year performances of the sample funds, we employ the iterative seemingly unrelated regressions to analyze the persistence of sample funds'' performances by using the measures of TE value and Sharpe ratio simultaneously. Our results show that there exists a significant 'hot hands' effect in Taiwan domestic equity funds under the TE measure.

Capital Adequacy Risk Management; Efficiency And Productivity In Taiwan"s Banking Industry

Huang, Ming-Hsiang - Huang; Cliff J.

Session 10-B Banking and Finance
Friday, July 1, 2005 16:45-18:45 Room B

Responding to the change of regulation governing financial markets, bank manager tends to adjust their attitudes toward risk accordingly. Numerous studies have examined the effect of the Basel Accord I on the risk taking of banking industry in several countries. Yet, the empirical evidences do not reach consensus conclusion whether the capital requirement encourage or discourage bank risk taking. This might be attributed to the fact that each country has its own unique market structure. The uniqueness of the market structure is indeed significantly related to the dynamic interactions between productivity, efficiency and managers¡¦ attitude toward risk in the underlying banking industry. The objective of this study is to examine the impact of the Basel Accord on the attitudes of bank mangers toward risk taking behavior, and its impact on the productivity and efficiency in the Taiwan banking industry. The panel data of forty-eight sample banks in Taiwan from 1981 to 2003 is utilized to examine the overall impact. A stochastic cash flow cost function is modeled to estimate the bank-specific efficiency, productivity, and its risk premium as a measure of risk behavior. In addition, this study adopts a metric for the risk of insolvency (Z-score) developed by Boyd, et al. (1993) to capture the probability of bank failure.

Impact Of Trade Area Environment On Bank's Comparative Advantages

Hubrecht, Aude - Hervé; Leleu

Session 7-A Macro-level Applications
Friday, July 1, 2005 9:00-10:30 Room A

This paper analyzes the relationship between the comparative advantages of bank branches and the trade area environment. Bank branches are points of sale whose trade environment influences their activities and performance. Comparative advantages are defined, for each output mix, by the strict dominance of a production technology in a specific trade area over the production technologies of other environments. Using Shephard's output distance functions on a sample of 728 bank branches, we compare the production technologies for different output mixes and different trade environments. We show that none of the production technologies strictly dominates the others and none of them is strictly dominated. Therefore, each trade area benefits from comparative advantages that we try to highlight. Finally, we evaluate the performance of the central banks regarding their ability to provide the right incentives on output mixes to their bank branches so that the latter may benefit from their comparative advantages.

Where Have All The Data Gone? Stochastic Production Frontiers With Multiply Imputed German Establishment Data

Jensen, Uwe - Raessler; Susanne

Session 6-B Parametric Applications
Thursday, June 30, 2005 16:45-18:45 Room B

In this paper, stochastic production frontier models are estimated with German establishment data. Our data are taken from two waves (2002 and 2003) of the Establishment Panel of the Institute for Employment Research of the Federal Labor Service. We are confronted with 4 % to 15 % of missing values particularly in the most important variables (output, capital and labor), a typical situation in empirical research. Ignoring this would reduce the complete data records available considerably. Whereas information from 18447 observations from the panel waves of 2002 and 2003 is collected in principle, only 13969 observations of them can be used when inference is based only on the complete cases. Ignoring the missing values would certainly lead to lower precision of the estimates. And the question arises whether the remaining data are still representative for the population of interest. If not, the resulting test statistics are no longer valid and the resulting estimates may be biased. Biases can be expected to occur particularly in the establishment''s inefficiency estimates of the stochastic production frontier.

Output Aggregation And Technical Efficiency: A Comparative Study Using Production Ray-Production And Distance Functions

Karagiannis, Giannis - Tzouvelekas; Vangelis

Poster Session
Friday, July 1, 2005

The level of aggregation of inputs and/or outputs in the specification of technology is an acute problem for efficiency measurement in a multi-input/multi-output context, which however has not yet received much attention in both theoretical and empirical grounds. The present paper provides an empirical investigation of the relationship between the level of output aggregation and the estimated output-oriented technical efficiency using a production, a ray-production, and an output distance function to represent technology. These alternative representations of the production technology are analyzed and compared using Monte-Carlo simulations. The simulation results are used to test the conditions for exact aggregation of outputs derived by Fare and Lovell (1988). Moreover, we compare the estimated technical efficiency scores obtained from the production, the ray-production and the output distance function representation of the underlying technology.

A Parametric Decomposition Of The Output-Oriented Malmquist Productivity Index For Public Hospitals In Greece

Karagiannis, Roxani - Hatziprokopiou; Michalis

Session 5-B Health
Thursday, June 30, 2005 14:15-16:15 Room B

Abstract (TO BE CONSIDERED FOR POST-CONFERENCE YOUNG RESEARCHERS WORKSHOP) The first objective of this paper is to measure the productivity of a panel of Greek public hospitals during the period 1999-2003. For this purpose a multiple - output multiple - input output distance function is employed to investigate how many patients could be nursed and how many laboratory tests could be accomplished, given the technology and input quantities such as beds, doctors, nurses, administrative personnel and medical and pharmaceutical costs. The adoption of the Malmquist productivity index is necessary because of two reasons: first, it is based only on output and input quantities, render hospital input prices unnecessary. Second, combines technological change and technical efficiency change. The second objective is to combine the measures of technological change, technical efficiency change, scale efficiency change, and output mix into a measure of total factor productivity using the methodology of Balk (2001). The resulting output-oriented Malmquist productivity index is measured using the parameter estimates of the underlying output distance function, which is estimated within a stochastic frontier framework.

Productivity And Deregulation Of Norwegian Electricity Utilities

Kittelsen, Sverre A.C. - Edvardsen; Dag Fjeld - Førsund; Finn R - Hansen; Wiljar - Et Al.

Session 4-A Energy and Regulation (Invited)
Thursday, June 30, 2005 11:00-13:00 Room A

The deregulation of the Norwegian electricity sector in 1991 separated production and supply on the one hand and transmission and distribution on the other hand. Distribution utilities remain natural monopolies and are subject to a regulatory regime designed to give incentives to productivity improvements. The basic mechanism is based on the RPI-x formula, i.e. costs (or maximal price) are allowed to increase according to the costs of inputs measured by the most relevant index, but not to a full extent; a productivity factor x has to be subtracted. Calibrating the x factor was partly based on an investigation of productivity development of utilities before the change of the regulatory regime. The x-factor was gradually introduced and increased to give the utilities some years to adjust. The full regulation took place in 1999. The purpose of the paper is to investigate the productivity development of individual distribution utilities for the last decade covering both pre- and post periods of the RPI-x regulation to study the impact of the regulation. A Malmquist productivity index approach will be used based on non-parametric frontiers. The decomposition of productivity change into technical shift and catching up will reveal the nature of the utilities' effort to benefit from the regulation.

On Estimating The Mixed Effects Model

Kneip; Alois - Song; Wonho - Sickles; Robin C.

Session 1-A Advanced Parametric Approaches
Wednesday, June 29, 2005 14:15-16:15 Room A

This paper introduces a new estimation method for time-varying individual effects in a panel data model. An important application is the estimation of time-varying technical inefficiencies of individual firms using the fixed effects model. Our paper drops the assumption of a pre-specified model of inefficiency, and provides a semiparametric method for estimation of the time-varying effects. The methods proposed in the paper are related to principal component analysis, and estimate the time-varying effects using a small number of common functions calculated from the data. Finite sample performance of the estimators is examined via Monte Carlo simulations. We apply our methods to the analysis of technical efficiency of the U.S. banking industry.

Finding Unique Weights For Efficient Units In Data Envelopment Analysis

Korhonen, Pekka - Färe; Rolf

Session 4-D Advanced Non-parametric Approaches
Thursday, June 30, 2005 11:00-13:00 Room D

This paper proposes two different principles to find unique weights (multipliers) for efficient units in the Data Envelopment Analysis. In the first approach, an extra single objective function is used to find the weights that discriminate the current efficient unit from the other units as clearly as possible. The min-max rule is applied. The second approach proposes the use of multiple objective linear programming. The multiple objective formulation provides the user with an opportunity to find the most preferred weights for units subject to that the unit remains optimal. The approaches are demonstrated by numerical examples.

Measuring Eco-Efficiency Of Production: A Frontier Approach

Kortelainen, Mika - Kuosmanen; Timo

Session 5-D Ecological Efficiency
Thursday, June 30, 2005 14:15-16:15 Room D

Eco-efficiency of production refers to the capability to produce goods and services by polluting the environment and using natural resources and energy as little as possible. The purpose of this paper is to present a general framework for the measurement of eco-efficiency by drawing insights both from the production theory and eco-efficiency literature. By utilizing methods used in productive efficiency analysis, we construct a general eco-efficiency index that can be applied in different kinds of applications. Although we exploit the existing methods and techniques, our approach differs in some important respects from the usual treatments of firm-level environmental performance analysis (e.g. Färe et al., 1996; Färe et al., 2005). The main difference between our approach and the earlier studies is that we build on the most standard definition of eco-efficiency as the ratio of economic value added to the environmental damage index. This definition gives an equal emphasis on both economic and environmental criteria. By contrast, the efficiency analysis literature typically treats the environment merely as one additional criterion (or constraint) in the technically oriented efficiency assessment.

Profit Efficiency Analysis With Absolute And Uniform Shadow Prices

Kortelainen; Mika - Kuosmanen; Timo - Sipiläinen; Timo

Session 4-D Advanced Non-parametric Approaches
Thursday, June 30, 2005 11:00-13:00 Room D

We extend the nonparametric toolkit for testing data consistency with profit maximization. Our methodological extensions exploit the dual 'shadow' profit efficiency interpretation of the DEA model that builds on assumptions of monotone and convex production possibility sets, and the concomitant use of DEA weight restrictions for constraining the relative shadow prices of the inputs and outputs. Extending earlier work (see Kuosmanen et al., 2004), we then suggest the introduction of uniformity restrictions regarding the shadow prices across the different observational units; the well-established 'Law of One Price' (LoOP) provides a solid theoretical basis for such cross-observational shadow price constraints. Within a directional distance function framework, we argue that the selection of a single numeraire good suffices for measuring LoOP-based profit efficiency in absolute price terms. An application to the profit efficiency evaluation of Finnish farms illustrates our methodology. This application shows the potential of the methodology for enriching the conventional shadow price based profit efficiency analysis, including the recovery of LoOP-consistent shadow price information. KUOSMANEN, T., L. CHERCHYE and T. SIPILÄINEN (2004), '

Modifications Of The Algorithms For Visualization Of The Multidimensional Frontier In DEA And Efficiency Analysis Of Russian Banks

Krivonozhko, Vladimir - Utkin; Oleg - Safin; Michail

Session 8-C Non-parametric Applications
Friday, July 1, 2005 11:00-13:00 Room C

In our previous works we have shown that standard parametric optimization algorithms may not be very efficient from a computational point of view. For this reason our group has developed a family of parametric optimization algorithms that allows us to visualize and to analyze production unit behavior in the multidimensional space of inputs and outputs. There are more than one thousand banks in Russia. So, we have to modify our algorithms in order to accelerate the speed of computations and to increase the accuracy of our algorithms. We apply our methods to efficiency analysis of Russian banks.

On The Minimum Extrapolation Principle Of Data Envelopment Analysis

Kuosmanen, Timo

Session 2-C Axiomatic Theory
Wednesday, June 29, 2005 16:45-18:45 Room C

The minimum extrapolation principle (MEP) is a cornerstone of Data Envelopment Analysis (DEA). This principle defines the DEA production possibility set as “the "smallest" set that consistent with the observed data and the postulated properties for the production possibility set” (Banker, Charnes, and Cooper, 1984, Management Science 30(9), p. 1082). Bogetoft (1996, Management Science 42(3)) has earlier noted that the MEP is not applicable with any set of assumptions. This paper presents another paradox: we show that under certain widely used postulates (convexity, free disposability of inputs and good outputs, weak disposability of bad outputs) the DEA production possibility set excludes input-output vectors that are technically feasible by those same postulates. We argue that resolving this type of paradoxes calls for a reformulation of the MEP. We propose a revised MEP that avoids the known paradoxes but preserves the spirit of the original MEP .

On The Anatomy Of Productivity Growth: A Decomposition Of Teh Fisher Ideal TFP Index

Kuosmanen; Timo - Sipiläinen; Timo

Session 4-C Growth and Dynamics
Thursday, June 30, 2005 11:00-13:00 Room C

Decompositions of productivity indices contribute to our understanding of what drives the observed productivity changes by providing a detailed picture of their constituents. This paper presents the most comprehensive decomposition of total factor productivity (TFP) to date. Starting from the Fisher ideal TFP index, we systematically isolate the productivity effects of changes in production technology, technical efficiency, scale efficiency, allocative efficiency, and the market strength. The three efficiency components further decompose into input- and output-side effects. The proposed decomposition is illustrated with an empirical application to a sample of 459 Finnish farms over period 1992-2000.

The Use Of Bootstrapped Malmquist Indices To Reassess Productivity Change Findings: Application To A Sample Of Polish Farms

Latruffe, Laure - Balcombe; Kelvin - Davidova; Sophia

Session 7-B Bootstrapping
Friday, July 1, 2005 9:00-10:30 Room B

This paper applies Simar and Wilson's (1999) bootstrapping procedure for constructing confidence intervals for Malmquist indices calculated with Data Envelopment Analysis (DEA), and correcting the indices for bias. In a second stage, in order to explain the farm-specific change in productivity, both the bias-corrected Malmquist estimates and their standard deviations are employed in a new form of heteroscedastic panel regression, using a maximum likelihood procedure which uses the DEA standard deviations of the Malmquist indices. Polish farm-level data between 1996 and 2000 are used. The final sample consists of 250 farms. A multi-output multi-input DEA model is employed. The three outputs are livestock output, crop output and other output, and the four inputs are land, labour, capital and intermediate consumption. 2000 bootstrap iterations were performed and the 95-percent confidence intervals were constructed. Results show that Polish farm productivity decreased by 2 percent on average between 1996 and 2000. After bias-correction, it appears that the productivity regress is even greater, at 4 percent. As for the confidence intervals, they are relatively large, about 0.50 on average.

Do the Ban on Use of Anti-Microbial Growth Promoter Impact on Technical Change and the Efficiency of Slaughter-Pig Production

Lartey Lawson - Lars Otto - Peter Vig Jensen - Mogens Lund
Food and Resource Economic Institute; The Royal Veterinary and Agricultural University, Denmark

Session 2-D Agriculture
Wednesday, June 29, 2005 16:45-18:45 Room D

This study aims at investigating the effects of the ban on the use of anti-microbial growth promoters in the production of "Finishing Pigs" for slaughter. We investigate if the ban on the use of anti-microbial growth promoters has for specialised pig-producers altered the productivity of inputs, technical change and the efficiency of production. This paper complements an earlier paper that investigated the impact of the ban on weaned-pig production. Background: The study is motivated by the fact that antimicrobial growth promoters have been known world wide to protect livestock from bacteria infections, and in effect stimulated the utilization of feedstuff and reduced the mortality rate. However, fears for increasing bacteria resistance with subsequent health hazards for humans and livestock has lead to societal debates about the pros and cons of its use in livestock production. Antibiotic–resistance infectious diseases increase health care costs associated with treatment expenses and possible multi-drug resistance infections. The Danish government and the pig industry in recognition of the negative effects associated with reduced efficacy of antibiotic drugs in the future started a gradual determination of the use of growth promoters in 1995, which resulted in a total ban in 2000. EU as a follow-up to the Danish action also initiated a ban on the use of growth promoters that are known to contribute to human health hazard. In the US the discussion of a ban is an ongoing subject of debate. For US producers, a study by Hayes et al. (2001), suggested that a ban would increase production costs and subsequently lead to an increase in the retail price of pork. In another US study, Wade and Barkley (1992) suggested that with a ban both producers and consumers surplus will increase. However, these studies are based on estimated anticipated results, which may not have very strong desire-to-change impact on the perception and the attitude of producers who are the users of growth promoters. Contributions of the paper: The paper is of an interest because it provides specific knowledge of the impacts of the ban. Therefore from a policy point of view, the paper will provide information for governments and industries contemplating a ban to identify the kind of incentives necessary to ensure a smooth implementation of a ban. For the producers in countries where the ban is still a question of debates the results will provide useful information about the response reaction of Danish slaughter-pig producers. Methods and data: We use the parametric stochastic frontier analysis approach and estimate a production function from an unbalanced panel-data. The data is the national stratified ran-dom sampled of about 75 farms, raising finishing pigs for slaughter, and collected annually for the period 1991 to 2003 by the Danish Agricultural Account Statistic. This sample data allows comparing the input productivities of output for before and after the implementation of the ban. Technical change defined with a time trend and the general index will also be compared. Similarly the over all yearly estimated technical efficiency would be compared.

Productive Efficiency Models For Environmental Performance Measurement: A Literature Review

Lauwers, Ludwig - Wustenberghs; Hilde - De Cock; Lieve

Session 5-D Ecological Efficiency
Thursday, June 30, 2005 14:15-16:15 Room D

In order to account for environmental side effects of production processes, several attempts have been made to incorporate them in efficiency and productivity analysis (EPA) models. Based on an extensive literature review, this paper inventories and tries to categorise the existing approaches and models for the environmental adjustment of the conventional productive efficiency measurements. The literature review starts with some "pre- Pittman" papers, the environmentally adjusted multilateral productivity index by Pittman (1983) and the concept of weak disposable bad output, introduced by Färe et al. (1989). The literature review further passes through several applications and further methodological adjustments and finally shows that the various efforts since more than twenty years, yield wide variety of models. Next, this paper tries to categorise these environment-incorporating efforts according to their finality, the way the unwanted side-effects are incorporated, the type of EPA method, and the type of performance measures. The main finality has been, for a long time, the derivation of shadow prices, which then served as proxies for pricing negative externalities in enhanced productivity measures. Alternative finalities are efficiency scores.

New Formulations Of DEA And FDH Models

Leleu, Hervé

Session 4-D Advanced Non-parametric Approaches
Thursday, June 30, 2005 11:00-13:00 Room D

New formulations of Data Envelopment Analysis (DEA) and Free Disposal Hull (FDH) models in a general and unified linear framework are proposed. One of the main objectives of this paper is to derive meaningful economic interpretations of the dual models in the price space. In particular, we introduce a new formulation of the returns to scale assumption with a straightforward economic interpretation. This framework allows for a clear distinction between DEA and FDH models and leads to a natural generalization of both models.

Searching For An Optimal Technical Efficiency Measure

Li, Sung-Ko

Session 8-C Non-parametric Applications
Friday, July 1, 2005 11:00-13:00 Room C

It is well-known that a technical efficiency measure is derived by comparing an observed point with an efficient point on the frontier. Different measures have been proposed in the literature. They identify different efficient points. For the same data set, different methods usually give completely different ranks of the firm. This will cause confusions to managers who want to get useful information from measuring the efficiency of individual units. To search for an optimal efficiency measure, this paper suggests four typical cases and proposes two different approaches. The four typical cases cover all possible considerations of the frontier in efficiency measurement. The two approaches, the shadow-price approach and the directional distance function approach, provide theoretical basis to compare different efficiency measures under the same unified frameworks. To overcome the data problem, the Monte Carlo method will be adopted to generate data that come from multi-output multi-input production technologies with different economic properties. With unified frameworks and data under the control of the researcher, this paper compares the ranks generated by each efficiency measure with the ranks implied by the two unified frameworks.

Market Fragmentation And Structural Efficiency In China

Li, Sung-Ko - Cheng; Yuk-Shing

Session 9-A Empirical Industrial Organization
Friday, July 1, 2005 14:15-16:15 Room A

The economic reform in China has been implemented successfully for more than two decades. A key feature of this economic reform is the decentralization of economic power to the local governments. From western point of view, decentralization will lead to a more competitive market. However, some researchers pointed out that in a transition economy like China, decentralizing powers from the central government to local governments would create new distortions. Although the market condition within a local region became more competitive, the competition between regions became less because resources are not allowed to flow freely. This caused a lot of efficiency losses. In this paper, we point out that the shadow price model of 'structural efficiency' introduced by Li and Ng (1995) and later extended by Färe and Valentin (2003) is well suited for this issue of regional market fragmentation. To model regional heterogeneity, we use a characteristic variable. Under constant returns to scale, we show that the long-run and short-run structural efficiency are equal. Our modified model is applied to measure the structural efficiency of China from panel data of her provinces. We then decompose the structural efficiency into aggregate inefficiency due to inefficiency within each province and re-allocative inefficiency due to inefficient resource allocation among provinces.

Assessing The Efficiencies Of Hospitals That Provide Health Services Research And Teaching

Lins; Marcos Estellita - Lobo; Maria Stella - Moreira Da Silva; Angela Cristina - Fiszman; Roberto

Session 4-B Health

Thursday, June 30, 2005 11:00-13:00 Room B

This paper presents an empirical illustration of the use of DEA to analyze the efficiency of hospitals that present pdevelop activities in three areas : research, teaching and services. The objective is to identify key factors associated with the efficient use of clinical resources in the provision of hospital services. This study will explore this question by considering a first level where the three aeas abovementioned are taken in separate, and a second level, where an aggregate approach is considered. A weight restricted DEA model is used in each level.

On The Relative Innovation And Productivity Performance Of Domestic And Foreign-Owned Enterprises: A Cross-Country Analysis

Lööf, Hans - Ebersberger; Bernd

Session 6-C Empirical Productivity

Thursday, June 30, 2005 16:45-18:45 Room C

This paper examines the phenomenon of firms taken over by foreign owners. It has three novelties. First, the it examines not just productivity differences compare to domestically-owned firms, but the efficiency with which it can utilize internal R&D, knowledge flow within the group and scientific-, vertical- and horizontal innovations system to produce patents, new products and labour productivity. Second, in order to incorporate corporate governance in the analyses, the foreign-owned firms are distinguished between three categories of corporate styles (Nordic firms, Anglo-Saxon firms and Continental European and other firms), and the domestically owned firms are separated between multinationals and uninationals (enterprises belonging to a group with only domestic affiliates). Third, the authors are using a uniform set of extensive firm-level data and a uniform econometric approach is applied on observations in four neighbouring countries. The study includes the entirely business sector including both manufacturing and service firms. A main justification for the study is the growing importance of multinational firms and foreign direct investments (FDI) which have grown significantly faster than the trade flow among the most developed countries during recent decades.

Searching For Obstacles To Further Banking Integration In Europe

Lozano-Vivas, Ana - Pastor; Jesus T.

Session 8-B Banking and Finance
Friday, July 1, 2005 11:00-13:00 Room B

The paper studies the evolution and determinants of productivity banking integration within and across European countries. We study banking productivity considering a worldwide unique constant returns to scale (global) frontier. Resorting to a rencently defined Global Malmquist Index we detect productivity growth and study the influence of its two components, efficiency change and technical change. We further analyze an sho convegence for productivity change and its components to test the pace and tren of European banking integration. We analyze the banking performance of a sample of fifteen European countries over the 1993-2000 period. The paper also presents empirical evidence on how the particular environmental contitions of each country affect the performance of the banking industry and its convergence trend. Banking integration is affected by both, performance and country environmental conditions so it can not be viewed as a uniform and balanced process across all countries

Efficiency Evaluation Of Polytechnic Higher Education Institutions With Considering Output Quality And Institutional Characteristics

Lu; Yung-Hsiang - Yang; Yung-Lieh

Session 7-D University and Education
Friday, July 1, 2005 9:00-10:30 Room D

The higher education institutions in Taiwan have essentially administrated at the discretion of the government for the past few decades. However, in recent years, the government of Taiwan has gradually lessened its rigid control and allowed higher education institutions more administrative and financial independence. This policy change has exerted pressure on administrators and policy makers to emphasize productivity, efficiency and cost-effective management. In this paper, we evaluate empirically the efficiencies of polytechnic universities and colleges in Taiwan. To evaluate efficiency performance of polytechnic colleges adequately, this paper develops a three-stage performance adjusted DEA evaluation model which can incorporate the quality factors of educational outputs and institutional characteristics of school. A total of 149 schools of Taiwan are empirically evaluated. We also compared efficiencies estimated from the proposed model with those estimated from the traditional unadjusted model. By defined institutional objectives of polytechnic schools, the student enrollments in normal or continued education programs, teacher¡¦s publications, collaborations with industry, professional certificates passed by students are identified as educational outputs for polytechnic colleges.

The Analysis Of Eco-Efficiency In An Input-Output Framework

Luptacik; Mikulas - Boehm; Bernhard

Session 7-C Ecological Efficiency
Friday, July 1, 2005 9:00-10:30 Room C

Eco-efficiency is characterised by production of goods and services with minimal resource use and generation of waste and other emissions of pollutants. Let the production possibility frontier of the economy be determined by the input-output model, primary inputs, pollution generation and abatement, and final demand. The degree by which a netoutput vector, for given primary inputs and environmental standards, could be extended, can be considered as measure of eco-inefficiency. Equivalently this could be also be achieved by a reduction of primary inputs for given environmental standards and given final demand. We have to take into account that desirable outputs are strongly disposable while undesirable ones are only weakly disposable meaning that their reduction can only be achieved by a reduction of desirable outputs or an increase of primary inputs. In the second part of the paper we propose another approach based on the construction of a production possibility frontier. For this purpose a multi-objective optimization problem with maximisation of final demand for each commodity subject to constraints on the primary inputs is formulated. Then, using data envelopment analysis with the production possibility frontier as the standard envelope, the ecoefficiency of an economy will be estimated.

Population Aging And Firm Level Productivity

Mahlberg, Bernhard - Fürnkranz-Prskawetz; Alexia - Skirbekk; Vegard

Session 10-A Micro-level Applications
Friday, July 1, 2005 16:45-18:45 Room A

The relationships of worker characteristics and productivity are examined using a matched employer-employee data set from forty branches of the manufacturing and service sectors of Austria. The cross section firm level and plant level data of 2001 are used to for estimating labor productivity according to social demographic characteristics of the staff (e.g. average age, average education, etc.), regional economic variables (e.g. regional GDP per capita, etc.) as well as other firm characteristics. As the indicators of labor productivity we apply the production value per employee and the value added per employee. The results are differentiated by branches as well as per region. On the basis of forecasts about the composition of the Austrian labor force regarding age, projections about the future development of labor productivity are computed. For estimates of productivity we adopt a multilevel regression approach.

Productivity Analysis Of Market And Environmental Regulations In China

Managi, Shunsuke - Kaneko; S.

Session 6-C Empirical Productivity
Thursday, June 30, 2005 16:45-18:45 Room C

Successful economic and environmental policies can contribute to technological or efficiency improvements by encouraging, rather than inhibiting, technological innovation. Although a large number of studies have been made on the constituents of technological change, little is known about the empirical evaluation of policies that encourage productivity progress and/or regress in China. This paper contributes to the literature on productivity change in several ways. First, we apply a productivity approach to a province-level data set tracked from 1987 to 2001 in China to measure various components of total factor productivity (TFP) within a joint-production model of market and environmental outputs. This contributes to our understanding of the various components of total factor productivity change in China. In addition, this study contributes to better economic and environmental policy design for sustainable development in China by empirically estimating the role of economic and environmental management on market and non-market productivity. Our result for market output is consistent with the literature that there has been considerable TFP growth, while environmental managements have not effectively regulated wastewater, air and solid waste pollutants emissions over our study periods. We found significant negative impacts of pollution abatement and control expenditure (PACE)

Efficiency And Convergence In Developing Countries

Mastromarco, Camilla

Session 6-B Parametric Applications
Thursday, June 30, 2005 16:45-18:45 Room B

Productivity growth is viewed as having three components: technological change, technological catch-up and a scale factor. Using a stochastic frontier model these components are calculated for 57 developing countries over the period 1960–2000. The empirical analysis follows three stages. The first stage tests for the statistical significance of the different hypotheses regarding augmenting factors and neutral technology (Hicks, 1932, Harrod, 1942 and Solow, 1969 neutrality). Technology is found to be non-neutral. Moreover, the specification of the production frontier with human capital affecting the quality of labour force fits the data better. Human capital affects total factor productivity through different channels (efficiency and augmenting labour force). In the second stage, the evolution of the entire distribution of the productivity components is analysed and a formal test for convergence is performed. With respect to regression analysis this approach is likely to be more informative (Quah 1996, 1997). The base of both the test and the visual analysis is the non-parametric kernel density estimator. Following Fan and Ullah (1999), Kumar and Russel (2002) a standard normal kernel is used to derive the test statistic. The first test analyses the importance of TFP and input growth. Both are found to be important for output growth.

Institutional Reforms Now And Benefits Tomorrow: How Far Is Tomorrow?

Méon; Pierre-Guillaume - Sekkat; Khalid - Weill; Laurent

Session 9-A Empirical Industrial Organization
Friday, July 1, 2005 14:15-16:15 Room A

This paper aims to investigate the timing of the impact of changes in the quality of institutions on macroeconomic efficiency. We do so by applying Battese and Coelli (1995)"s stochastic frontier model at the aggregate level. We find that changes in quality of institutions exert two effects on macroeconomic efficiency, a short-term, i.e. after two to four years, and a medium-term effect, around eight years. Robustness checks performed with different measures of the quality of institutions tend to support these results.

A Comparison Of Productivity In Public And Private Industrial Enterprises In India

Mohan, Ram - Ray; Subhash

Session 9-A Empirical Industrial Organization
Friday, July 1, 2005 14:15-16:15 Room A

India has been going through a halting and controversial privatization program over the past decade. The program is premised on the hypothesis that India"s public sector enterprises are inefficient and that an improvement in efficiency can come about only by privatizing these. We subject this hypothesis to scrutiny by comparing productivity at public and private enterprises in the industrial sector of India. We use two measures, Malmquist total factor productivity and Tornquist total factor productivity, and compare performance in eight different industries over the period 1991-92 to 1998-99. The Malmquist total factor productivity growth is obtained by applying DEA to the panel data. We find that in six out of eight industrial sectors, there is no difference in Malmquist productivity growth between public and private enterprises. In the remaining two sectors, the public sector does better in one and the private sector in the other. In respect of Tornquist total factor productivity growth,we find that there is no difference in four sectors. In the remaining four sectors, the private sector does better in two (at a 5 per cent confidence level) while the public sector does better in two (at a 10 per cent confidence level).

Does Foreign Presence Boost The Efficiency Of Domestic Firms?

Mohnen; Pierre - Kravtsova; Victoria

Post-Conference
Saturday, July 2, 2005 11:00-13:00 Room A

When MNCs set up subsidiaries, they bring with them firm-specific intangible assets. These assets contribute to the MNC"s efficiency and competitiveness, allowing them to compete successfully with local firms that have superior knowledge of the local market and business environment. While MNCs go to great lengths to protect their knowledge, some of these intangible assets - knowledge and skills related to product and process technologies as well as management, marketing, and other aspects of firm operations - normally spills over to local firms over time. This can happen in many ways: through employee turnover, linkages, or via simple demonstration effects. Pioneered by Caves in 1974 and extended by Blomstrom (1986), Kokko (1994, 1996) and others, most of the studies on FDI spillover effect rely on partial productivity measures and recurrent costs per unit of output. These measures are, by definition, partial, in that they do not account for the relationships and trade-offs between different inputs and outputs. Partial measures may provide important information on specific aspects of operation, but it is important to see how the firm is performing overall relative to comparable organizations producing similar outputs.

'Just DEA It!': A New DEA Software And Its Possibilities For Applied Researcher

Morgunov, Eugene - Zelenyuk; Valentin

Session 8-A Software
Friday, July 1, 2005 11:00-13:00 Room A

In this paper we review the possibilities of the new version of the software for applied researchers in efficiency analysis—"Just DEA It!". The software is capable of estimating DEA models under assumptions of constant, no-increasing and variable returns to scale, for input and output orientations, it estimates slacks, Malmquist Productivity indexes, etc. The key novelty of this software is application of statistical bootstrap to obtain bias correction and confidence intervals for the individual and aggregate efficiency scores, as well as to perform some statistical tests. The speed of such estimations in our software is much faster than, for example, in Matlab. Software is enhanced by graphical and user interface, while the data is stored in relational database. Overall, the new software shall be a useful tool for applied researchers, facilitating the use of advanced techniques such as bootstrap.

A Shadow Cost Function Model Of The Dairy Sector In The United States

Mosheim, Roberto - Lovell; Knox

Session 2-D Agriculture
Wednesday, June 29, 2005 16:45-18:45 Room D

In this study, a new data set based on the 2000 Agricultural Resource Management Survey, the most recent national survey of milk producers, is used to measure and analyze the determinants of technical and allocative efficiency and scale economies for the dairy sector in the United States. A shadow cost function is employed to decompose and analyze economic efficiency. In order to ensure theoretical consistency of the estimated function and the reliance of results, the properties of the shadow cost function are tested. This paper makes a contribution from the standpoint that it applies a sophisticated econometric methodology to a very rich dataset. The study will offer new insights into the dairy sector's performance , given for example, differences in size, feeding technology and management practices.

Productivity, Efficiency And Financial Performance Of The United States Dairy Sector: A Frontier Approach

Nehring, Richard - Tauer, Loren - O'donoghue, Erik - Sandretto, Carmen

Session 10-A Micro-level Applications
Friday, July 1, 2005 16:45-18:45 Room A

Allocative Efficiency And Decomposition Of Productivity Change

Nemoto, Jiro - Goto; Mika

Session 4-C Growth and Dynamics
Thursday, June 30, 2005 11:00-13:00 Room C

This study aims to develop a framework of the productivity decomposition by which the allocative efficiency factor is identifiable as a source of productivity change. Although we have a lot of ways to decompose productivity change, none of them iof them is indicative of allocative efficiency. This is because efficiency has been measured along the fixed ray passing through an observed combination of inputs and outputs regardless of their efficient combination. To make the efficiency measure sensitive to alloccative efficiency, we define the productivity index in the form of the ratio of aggregate inputs and outputs which are implicitly formed from revenues and costs divided by aggregate price indexes of the Konus type. The resulting decomposition analysis is approximately equivalent to that of the Hicks-Moorsteen-Bjurek productivity index measured along the ray of efficient input-output combination. An empirical illustration will be delivered using data on the Japanese prefectures.

Research Peformance Of Chinese Universities After A Decade Of Reform: An Application Of Dea

Ng, Ying Chu - Li; Sung-Ko

Session 7-D University and Education
Friday, July 1, 2005 9:00-10:30 Room D

Much work have been done in accessing the research performance of higher education institutions in the US, UK or Australia. Similar study in developing countries has rarely been found. The present study attempts to fill this gap. Using Chinese universities as targets for analysis provides insights into the effectiveness of the education reform. The economic reforms implemented since 1985 facilitated universities in accessing extra resources for development and operation. However, an imbalance growth across regions in China was resulted. Accordingly, the performance of universities is further complicated by this regional effect. With both education reform and economic reforms, an investigation of the efficiency of Chinese universities by region after a decade of reforms is called for. It was found that universities were very inefficient regardless their location. Inefficiency mainly comes from pure technical inefficiency. Across region, universities in the east region were, interestingly, more inefficient over time while there were virtually no changes in inefficiency for universities in the central and west region. In addition to the measures of efficiency, the input-base DEA allows us to examine the possibility of over-utilization in inputs given the amount of outputs.

Disentangling Risk And Inefficiency Using State-Contingent Frontiers

O'donnell, Chris

Session 1-C Production under uncertainty
Wednesday, June 29, 2005 14:15-16:15 Room C

The state-contingent production model of Chambers and Quiggin (2000) is a flexible and realistic model of producer behaviour under uncertainty. O''Donnell and Griffiths (2004) show how a frontier variant of the model can be used to decompose output shortfalls into inefficiency and risk components. In this paper we use Philippine rice data to compare sampling theory and Bayesian estimators of state-contingent production and cost frontiers.

Returns To Scale In DEA With Non-Discretionary Inputs And Outputs.

Olesen, Ole - Petersen; Niels Christian

Session 10-D Returns to Scale
Friday, July 1, 2005 16:45-18:45 Room D

This paper discusses methods for determining returns to scale in DEA when non-discretionary inputs and/or outputs are present. Returns to scale in multiple input multiple output is a well known problem. Banker and Thrall (1992) derive a measure of returns to scale based upon the standard definition, which considers the ratio between marginal proportionate changes in outputs and inputs. This approach can not be applied when non-discretionary categories are present because radial expansions involving such categories are not allowed. The procedure suggested in this paper involves directional derivatives keeping the level of the non-discretionary categories fixed. The suggested approach can be extended to the case of negative inputs and outputs; this extension will be discussed briefly.

Economic Growth With Inefficiency

Luis Orea - Antonio Álvarez
Department of Economics; U. of Oviedo

Session 3-C Growth and Dynamics
Thursday, June 30, 2005 9:00-10:30 Room C

Standard economic theory does not say anything about the behavior of inefficient firms (regions, countries, etc). In fact it implicitly assumes the same behavior regardless of the efficiency level. However, it is reasonable to think that both efficient and inefficient firms would react differently under changes in size, regulation or when an economic policy is implemented. This paper argues that these differences in behavior between efficient and inefficient firms should be taken into account in order to explain changes in total factor productivity and, hence, the in income per capita over time. In particular, we show that overall productivity (economic) growth estimates are biased when they are obtained exploiting information exclusively for efficient firms. To achieve this objective we propose using a model that allows efficient and inefficient firms to behave differently.

Aggregating Efficiency In Dea

Pachkova, Elena V.

Poster Session
Wednesday, June 29, 2005

This presentation investigates the efficiency of aggregated units in a DEA context. Specifically we suggest a way to calculate the efficiency of groups of units, based on the efficiencies of the individual units. Suppose that we operate in the CCR context with a number of comparable units. It is shown how the efficiency of a group of units can be written as a simple function of individual efficiencies of the group members. The obtained formula is more general though. It also can be applied if the group members are not DEA comparable with each other, provided we can find their individual efficiencies. The result can be used to calculate the aggregated efficiency of units over several periods of time, even though environment and assumptions differ from one period to another. Moreover, it is possible to find the efficiency of larger corporations, consisting of several branches. Conventional DEA methods cannot be used on such units, since it is unlikely to find enough similar larger units. The presented method provides efficiencies of individual branches and combines them to an aggregated efficiency value for the entire corporation using the above result. Finally we discuss how group efficiency can be combined with individual efficiency to provide incentives for cooperation between units.

The Use Of DEA In The Measurement Of Software Development Efficiency: A Quality Focused Approach

Paradi, Joseph - Schmidt; Dwight

Session 10-C Innovative nonparametric applications
Friday, July 1, 2005 16:45-18:45 Room C

Proper measurement of the software development process is the key to a better understanding of the problems that hinder software development performance. This work examines the relative efficiency of software project development using Data Envelopment Analysis. New DEA models for measuring software development efficiency were introduced using end-user quality experience as the main output instead of traditional size metrics, which have been used extensively in the past. Projects with higher quality were found to be more efficient while larger, riskier, more complex projects had slightly lower efficiency. The relationship between size/risk/complexity and project quality was found to be negligible. DEA based software development productivity measurement offered managerially useful results.

Price-Induced Technical Progress In 80 Years Of US Agriculture"

Paris, Quirino

Session 6-D Invited Modeling Session
Thursday, June 30, 2005 16:45-18:45 Room D

This paper presents a theory of technical progress that interprets the price-induced conjecture of Hicks. It provides also an exhaustive set of comparative statics conditions that constitute the scaffolding for an empirical test of the theory. A crucial assumption is that entrepreneurs make decisions about techniques on the basis of expected information about prices and quantities. Another assumption is that these decisions are made in order to fulfill a profitability objective. The novelty of our approach is that expected relative prices enter the production function as shifter of the technology frontier. The consequence of this assumption is an expansion of the traditional Shephard lemma that is useful for identifying the portion of input quantities that have been determined by the conjecture of price-induced technical progress (PITP). The theory is applied to a sample of 80 years of US agriculture. Three versions of the general model are presented. The first version deals only with expected relative prices. The empirical results do not reject the PITP hypothesis. The second and third versions introduce lagged expected relative prices, lagged R&D expenditures and lagged extension expenditures as explanatory variables of the portion of the input quantities that may be attributable to technical progress.

Estimation Of Information Asymmetries In Housing Markets: A Two-Tier Stochastic Frontier Approach

Parmeter, Christopher - Kumbhakar; Subal

Session 5-B Health
Thursday, June 30, 2005 14:15-16:15 Room B

In this paper we estimate a hedonic price function for housing characteristics. Since the buyers and sellers do not have full information at the time of the sale, the offer price (maximum that the buyer is willing to pay) will differ from the reservation price (minimum that the seller is willing to accept). If information is freely available to both parties (as is the case if the market is perfectly competitive and centrally located), there will be no difference between the maximum offer price and the minimum acceptance price. If not, there are both positive and negative effects influencing the market equilibrium price due to information asymmetries between buyers and sellers. To measure the impact of these information deficiencies on price we need to estimate the hedonic price function in such a way that both the maximum offer price and the minimum acceptance price functions can be obtained. That is, using the observed data we need to fit a function so that each observation lies between, barring the stochastic noise component, the maximum offer price and the minimum acceptance price functions. This is done using the two-tier stochastic frontier approach, developed by Polachek and Yoon in 1987, composed of one two-sided and two one-sided errors, i.e., the composed error term v+w-u.

Educational Efficiency In Belgian Schools: A Parametric Distance Function Approach At Student Level

Perelman, Sergio - Santín; Daniel

Session 8-D University and Education
Friday, July 1, 2005 11:00-13:00 Room D

The factors explaining achievement at school is a topic research that has motivated considerable attention in the economics of education literature. Since the mid-sixties a wide number of studies have sought the relationship between school inputs, students' background, peer-group or socio-economic variables and test scores. Despite all the research devoted to this issue the well-known "Does school matter?-Does money matter?" debate remains open yet (e.g. Hanushek, 2003, and Krueger, 2003). In the mean of this controversy we think that is worth to review the main problems for estimating and educational production function. We can roughly summarize three reasons influencing the debate. Firstly, education is a high complex process with variables like organization or non-monetary inputs implied in the production function that are difficult to be quantified and captured in the model. Secondly, recent literature provides evidence about the inconsistency of using a Cobb-Douglas specification for estimating the educational production function. Third, traditional production function analysis does not consider the technical efficiency component in education. Last, most studies that explicitly consider the presence of inefficiency typically employ schools or districts like DMU imposing a considerable limitation in order to disentangling students' self background from peer-group characte

On The Generation Of A Regular Multiple-Inputs Multiple-Outputs Technology Using Parametric Output Distance Functions

Perelman; Sergio - Santín; Daniel

Session 2-A Advanced Parametric Approaches
Wednesday, June 29, 2005 16:45-18:45 Room A

Monte-Carlo analysis is a statistical computational methodology frequently used in efficiency and productivity research for testing different properties of analytical tools. A relatively large number of papers have applied Monte-Carlo experiments in both parametric and non-parametric techniques as well as for comparisons between them. Most of problems in economics have to deal with a multiple-inputs multiple-outputs process. This is especially observed in the public sector where policy makers usually face up to different outputs. However an important drawback in Monte-Carlo experimental design is how to generate a multi-input multi-output production function with noise and inefficiency able to globally fulfill all properties required in the economic theory. In fact, this difficulty motivates that most of Monte-Carlo experiments works only use one output production functions. In this paper our purpose is to show that the theoretical properties of parametric output distance functions provide a useful tool to perform such data generation in order to test efficiency methodologies under different hypothesis. Together with the general requirements for a well-behaved multiple-inputs multiple-outputs production function, we provide a number of sufficient conditions and straight rules to generate data in the simplest case: a two-inputs two outputs production function.

Nitrate Pollution Control Policy And Its Impact On Farms" Performance: A Nonparametric Approach

Piot-Lepetit, Isabelle - Le Moing; Monique

Session 5-D Ecological Efficiency
Thursday, June 30, 2005 14:15-16:15 Room D

In Europe, water quality problems associated with the use of synthetic fertilizers and the disposal of animal wastes have become a major environmental policy issue in many countries. Nitrates in drinking water supplies and eutrophication of inland and coastal waters are especially of concern. High levels of nitrate in water may adversely affect human health as well as the metabolism of livestock.. Increasing concentrations of nitrates in groundwater, the primary source of drinking water in many regions, have been observed, notably in France. Agriculture is not the only source of nitrates in ground and surface waters but it is one of the most concern. There is widespread interest in implementing policies that will be more effective in protecting water quality without causing undue economic harm to agricultural producers. The two farming practices that most concern policymakers are the use of large amounts of fertilizer for crop growth and the disposal of livestock manure. Both materials are sources of nitrogen, which transformed into nitrate once in the soil. Nitrate that is not used by plants or transformed back into atmospheric nitrogen leaches through the soil or runs off into water supplies. Intensive livestock production is an important source of pollution, due to an insufficient area of land available to these farmers on which to apply manure.

Global Returns To Scale In Efficiency Analysis

Podinovski, Victor

Session 10-D Returns to Scale
Friday, July 1, 2005 16:45-18:45 Room D

Global returns to scale (GRS) is a new concept suitable for efficiency analysis with an arbitrary underlying production technology. The types of GRS are indicative of the location of the most productive scale size (MPSS) of the decision making unit (DMU) under consideration. This contrasts with the traditional local classification of RTS, where the latter is indicative of the direction of marginal rescaling that the DMU should undertake in order to improve its productivity. In a nonconvex technology the local and global characterisations of RTS are generally different. The GRS classes are useful in assisting strategic decisions like those involving mergers of units or splitting into smaller firms. It is shown that, in a non-convex technology, the well-known method of testing RTS proposed by Färe et al is in fact testing for GRS and not RTS. Further, while there are three types of RTS: constant, decreasing and increasing, the classification according to GRS includes the fourth type of sub-constant GRS, which describes a DMU able to achieve its MPSS by both reducing and increasing the scale of operations.

Restructuring And Efficiency In The U.S. Electric Power Sector

Pollitt, Michael - Kwoka; John

Session 3-A Energy and Regulation (Invited)
Thursday, June 30, 2005 9:00-10:30 Room A

Structural change has dominated the U.S. electric power sector over the past decade. During this time around one third of the 260 or so private operating companies have been involved in mergers. By analysing the data on operating companies for the period 1994-2001 and focussing on the distribution businesses of those companies we seek to analyse the impact of merger on US utilities. We do this using Data Envelopment Analysis. Our analysis allows us to investigate the effect on efficiency of mergers and to test for the determinants of successful mergers. We examine the extent to which the degree of vertical integration, geographic proximity and the sector experience of merger partners influences merger success. Our paper represents the most comprehensive study of the efficiency impacts of merger activity in the US electricity sector to date.

Malmquist Indexes Using A Geometric Distance Function (GDF)

Portela, Maria - Thanassoulis; Emmanuel

Session 4-C Growth and Dynamics
Thursday, June 30, 2005 11:00-13:00 Room C

Traditional approaches to calculate total factor productivity change through Malmquist indexes rely on distance functions. In this paper we show that the use of distance functions as a means to calculate total factor productivity change may introduce some bias in the analysis, and therefore we propose a procedure that calculates total factor productivity change through observed values only. Our total factor productivity change is then decomposed into efficiency change, technological change, and a residual effect. This decomposition makes use of a non-oriented measure in order to avoid problems associated with the traditional use of radial oriented measures, especially when variable returns to scale technologies are to be compared.

Environmental Externalities And Regulation Constrained Cost Productivity Growth In The U.S. Electric Utility Industry

Prior, Diego - Granderson; Gerald

Session 6-A Energy and Regulation

Thursday, June 30, 2005 16:45-18:45 Room A

This paper examines productivity growth and its decomposition into various components for U.S. electric utilities, when accounting for the production of multiple outputs (good and bad), and the regulations the utilities face. The use of fossil fuels in producing electricity contributes to the joint production of good (electricity) and bad (carbon dioxide, nitrogen oxide, and sulfur dioxide) outputs. Reductions in the quantities of the bad outputs can be achieved via reductions in electricity production, employing inputs to reduce the quantities of the bad outputs, or using technologies that contribute to reductions in the bad outputs. Implementing policies to reduce the quantities of the bad outputs, which has benefits for the environment, may lead to higher production costs on electric utilities, and higher prices on consumers. Electric utilities in the U.S. are subject to various state and federal regulations. Regulatory authorities may regulate the rate of return the utilities can earn on their investment. Some state agencies allow the utilities to file for fuel adjustment clauses, which allow the firms to more easily pass fuel price increases onto consumers (compared to undergoing formal rate case hearings).

Economics And Olympics: An Efficiency Analysis

Rathke, Alexander - Woitek; Ulrich

Session 6-B Parametric Applications

Thursday, June 30, 2005 16:45-18:45 Room B

Applying stochastic frontier analysis, we estimate the technical efficiency of countries in the production of Olympic success since the 1950s. Following Bernard and Busse (2004), population and GDP are used as inputs. We also control for host country advantage and for differences in public support for sports. The results show that the spread of technical efficiency is very wide across countries and across sports. These differences can be seen as caused by different production technologies. Examples for technological differences are training methods, organization, or culture, but also illegal practices like doping. Using the method proposed by Battese and Coelli (1995), we are able to judge the relative importance of these components. Reference Battese, G. E. and Coelli, T. J. (1995), "A Model for Technical Inefficicency Effects in a Stochastic Frontier Production Function for Panel Data", Empirical Economics, 20, 325-332. Bernard, A. and Busse, M. (2004), "Who wins the Olympic Games: Economic Resources and Medal Totals", Review of Economics and Statistics 86, 413-417.

Direct And Indirect Measures Of Capacity Utilization: A Nonparametric Analysis Of U.S. Manufacturing

Ray, Subhash - Mukherjee, Kankana - Wu, Yanna

Session 10-D Returns to Scale
Friday, July 1, 2005 16:45-18:45 Room D

The capacity output of a firm can be defined in two alternative ways. The first definition, due to Johansen (1968), known as the physical measure of capacity output, measures the maximum quantity of output that a firm can produce from a given bundle of quasi-fixed inputs even when other (variable) inputs are available without any restriction. The second definition, due to Klein (1960) is the economic measure of capacity output and corresponds to that output where the firm's short run average cost curve is tangent to the long run average cost curve. Färe, Grosskopf, and Kokkelenberg (1989) provide a nonparametric model using Data Envelopment Analysis for measuring the physical capacity output and the associated rate of capacity utilization in the presence of fixed inputs. In neoclassical economics, a firm, unlike a consumer, does not face a budget constraint. However, there are various reasons related to capital markets why a firm may face budgetary constraints in the short run. In the short run if the firm cannot easily raise capital by issuing new equity then borrowing remains the only plausible way to finance additional expenses. Bur this could adversely affect the debt-to-equity ratio of the firm, which in turn could adversely affect its valuation. Also sometimes borrowing on short notice can only be at unfavorable interest rates.

Do Banking Crises Enhance Efficiency? A Case Study Of 1994 Turkish And 1997 Indonesian Crises

Reynaud, Julien - Rohkim; Rofikoh

Post-Conference
Saturday, July 2, 2005 11:00-13:00 Room A

The question addressed in this paper is motivated by the growing number of banking crisis in emerging economies over the last decade. Our study is directly inspired by business cycles theory in which a crisis is the turning point from which the market/economy is recovering. Parallel to this approach, if inefficiency plays a role in the occurrence of banking crisis, the post-crisis period should be the time of recovering efficiency. Moreover, the crisis should eliminate bad banks from the system, leading to a more efficient banking sector. We tested this hypothesis on the 1994 Turkish and 1997 Indonesian banking crises using stochastic cost frontier analysis. We differentiate between banks using the type of ownership: state, privately and foreign owned banks, and compare scores before and after the crises. Our results show two interesting patterns, opposed to what theory predicts: firstly, we find that inefficiency increase after the crises in both banking sectors, and secondly, it also increases over the period after the crises.

Technical Efficiency Versus Rail Reforms: The Case Of Western European Railways

Rivera-Trujillo, Cesar

Session 2-B Transportation and infrastructure
Wednesday, June 29, 2005 16:45-18:45 Room B

The purpose of this paper is to estimate and compare the technical efficiency between 14 Western European Railways during the period 1977-1999. Moreover, this paper analyses the impact of key rail reforms of the 1990s on technical efficiency. It uses a Stochastic Frontier Analysis as this approach has the advantage over the deterministic methods (e.g. Data Envelopment Analysis DEA, Corrected Ordinary Least Squares COLS) of separating inefficiency from the statistical noise. An input distance function approach is used in order to take into account the multi-output characteristic of the rail industry and because this approach does not rely on price or financial data, therefore, it is possible to use the most recent data available.

Infrastructure Productivity Estimation By Maximum Entropy Econometrics

Rodriguez; Jorge - Fernandez; Esteban - Arias; Carlos

Post-Conference
Saturday, July 2, 2005 16:15-17:45 Room A

Many econometric problems are present in the empirical analysis of productivity of public infrastructure. As a result, there is great variability in the results reported in the literature. One of these econometric problems is the collinearity between production factors in a regional production function. Maximum entropy econometrics is well suited to deal with problems of limited information (e.g. small samples, collinearity). In this paper, we explore the use of maximum entropy econometrics to estimate the parameters of a regional production function in Spain. The preliminary estimates are in the line of previous results in the literature and are not very sensitive to the support vector.

Efficiency Benchmarking Of Railway Infrastructure: A DEA Approach

Roets, Bart - Christiaens; Johan

Session 2-B Transportation and infrastructure
Wednesday, June 29, 2005 16:45-18:45 Room B

This paper presents a benchmarking model, based on DEA, measuring the cost efficiency of railway infrastructure. In this model, determinants of efficiency such as asset age, network complexity, traffic density, etc. are also examined. Nowadays, European railway companies are in the middle of a profound change process. Since 1991, European directives guide the whole railway industry through an important organisational and regulatory transformation. The holistic "Railway System" is vertically separated into national "Infrastructure Managers" (public companies providing railway infrastructure) and several competing "Railway Undertakings" (public or private companies, delivering train services). Infrastructure Managers are not providing infrastructure as such, but rather the infrastructure capacity enabling the train circulations. The infrastructure capacity is an essential constituent of the railway system supply chain. Serving as an input for the Railway Undertakings, it is the principal output for the Infrastructure Managers. As a result of the aforementioned vertical separation, research on productivity and efficiency measurement of railway infrastructure is gradually emerging. Previous research was mainly based on parametric techniques, ranging from a translog cost function to a stochastic input distance function.

Measuring The Efficiency And Returns To Scale Of Publicly Owned Electricity Distribution Systems In The United States: An Input Distance Function Approach

Saal, David

Session 6-A Energy and Regulation
Thursday, June 30, 2005 16:45-18:45 Room A

Over 2000 publicly owned electric power systems operate in the United States. While there are several relatively large public power systems that operate in cities such as Los Angeles, Seattle, and San Antonio, most serve less than 25,000 customers. Given their small scale relative to investor owned utilities, some have argued that the continuing existence of these small public power systems perpetuates an inefficient industry structure. However, as relatively few studies of US electricity distribution have actually included public power systems, there is little evidence to support this assertion. This paper will therefore employ stochastic frontier techniques to estimate an input distance function model of electricity distribution using data available from FERC, EIA, and Platts UDI Electricity datasets. These models will provide evidence not only with regard to the returns to scale which characterize publicly owned distribution systems, but will also allow an assessment of whether smaller systems are less efficient than larger systems. These results will allow meaningful conclusions to be drawn with regard to the appropriate scale of public power systems.

Estimation Of Environmental Efficiencies And Shadow Prices Of Pollutants: A Cross-Country Approach

Salnykov, Mykhaylo - Zelenyuk; Valentin

Post-Conference
Saturday, July 2, 2005 14:15-15:45 Room A

Various measures of technical efficiency can be used as sustainability indicators in the case when some outputs produced are undesirable, such as pollution. Shadow prices of environmental pollution assess short run perspectives of increase in pollution when desirable output is increased and may serve as a reference value for environmental taxes and prices for international emission trade. We estimate environmental efficiencies of countries (based on the output distance function with the general directional vector) as well as shadow prices for selected air pollutants using parametric (Translog specification) approach. Our results indicate that, on average, countries value pollutants proportionally to their direct impact on human health (i.e. the most hazardous pollutants have the highest shadow prices in absolute value). We find that in general both rich and poor countries can be fully environmentally efficient, while most of the countries in transition (CITs) turned out to be inefficient. Our findings imply that under emission permit trade agreements CITs will generally be permit sellers. By selling permits they will hamper their future ability of economic growth, thus some restrictions (which we propose) must be made in such agreements to limit their unsustainability for CITs. Our estimates show that currently global wealth and pollution are allocated inefficiently.

Efficiency Flooding - Black-Box Frontiers And Implications

Sauer, Johannes - Hockmann; Pd Dr. Heinz

Session 10-C Innovative nonparametric applications
Friday, July 1, 2005 16:45-18:45 Room C

ABSTRACT The availability of efficiency estimation software – freely distributed via the internet and relatively easy to use – recently inflated the number of corresponding applications. The resulting efficiency estimates are used without a critical assessment with respect to the literature on theoretical consistency, flexibility and the choice of the appropriate functional form. The robustness of policy suggestions based on inferences from efficiency measures nevertheless crucially depends on theoretically well-founded estimates. This paper adresses stochastic efficiency measurement by critically reviewing the theoretical consistency of recently published technical efficiency estimates with respect to economic development. The results confirm the need for a posteriori checking the regularity of the estimated frontier by the researcher and, if necessary, the a priori imposition of the theoretical requirements. I) INTRODUCTION In the last 15 years applied production economics experienced a clear shift in its research focus from the analysis of the structure and change of production possibilities to those of technical and allocative efficiency of decision making units. Parametric techniques as the stochastic production frontier model dominate the empirical literature of efficiency measurement (for a detailed review of different measurement techniques see e.g. COELLI ET AL.,

Axiomatic Foundations Of Efficiency Measurement On Free-Disposal-Hull Technologies

Schworm, William - Russell; Robert

Session 2-C Axiomatic Theory
Wednesday, June 29, 2005 16:45-18:45 Room C

Bol (1986 JET) showed that there does not exist an efficiency index satisfying a set of reasonable axioms proposed by Färe and Lovell (1978 JET) for all (closed) technologies. Dmiturk and Koshevoy (1990 JET) provided a complete characterization of the set of technologies for which there exists an index satisfying the Färe-Lovell axioms. The empirical technologies intrinsic to DEA methods belong to this class. As the Dmitruk-Koshevoy sufficiency proof is constructive, it provides a class of indexes that satisfy the axioms. In our paper presented at the NAPW04 Conference in Toronto, however, we show that the Dmitruk-Koshevoy class of indexes fails to satisfy the more-fundamental axiom of commensurability (independence of units of measurement). We formulated an alternative index that satisfies commensurability as well as the Färe-Lovell axioms on convex polyhedral technologies. In this sequel, we extend those results to the class of free-disposal-hull technologies. In addition, we hope to have results on the empirical implementation of these indexes in time for presentation at EWPE05.

Productivity Technological Spillovers And Human Capital. An Analysis On Italian Firm Data.

Sena, Vania - Destefanis; Sergio

Session 5-C Empirical Productivity
Thursday, June 30, 2005 14:15-16:15 Room C

The hypothesis that technological knowledge acquired by a firm can spill over to other firms and enhance the latter group"s total factor productivity was first suggested by Arrow (1962) in his work on the effects of learning embodied in new capital equipment. Since then, there has been a considerable theoretical debate on the extent to which a firm can benefit from spillovers and also how much of its productivity growth such spillovers can explain (Romer, 1986; Grossmann and Helpman, 1990; Cohen and Levinthal, 1989). While there exists now considerable evidence that knowledge spillovers exist and do increase total factor productivity by allowing lagging firms to get closer to the technology frontier (see Sena, 2004a), it is not clear yet what are the factors that facilitate and amplify the potential spillovers. In this paper, we test the extent to which human capital can be considered among the factors facilitating spillovers and the diffusion of new technologies. This is highly relevant for the debate on recent trends in the competitiveness of the Italian economy, as the low educational attainment of the latter has often been quoted as one of its main weaknesses. More specifically, extending upon the analysis contained in Sena (2004b) and using stochastic frontier analysis for the main sectors of the Italian manufacturing, we test a) whether technology spillovers help firm

Shadow Price Of Capital And Underinvestment In Cooperatives And Conventional Firms

Sena, Vania - Maietta; Ornella

Session 9-A Empirical Industrial Organization
Friday, July 1, 2005 14:15-16:15 Room A

Cooperatives are usually considered to be allocatively inefficient because they underutilize capital (Mosheim, 2002). This undercapitalisation is attributed to the lack of property rights in the cooperative that often prevents a member from selling an ownership share upon leaving the cooperative: members of cooperatives do not have an incentive to invest in capital equipment as they may not appropriate the increase in value following the investment, in case they decide to leave the cooperative. This means that, comparing the inputs used by conventional firms and by cooperatives, on average, cooperatives use less capital and labour than conventional firms but use more intermediate consumption (see Maietta and Sena, 2004 for the Italian cooperatives). This relative undercapitalisation of coops is quite common and not limited to the Italian cooperatives. The purpose of this paper is to verify whether a different shadow price of capital exists for cooperatives and for conventional firms and whether this can be explained by the existence of finance constraints.

Cost Efficiency Of The Health Insurance Industry In Switzerland 1994-2001

Sheldon, George

Session 4-B Health
Thursday, June 30, 2005 11:00-13:00 Room B

In 1996, Switzerland introduced a new federal law intended to increase competition among the health insurers in Switzerland. Using firm-level data for the period 1994-2001 and employing Malmquist indices calculated with both parametric (stochastic frontier analysis) and nonparametric techniques (DEA), we investigate whether the institutional changes raised the cost efficiency of the health insurance industry. Our study focuses on operating costs, as opposed to medical costs, and employs real variables (number of insured and number of claims filed) as outputs, instead of the monetary variables drawn from accounting data common to previous efficiency studies of insurance firms. Both the parametric and non-parametric approaches yield similar results indicating a marked increase in total factor productivity after the new law went into effect. Our findings also show that the firms that exited the industry exhibited below-average cost efficiency as increased competition would lead one to expect.

A Dimensional Decomposition Approach To Identifying Efficient Units In Large-Scale Dea Models

Siitari, Pyry-Antti - Korhonen; Pekka J.

Post-Conference
Saturday, July 2, 2005 16:15-17:45 Room A

In this paper, we propose a dimensional decomposition procedure to reduce computational burden when identifying the efficient units in Data Envelopment Analysis (DEA). The algorithm divides the problem dimensionally by selecting a subset of variables into artificial sub-problems. The efficient units found in sub-problems are then used to reduce the set of decision making units in the original problem. The efficiency of the approach is demonstrated by numerical results.

A Directional Distance Function Approach To Dynamic Efficiency: An Application To The Dutch Glasshouse Horticulture

Silva, Elvira - Oude Lansink; Alfons

Session 2-D Agriculture
Wednesday, June 29, 2005 16:45-18:45 Room D

Dutch horticulture holds a strong position on world markets of several horticultural products. The contribution of horticultural industry to Dutch agriculture is becoming increasingly important in terms of production value and employment. Meanwhile, the intensive use of some inputs, in particular energy, pesticides and fertilizer, is also posing environmental problems. To design an effective policy it is of interest for policy makers to know the potential of efficiency improvement and identify the factors that cause the inefficiency of individual inputs in Dutch horticultural production. Conventional static measures do not account for dynamic processes at firms such as investments in new capital goods. Input-based dynamic efficiency measures are derived from an adjustment-cost directional distance function approach. A dynamic input directional distance function can be generated from an adjustment-cost technology where the dynamics are explicitly incorporated in the form of the properties of the input requirement sets with respect to the quasi-fixed factors. The properties of the dynamic input directional distance function are inherited from the properties of the technology. The dynamic efficiency analysis is carried out for Dutch vegetable firms over 1991-1995. 345 observations from 123 firms are available in the data set. One output and six inputs are included.

Linearly Interpolated FDH Efficiency Score For Nonconvex Frontiers

Simar, Leopold - Jeong; Seok-Oh

Session 2-C Axiomatic Theory
Wednesday, June 29, 2005 16:45-18:45 Room C

This paper address the problem of estimating the monotone boundary of a nonconvex set in a full nonparametric and multivariate setup. This is particularly useful in the context of productivity analysis where the efficient frontier is the locus of optimal production scenarios. Then efficiency scores are defined by the distance of a firm from this efficient boundary. In this setup, the Free Disposal Hull (FDH) estimator has been extensively used due to its flexibilty and because it allows nonconvex attainable production sets. However the nonsmoothness and discontinuities of the FDH is a drawback for conducting inference in finite samples. In particular, it is shown that the bootstrap of the FDH has poor performances and so is not useful in practice. Our estimator, the LFDH, is a linearized version of the FDH, obtained by linear interpolation of appropriate FDH-efficient vertices. It offers a continuous, smooth version of the FDH. We provide an algorithm for computing the estimator, and we establish its asymptotic properties. We also provide an easy way to approximate its asymptotic sampling distribution. The latter could offer bias-corrected estimator and confidence intervals of the efficiency scores.

Performance Of Agriculture In The Northern Europe

Sipiläinen, Timo - Heshmati; Almas - Kumbhakar; Subal - Pietola; Kyösti

Poster Session
Thursday, June 30, 2005

One of the most important goals of the European Common Agricultural Policy (CAP) is to promote economic efficiency and productivity growth in agriculture. A high and sustainable productivity growth contributes directly to agricultural income and competitiveness of farming. Efficient food market prevents food prices from increasing due to mark-up and other non-competitive practices. From the welfare perspective inexpensive food is particularly important, because it has regressive effects on the distribution of purchasing power. It benefits more to the low income than high income households. Productivity growth is also a means for more sustainable use of natural resources, such as non-renewable fossil fuels. Productivity is a physical measure but it is strongly linked to economic performance . The level and growth of productivity crucially depend on economic incentives, market environment, policy measures, and exogenous resource constraints. Particularly in agriculture, these resource constraints, which are exogenously imposed by the nature, are important determinants of feasible input quantities, input allocations, output, and productivity. Because economic environment of farming is largely steered by policy measures, these policy measures affect farmers' incentives to improve their economic efficiency and productivity.

Minimum Distance And Efficiency Assessment With DEA Models

Sirvent, Inmaculada - Aparicio; Juan - Ruiz; Jose Luis

Session 9-D Non-parametric Applications
Friday, July 1, 2005 14:15-16:15 Room D

In the recent literature, we can find a body of papers that are aimed at determining the minimum distance from an inefficient unit to the weakly efficient frontier. We address here the problem of determining the minimum distance from an inefficient unit to the efficient frontier. This approach makes it possible to identify referents on the efficient frontier that are closer to the assessed unit, which may lead to more sensible efficiency measures, since they would be the result of a more homogeneous comparison. In particular, the second stage of the procedure used for solving the radial DEA models can be adapted to this approach and, what is probably more important, we can define new versions of some existing efficiency measures by means of new DEA formulations following these ideas. Most of the existing approaches to this problem require the specification of all the efficient facets of the frontier, which usually leads to complex algorithms that have to be solved in order to find a solution. In our proposal, the efficiency measures are implemented in several new DEA formulations, which avoids the need for specifying the facets of the frontier, and so, reduces the computational burden.

Multi-Output Technical Efficiency For Hillside Farm Households In Central America Using Stochastic Distance Functions And DEA Methods

Solis, Daniel - Bravo-Ureta; Boris - Quiroga; Ricardo

Session 1-D Agriculture
Wednesday, June 29, 2005 14:15-16:15 Room D

INTRODUCTION Productivity analyses in peasant economies are usually undertaken at the farm-level. However, using the farm as a level of analysis to study productivity in developing countries has been criticized during the last years. Singh et al (1986) explain that under competitive markets for commodities and labor, and perfect substitution between family labor and wage labor, farm decisions are separable from other household decisions. Thus, farm-level productivity analysis is appropriate when the separability assumption is fulfilled. However, López and Valdés (2001) indicate that in developing countries, separability between farm and other household decisions does not always hold. Moreover, Chavas et al (2004) argue that performing efficiency studies at the farm-level in an environment with market imperfections may be inappropriate. These authors contend that farm-level analyses neglect possible labor allocation inefficiency between farm and non-farm activities and that off-farm activities are often joint with farm activities. Therefore, Chavas et al (2004) derived formally, from a household production model, a multi-output multi-input model designed to measure efficiency where household outputs include not only farm products but also off-farm income.

Estimating Structural Efficiency Of The Public Standard Hospital Sector In Austria: 1999-2002

Sommersguter-Reichmann, Margit

Session 3-B Health

Thursday, June 30, 2005 9:00-10:30 Room B

This paper suggests a framework for assessing the technical efficiency of public, standard acute care hospitals in Austria between 1999 and 2002. Since the hospital service production process is considered to be represented by the use of multiple inputs to produce several outputs the flexible non-parametric approach of Data Envelopment Analysis (DEA) has been chosen to analyse the performance differentials of hospitals. To assess hospital efficiency, we apply an input-oriented radial efficiency measure since hospitals are increasingly confronted with scarce resources which have to be used efficiently to satisfy increasing demand. The prevailing analysis goes beyond previous efficiency studies in the Austrian hospital sector since - in contrast to sample-based analyses – in this case the performance of the population of Austrian public standard hospitals is evaluated. The population of all Austrian public hospitals consists of standard, centre, specialised and central hospitals, mainly differing in size and range of services offered. As preceding sensitivity analyses in terms of different input-output-specifications revealed considerable efficiency differentials for centre, specialised and central hospitals, we concentrated on the population of public standard hospitals as we found (input-output) model-independent efficiency findings for the latter group of public hospitals.

Relative Efficiency Of Service Centres Of Sickness Funds: A DEA-Bootstrap Approach

Staat, Matthias

Session 7-B Bootstrapping

Friday, July 1, 2005 9:00-10:30 Room B

I analyze data on 124 service centres of a German sickness fund. The centres are located across Germany and provide support to customers insured with the sickness fund and at the same time try to canvass new customers. At the time of the analysis, the sickness fund was in the process of restructuring its branches and was interested in identifying efficient branches that could serve as role models for others. The potential reduction of inputs that could be achieved without jeopardizing service quality was also of interest. Therefore, the data were analyzed with an input-oriented Data Envelopment Analysis model. The data contained a host of parameters which included numbers of staff as well as number and type of customers, the quality of the location of the branch, its opening hours and every possible aspect of service quality. In addition, there was information on cancellations of policies as well as from customer interviews about parameters such as the customer's likelihood of a referring somebody to the sickness fund. The premium rates of other local competitors were considered to be indicators for the competitive pressure. Branch management claimed that these parameters, many of them outside its control, did have an impact on the performance of its branch. Since it is not possible to use a huge number of parameters with a limited number of observations, a bootstrap regression

Linking Investment Bursts And Productivity: An Empirical Investigation In US. Food Manufacturing

Stefanou, Spiro - Celikkol; Pinar

Session 5-C Empirical Productivity
Thursday, June 30, 2005 14:15-16:15 Room C

Quantifying the importance of factors driving productivity growth such as changes in technology and identifying the relationship between productivity and investment are challenging tasks and have been only partially successful to date. The major complication arises from the causality in the relationship between investment and productivity. Productivity growth implies resource use decisions can impact the quantity of resources available for new production planning, in particular, and activities, in general. Some of these changes may involve doing the same thing more extensively (i.e., extracting scale economies) and some of these changes may involve doing things differently (i.e., introducing new equipment and processes). A detailed empirical analysis at plant-level to gain a better understanding of the relationship between the decision to invest, productivity and plant characteristics can shed some light to this relationship. The main objective of this study is to investigate the causal mechanism between investment and productivity in a structural model using Census Bureau's Longitudinal Research Database at plant-level from 1972-1999 by focusing on various sub-industries of U.S. Food and Kindred Products Industry.

Measuring Public Sector Performance And Productivity

Stevens,Philip - O'mahony; Mary

Session 8-D University and Education
Friday, July 1, 2005 11:00-13:00 Room D

Explaining differences in countries' propensities to create wealth is at the heart of economic analysis. This is informed by measures of relative performance of nations and sectors within these nations in terms of output, input and productivity growth. The motivation for this paper is the evaluation of output and productivity performance of sectors where a significant proportion of the output is not sold on the market. This has long been an issue of concern for analysts in the field of productivity measurement since many countries national accounts measure non-marketed outputs by inputs. Hence cross-country comparisons of aggregate productivity growth or levels are contaminated by incorrect measurement in sectors that represent about 20% of aggregate activity. A solution is to exclude non-market sectors when considering aggregate differences and in analysis at the industry level. However this is unsatisfactory given the importance of the sectors excluded. In this paper we consider the measurement of performance in public service provision. We consider the theoretical arguments for employing outcomes in measuring productivity growth and set out a measurement framework.

U.S. Dairy Farm Cost Efficiency

Tauer, Loren - Mishra; Ashok

Session 1-D Agriculture
Wednesday, June 29, 2005 14:15-16:15 Room D

A stochastic cost efficiency equation was estimated for the U.S. dairy industry using national data from the production year 2000. The cost of producing a unit of milk was estimated into separate frontier and efficiency components, with both components estimated as a function of causation variables. Unfortunately, prices of inputs were not collected and thus it was not possible to estimate a standard cost function where cost is a function of input prices. Rather, cost per hundredweight of milk produced was estimated as a function of farm characteristics and practices, resulting in an estimated average cost curve. The average or unit cost curve for a farm is estimated as a function of a covariate set Xi , an error term vi, and an efficiency term u, (1) ci = f(Xi,¦Â) + vi + u(Zi,¦Ä), u(Zi,¦Ä)¡Ý0, where ci is the cost of production per hundredweight of milk on farm i, Xi are the covariates which impact cost, and the vi error term is independent of Xi, Zi and u. The efficiency term, u, is specified as a function of a set of covariates Zi , which may overlap with the covariate set Xi. The ¦Â vector is the coefficients for the frontier cost curve, while the ¦Ä vector is the coefficients for the efficiency cost curve.

Faculty Research Productivity And Promotion: Testing The Behavioral Reinforcement Theory

Tien, Flora F.

Session 8-D University and Education
Friday, July 1, 2005 11:00-13:00 Room D

This paper aims at exploring how faculty research productivity changes before, during, and after promotion. A mail survey investigating Taiwanese faculty members in nine universities and in fourteen disciplines is conducted. The survey response rate is 52% (N=1017). The measures of faculty research productivity are numbers of published articles and of books. Testing a research hypothesis generated from behavioral reinforcement theory and an alternative claim on the learning effect of familiarity with publishing norms, the study makes several methodological efforts such as collecting career history data and longitudinal records on faculty research productivity to fill literature gaps. The main findings include: (1) overall, behavioral reinforcement theory receives support. Only a few natural sciences & engineering faculty publish articles and a few humanities and social science faculty publish books during the early years before promotion. As faculty approaches the promotion decision, the proportion of publishing the main publication type of their field increases. After promoting to the full professorship, the proportion publishing declines; (2) among different field groups, the research behavior change curve of the natural sciences & engineering faculty best fits the theory; (3) different levels of anticipated promotion rewards have different effects for motivating subjects

Semiparametric Stochastic Frontier Models With Varying Coefficients:A Local Likelihood Approach

Tran; Kien - Tsionas; Mike - Karagiannis; Giannis

Session 2-A Advanced Parametric Approaches
Wednesday, June 29, 2005 16:45-18:45 Room A

In this paper, we propose a semiparametric stochastic frontier models with varying coefficients as a useful yet flexible specification for studying the measurement of efficiency. Specifically, we consider the following model: (1) where is a vector of unspecified smooth function of . The paper proposes a local maximum likelihood method with a kernel weight function to estimate the varying coefficient function by locally approximating the unknown function in (1) by a polynomial function . The consistency of the estimator and its asymptotic normality are established. A comparison of our proposed method with the Bayesian approach of Tsionas (J. Applied Econometrics, 2002) and parametric approach of Greene (J. Productivity Analysis, 2005) is made in term of real data.

The Cost Of Allocative Efficiency For Multioutput Cargo

Trujillo, Lourdes - Tovar De La Fé; Beatriz - Rodríguez-Álvarez; Ana

Session 1-B Transportation and infrastructure
Wednesday, June 29, 2005 14:15-16:15 Room B

Ports are a key component of the logistics chain and, therefore, their operation has a direct effect on relevant economic variables such as exports competitiveness and final imports prices, thus affecting economic development. This explains the governments' concern to set adequate competitive or regulatory conditions to enable the efficient operation of port activities, which are generally coordinated by entities known as Port Authorities. In most countries these are public entities that, in general terms, act as the regulatory body for all the companies operating at the port. Port regulation is not an easy task considering the diversity of activities developed at port facilities. Among those activities, cargo handling is of special relevance since the cost of this service generally represents over 80% of the costs incurred by a ship loading or unloading goods at a port. Cargo handling in ports is a multioutput activity, as freight can arrive in many forms like containers, bulk, rolling stock, or non-containerised general cargo. Each type of movement involves the use of both common and specialised inputs. In spite of the importance of this activity for the regulation of the sector, little is known in practice about the economics of this service.

Estimation Of Technical And Allocative Inefficiency In A Translog Cost System:

Tsionas, Mike - Kumbhakar; Subal

Session 1-A Advanced Parametric Approaches
Wednesday, June 29, 2005 14:15-16:15 Room A

In this paper we propose and implement maximum likelihood estimation in the context of cost function and cost-share systems when both technical and allocative inefficiency are modeled in a consistent way. Estimation of such models is quite complicated and is known as the Greene problem. We use the maximum likelihood method to address the problem in the context of cross-sectional data when technical and allocative inefficiency are modeled as random variables. The proposed technique is illustrated using the Christensen and Greene (1976) data on U.S. electric utilities.

Estimation Of Technical And Allocative Inefficiency Using A System-Wide Local Maximum Likelihood Approach

Tsionas; Efthymios G. - Tran; Kien C. - Karagiannis; Giannis

Session 2-A Advanced Parametric Approaches
Wednesday, June 29, 2005 16:45-18:45 Room A

Due to the so-called Greene problem, the simultaneous estimation of technical and allocative efficiency is perhaps the most challenging issue in the stochastic frontier literature. In order to obtain separate estimates of technical and allocative efficiency it is necessary to consider a system-of-equations, where the internal consistency of the specification of allocative errors in the objective function (e.g., cost function) and the derivative equations (e.g., share or input demand functions) is the most difficult task. This becomes really complicated when a flexible function form (e.g., translog) is chosen for the objective function, see Kumbhakar (1997) and Kumbhakar and Tsionas (2004a,b) for empirical implementation and detailed discussion of the econometric difficulties and issues involved. Nevertheless, estimation is not straightforward even for simple functional forms, such as the Cobb-Douglas, which by definition is self-dual. Notice that Schmidt and Lovell (1979) have found the Cobb-Douglas dual (cost) system to have a rather complicated error structure and for this reason they have recommended estimating the primal system (i.e., the production function along with the first-order conditions for cost minimization) to measure technical and allocative efficiency.

Decomposition Of Cost Efficiency And Its Application To Japan-US Electric Utilities Comparisons

Tsutsui, Miki - Tone; Kaoru

Session 6-A Energy and Regulation
Thursday, June 30, 2005 16:45-18:45 Room A

Technology and cost are the wheels that drive modern enterprises; some enterprises have advantages in terms of technology and others in cost. Hence, the management is eager to know how and to what extent their resources are being effectively and efficiently utilized, compared to other similar enterprises in the same or a similar field. This paper presents a new formula for decomposing the actual supply cost into the optimal cost and three types of losses due to input inefficiency to be dependent on technical inefficiency, input price differences, and inefficient cost mix. --Methodology Technical efficiency is measured using the traditional CCR model within the supposed technical production possibility set. The technical efficient input cost, which is obtained by multiplying the CCR optimal input by the input factor price, cannot be reduced further by reducing the amount of input. However, taking into account the differences in input prices under the situation that the unit prices might differ from DMU to DMU, the cost can be reduced by reducing the input factor prices. The traditional cost and allocative efficiencies, which assume the given uniform input prices, suffer from a critical shortcoming if the unit prices of the inputs are not identical among DMUs in the actual economy, as pointed out by Tone (2002).

Measuring And Improving System Efficiency During Transition Periods

Vaneman; Warren - Triantis; Kostas

Session 3-C Growth and Dynamics
Thursday, June 30, 2005 9:00-10:30 Room C

Transition is an overarching theme in today's organizations. The body of literature is rich with change frameworks that provide guidance to organizations seeking performance improvement. However, in spite of the exceptional guidance available, the activities that take place during transition periods are often the most disruptive, and contain the most adverse performance and cost consequences, of any period during the system's life-cycle. One of the reasons for this unfortunate result is the failure of change techniques and methods to identify an efficient path of transition, from the old way of doing business, to the new performance paradigm. We believe that an organization's ability to master these transition periods is fundamental to achieving steady state operations more efficiently. Our research defines and explores transitional phases within systems and develops new methods for analysis of problems in a complex and dynamic environment. This paper uses a methodological approach that combines system dynamics modeling with the measurement of productive efficiency for the purpose of evaluating systems with respect to efficiency performance and costs during transition periods. The two fundamental premises of this research are that production systems are dynamic in nature, and that dynamic behavior of a system is a consequence of its structure.

The Assessment Of Retailing Efficiency Using Network Dea

Vaz, Clara - Camanho; Ana

Session 8-C Non-parametric Applications
Friday, July 1, 2005 11:00-13:00 Room C

The objective of this paper is to develop a methodology, based on Data Envelopment Analysis, to assess and improve the performance of retailing organisations with multiple units (shops). The methodology developed is applied to a case-study consisting of 78 supermarkets to ensure its relevance and applicability to real-world assessments. The Decision Making Units (DMUs) of retailing organisations are complex and often include multiple sub-units. For example, in the case of supermarkets, the shops are usually organised in sections that sell different products (e.g., grocery, perishables, textiles, light bazaar and heavy bazaar). This paper proposes assessing the retailing shops considering the DMU at the section level, whose efficiency levels can be obtained from a comparison with similar sections from other shops. This is consistent with the adoption of a commercial perspective for the assessment, such that the outputs are volume of sales, and the inputs measure the resources available at each section (area, stock and number of references available). This analysis is further refined with the inclusion of an additional input reflecting the value of products wasted in the shop floor, which often represents a significant proportion of the operational costs. This analysis enables the identification of benchmarking sections across all retailing stores under analysis

Modelling The Efficiency Of European Insurance Companies: A Stochastic Frontier Analysis

Vencappa, Dev - Fenn; Paul - Diacon; Stephen - O'brien; Christopher

Post-Conference
Saturday, July 2, 2005 16:15-17:45 Room A

There is a growing interest and concern about the international competitiveness and efficiency of European insurers. International comparisons of efficiency are crucial as efficiency is a relative concept. It is not possible to define an 'ideal' level of efficiency. Instead, companies have to be compared with the best practice companies in an international market (given the current state of production technology in the industry). In this study, we measure and model the efficiency of the European insurance companies using stochastic frontier analysis. Given the criticisms levelled against the use of a two-stage approach to modelling the effect of exogenous influences on efficiency, we adopt a one-stage approach that simultaneously controls for size-related heteroscedasticity in both error terms, as well as controlling for other exogenous influences on technical efficiency through a model of the heteroskedasticity in the one-sided error term. Contributions to this approach include Reitschneider and Stevenson (1991), Huang and Li (1994) and Battesse and Coelli (1995) amongst others. The study draws on a panel from the Standard's & Poor's Eurothesys data set for the period 1995 to 2002. These cover life, non-life and composite insurance businesses for 16 major European countries and provide technical and non-technical accounts at year-end.

A Two-Stage Efficiency Analysis Of Portuguese Municipalities

Vieira; Paulo Daniel - Silva; Elvira

Session 7-B Bootstrapping
Friday, July 1, 2005 9:00-10:30 Room B

Portuguese municipalities are responsible to a large extent for the definition and execution of local public policies. Given the contractionary fiscal policy, the limited fiscal autonomy of municipalities and the local government budget law that constraints the borrowing capacity of municipalities, Portuguese local governments face new challenges that consists in finding financial resources necessary to pursue their public services provision. In this context, the efficient allocation of resources becomes a particular relevant issue. The purpose of this paper is to investigate cost efficiency of a sample of 166 municipalities during the year of 2000. The analysis is conducted in two stages. In the first stage, cost efficiency scores are generated using Data Envelopment Analysis. In the second stage, single bootstrapping is used to explain the differences in efficiency scores through a set of variables that characterize the environment within which the activity of municipalities are developed.

Productivity Growth Under Uncertainty: An Application To Spanish Dairy Farms

Wall, Alan - Orea; Luis

Session 3-C Growth and Dynamics
Thursday, June 30, 2005 9:00-10:30 Room C

In this paper we test for the existence of risk aversion among Spanish dairy farmers. Following the methodology of Kumbhakar (2002) we estimate risk preferences of dairy farmers using a panel data set covering the years 1993-98. We find that farmers are risk averse and find evidence of decreasing absolute risk aversion and increasing relative risk aversion. In the second part of the paper we propose a Malmquist-type index of productivity growth under risk and use the results of the estimation of risk preferences to calculate the index and carry out a decomposition of productivity growth.

Directional Hicks Neutralities

WALTER; BRIEC - ROBERT; CHAMBERS - ROLF; FÄRE - Et Al.

Post-Conference
Saturday, July 2, 2005 11:00-13:00 Room A

Technical change component of productivity growth is interesting for analyzing relationships to innovation and shifts in the frontier of technology. Because of the concerns about technical change displacing inputs in production, a further taxonomy of technical change is often convenient. Since the time of Hicks (The Theory of Wages, 1963), it has been commonplace to classify technical change further according to its effect on relative input utilization. If the relationship between the marginal rate of substitution and the factor input proportion remains invariant under technical progress, the latter is said to be hicks neutral. Then, technical change was defined as neutral if at points on the expansion path the marginal rate of technical substitution was independent of time. The concept of Hicks neutrality was defined, first, by Hicks. Later, various forms of Hicks neutrality have appeared in the literature and Hicks haves introduced a taxonomy. Blackorby, Lovell and Thursby (Economic Journal, 1976) have examined in some detail these different types of neutrality. They have established a formal taxonomy with definitions and representations of Hicks neutrality, implicit Hicks neutrality and direct Hicks neutrality on the input side. But much confusion still exists on the output side and different interpretations of neutral productivity growth were proposed.

Estimation Excess Capital Technical And Allocative Inefficiency

Wang, Hung-Jen - Kumbhakar; Subal

Session 10-D Returns to Scale
Friday, July 1, 2005 16:45-18:45 Room D

For many empirical studies using production and cost functions, the input variables are often measured imprecisely. In many cases these measurement errors are one-sided. For example, when idle or obsolete machinery is not properly adjusted in the accounting data, the reported capital stock would over-estimate the actual stock in use. In such a case, reported data on capital stock tend be systematically biased upward. In this paper, we consider a cost minimization model where the measurement of the capital input is systematically biased upward. The setup of the model is somewhat similar to Schmidt and Lovell (1979), except for the fact that we distinguish between measured capital and capital actually used in production. We consider both a single and a two-step estimation methods. The model is applied to the estimation of a US agriculture panel data. The results show that the reported capital overstates the actual capital in use by 2% on average, and that the technical inefficiency reduces output by 12%.

Economies Of Scope In European Railways - An Efficiency Analysis

Wetzel, Heike - Growitsch; Christian

Session 2-B Transportation and infrastructure
Wednesday, June 29, 2005 16:45-18:45 Room B

This paper conducts a cross-country analysis to investigate the performance of European railways with particular focus on economies of scope. We test the hypothesis that so called integrated railways – companies owning a network and providing transport services – realise vertical and/or horizontal economies of scope. Our analysis adopts a two step approach. In a first step we analyze the existence of scope economies by estimating technical efficiency of integrated and non-integrated railways using data envelopment analysis (DEA). Following the model introduced by Morita (2002) we compare the efficient frontiers of joint and separate production by constructing a virtual efficient frontier of joint production by separated companies. To determine whether joint or separate production is more efficient we apply a DEA super-efficiency model which relates the efficiency for each type of production to a reference set consisting of the alternative production technology. In a second step, we evaluate the influence of various country-specific and environmental factors of European railway efficiency by using the Tobit regression model approach.

FEAR 1.0: A Software Package For Frontier Efficiency Analysis With R

Wilson, Paul W.

Session 8-A Software
Friday, July 1, 2005 11:00-13:00 Room A

DEA estimators have been applied in more than 1,800 articles published in more than 490 refereed journals (Gattouf et al.}, 2004). DEA and similar non-parametric estimators offer numerous advantages, the most obvious being that one need not specify a (potentially erroneous) functional relationship between production inputs and outputs. Although much of the nonparametric efficiency literature has ignored statistical issues such as inference, hypothesis testing, the statistical properties of DEA estimators have recently been established; see Simar and Wilson (2000) for a survey of these results, and Kneip ~{\it et al.} (2005) for more recent results. Standard software packages (e.g., LIMDEP, STATA, TSP) used by econometricians do not include procudures for DEA or other nonparametric efficiency estimators. Several specialized, commercial software packages are available, as well as a small number of non-commercial, freeware programs. To varying degrees, all of the aforementioned packages are good at what they were designed to do. The existing packages are designed for ease of use (again, with varying degrees of success), but the cost of this is often inflexibility, limiting the user
to procedures the authors have explicitly made available. Moreover, none of the existing packages include procedures for statistical inference.

Estimation And Inference In Stochastic Frontier Models

Wilson, Paul W. - Simar; Leopold

Session 1-A Advanced Parametric Approaches
Wednesday, June 29, 2005 14:15-16:15 Room A

Stochastic frontier models introduced by Aigner et al (1977) and Meeusen and van den Broeck (1977) specifiy output, cost, etc. in terms of a response function and a composite error term. The composite error term consists of a two-sided error representing random effects and a one-sided term representing inefficiency. Stochastic frontier models are typically estimated by the maximum likelihood (ML) method. Interest typically lies in (i) inferring returns to scale or other features of the response function; (ii) inferring technical efficiency for each firm represented in a sample; or (iii) inferring average technical efficiency within a sample. With regard to (ii) and (iii), many papers have relied only on point estimates, although interval estimates are possible using a ``conventional'''' approach, where one obtains bounds of confidence intervals as percentiles of the estimated distribution of the one-sided error term, conditional on the composite error. However, the intervals estimated by this approach do not reflect the uncertainty surrounding parameter estimates used to construct the interval estimates. This paper develops a bootstrap method for overcoming this limitation. Although asymptotic properties of ML estimators are well-known, their finite sample properties in the context of stochastic frontier models remain unknown.

The Efficiency And Effectiveness Measurements For Worldwide Railway System In An Unified Framework

Yu, Ming-Miin - Lin; Erwin T. J.

Session 1-B Transportation and infrastructure
Wednesday, June 29, 2005 14:15-16:15 Room B

In the past recent years, many contributions regarding efficiency measurement for rail transport industry can be found in journals. For example, Oum and Yu (1994) applied DEA data envelopment analysis) method to evaluate the efficiency of 19 OECD countries¡¦ rail companies over the period of 1978 to 1989. Chapin and Schmidt (1999) used the DEA approach to measure the efficiency of US Class I railroad companies since deregulation. Cowie (1999) also applied the DEA method to compare the efficiency of Swiss public and private railways by constructing technical and managerial efficiency frontiers and then measured both efficiencies. However, while evaluating performance of railway system, it is worth to note that, unlike the production and consumption processes of the manufacturing sectors, a transport service cannot be stored; therefore, the output consumption (or the final output, such as passenger-kms) may different substantially from the output production (or the intermediate output, such as seat-km) in a transit system. More specifically, since the outputs were consumed concurrently with its production, once the outputs were not consumed (that is, seats were not sold), all of them will be wasted (Tomazinis, 1975). In other words, it is important to distinguish the output consumption from output production.

Quality Production And Quality Indicators In Intermediate Products

Zago, Angelo

Session 2-D Agriculture
Wednesday, June 29, 2005 16:45-18:45 Room D

Measuring and evaluating the right attributes of raw materials, commodities, and intermediate products is a common problem in many sectors of the economy. In food industries, for instance, it is well known that the necessary condition for the making of a good wine is the availability of grapes with the right attributes. The same argument can be put forth for the characteristics of milk for cheese production, of fruits for juices, of beets or canes for sugar, of beans for coffee, and many others. In addition, this problem is of interest also in other industries: for example, the quality of chips is important for the computer industry, like that of ores for steel production, of steel for construction works, and of crude oil for refined oil, just to name a few.

Frontier Analysis And Non-Linear Pricing For Quality In Supply-Chain Relationships

Zago, Angelo - Chambers; Robert G.

Session 1-C Production under uncertainty
Wednesday, June 29, 2005 14:15-16:15 Room C

The payment systems for raw commodities and intermediate products define one of the most critical relationships of many vertically related industries, since they establish how revenues are distributed among growers and processing firms. Intermediate products payment systems also have a pivotal role in setting the incentives that growers and processing firms face: not only do they heavily influence the incentives to improve technical efficiency, they also have far-reaching implications for investment decisions. For these reasons, measuring and evaluating the right attributes in raw materials, commodities, and intermediate products is a common problem in many sectors of the economy (Barkley and Porter, 1996; Buccola and Iizuka, 1997; Ladd and Martin, 1976). This happens to be true in food industries, such as grapes for wine production, milk for cheese, canes for sugar, beans for coffee, but also in other industries, such as for chips in the computer industry, ores in steel production, steel in construction works, crude oil in refined oil production, etc. In this paper we show how to design an optimal payment system for a group of producers using market demand and production data information. Contrary to the New World countries, the wine industry in Europe is very fragmented and appears relatively uninterested by the consolidation processes that are taking place worldwide

Corporate Governance And Firm's Efficiency: The Case Of A Transitional Country Ukraine

Zheka, Vitaliy - Zelenyuk; Valentin

Session 10-A Micro-level Applications
Friday, July 1, 2005 16:45-18:45 Room A

"The entrepreneurship structure itself may be critical, with the classic issue of the separation of ownership from control being regarded as one of the earliest and most important sources of X-efficiency" (Button and Weyman-Jones, 1992, American Economic Review). Corporate Governance and Firm's Efficiency: The Case of a Transitional Country, Ukraine One of the major current areas of research in management theories and practices is the issue of corporate governance as an important determinant of a firm's performance. This issue has become most pronounced, perhaps, with the corporate scandals at Enron, WorldCom, and other giants, but as a theoretical concept it had been in economists' minds for at least a half of the century. Among the classical papers is certainly that of Leibenstein (1966), who by conceptualizing his notion of X-efficiency had been talking, essentially, in a language of corporate governance. His concept of X-efficiency has spurred a tremendous amount of literature, pro and con, and also inspired us to look for an empirical confirmation/opposition of his ideas—now explicitly in the light of the corporate governance notion. Whenever there is a division of ownership and management in a firm, it is likely that a well-known principal-agent problem would arise.

A Robust Estimator For Performance Modeling

Zhengfei, Guan - Oude Lansink; Alfons

Session 2-A Advanced Parametric Approaches
Wednesday, June 29, 2005 16:45-18:45 Room A

In recent economics literature, Malmquist productivity growth index (Fare et al.) is often used as a measure of total factor productivity. In finding the factors affecting the productivity growth, a two-step approach is often employed where the Malmquist index is computed in the first step and regressed on a set of explanatory variables in the second step. The two-step approach is also frequently used to study factors affecting technical efficiencies. Recent literature in efficiency and productivity studies criticized this two-step approach, arguing that bootstrapping should be used to correct the bias and solve the serial correlation problem which otherwise jeopardizes the validity of econometric procedure. Unfortunately, the bootstrapping method is computationally demanding and may be less appealing to applied researchers. In finding factors affecting firm performance, in many cases variables used in the regression model are likely to be endogenous. For example, investment may be affected by firm performance. Without addressing the endogeneity, analysis may result in inconsistent results. As an additional problem in modeling firm performance, we find that static models are routinely used both in efficiency and productivity studies and in financial studies. However, we notice that firm performance has its specific dynamics.

EWEPA IX

Group for Analysis of Performance in Economics and Management

Groupe d' Analyse de la Performance en Economie et Management

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"Efficiency Analysis for Policy Making"

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