



INTERNATIONAL CONFERENCE ON DATA ENVELOPMENT ANALYSIS



DEA40

April 16-18, 2018
Aston Business School,
Aston University
Birmingham, United Kingdom



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WELCOME



Dear DEA40 Conference Participants,

We are delighted to welcome you all to DEA40: International Conference on Data Envelopment Analysis, at Aston Business School, Aston University. This conference has been organised to celebrate the success of DEA on the 40th Anniversary of the publication of the seminal paper on DEA by Charnes, Cooper and Rhodes in the European Journal of Operational Research. The paper has spawned a multitude of papers on the theory and application of DEA taking forward efficiency and productivity analysis in a variety of directions.

Aston Business School is one of the largest and most successful Business Schools in Europe. It is among the elite 1% of Business Schools worldwide who have achieved triple accreditation from AMBA, EQUIS and AACSB, the standard accrediting bodies of the UK, Europe and the USA. The School is within Aston University, located in the centre of the second largest city of England, Birmingham.

Birmingham, with a population of one million inhabitants, is a vibrant multi-ethnic city and the centre of a wider region of some 7 million people. Long since known as the home of manufacturing and of the automotive industry in the UK, the city has in recent times added education, finance, transport and many other services to its booming economy. While in the city you will have the opportunity to sample both its historical and its modern attractions, many of which are within walking distance of the conference venue.

We are very pleased about both the number and the quality of the papers submitted. Delegates will have the choice between five parallel streams and several plenaries / semi-plenaries. As conference organisers, we are especially happy to support those new to research or to research in the efficiency and productivity area. The Conference has been designed with special attention to such researchers and features not only a Special Issue of the Annals of Operations Research but also sessions with special advice for conducting and publishing research in this area. We have also been keen to embrace the users of our research and to that end we have organised semi-plenaries on applications of DEA in Banking, Finance and Education and a semi-plenary and a plenary on the use of DEA in Regulation.

Once again, we wish you all a successful and enjoyable conference.

Emmanuel Thanassoulis and Ali Emrouznejad
Aston Business School, Aston, University, Birmingham, UK.

April 2018

Aston University

Founded in 1895 and a University since 1966, Aston is a long established research-led University known for its world-class teaching quality and strong links to industry, government and commerce, situated in the city centre of Birmingham, United Kingdom

Over the last 20 years Aston University consistently been ranked as a top university for graduate employability (80 in the World and 12th in the UK according QS Graduate Employability Rankings).

Research at Aston University has a direct impact to society and 78% of it is rated world leading internationally excellent (REF 2014). Aston University were recently ranked the 33rd Most International University in the world and 10th in the UK (THE Most International Universities' table), as well as 11th in UK for Student Experience (2016 Times/Sunday Times Good University Guide).

Aston Business School (ABS)

Aston Business School is one of the largest and most successful Business Schools in Europe. It is among the elite 1% of Business Schools worldwide who have achieved triple accreditation from AMBA, EQUIS and AACSB, the standard accrediting bodies of the UK, Europe and the US.

The ABS vision is to be a global leader in bridging the world of intellectual discovery and the practical needs of enterprises and the professions. Our goal is to enhance enterprise and enterprises. We develop individuals to perform better within enterprises and the professions, and to create successful new ventures. We support business leaders in enhancing their organisation's performance and growth. We advise policy-makers on ways to improve society and the economy. Our research creates new knowledge that furthers these aspirations. It is our particular aim to ensure that the opportunities we create are made available to all members of our society.

Aston Group on Efficiency and Productivity (AGEP)

The Aston Group on Efficiency and Productivity (AGEP) is an internationally recognized group researching and teaching in the broad area of performance measurement and management, including DEA and Stochastic Frontier Analysis (SFA). AGEP delivers occasional short courses on DEA and SFA.

CONFERENCE COMMITTEE



CONFERENCE ORGANIZERS:

Emmanuel Thanassoulis, Aston Business School, Aston University, UK
Ali Emrouznejad, Aston Business School, Aston University, UK

CONFIRMED INVITED SPEAKERS / PANELISTS:

Ahn, Heinz (Institut für Controlling – Germany)
Bogetoft, Peter (Copenhagen Business School – Denmark)
Despotis, Dimitris (University of Piraeus – Greece)
Dyson, Robert (University of Warwick- UK)
Forsund, Finn (University of Oslo – Norway)
Karagiannis, Giannis (State University of New York at Binghamton, Greece)
Kumbhakar, Subal C (State University of New York at Binghamton, New York – USA)
Kuosmanen, Timo (Alto University School of Business – Finland)
Lopes, Ana Lúcia Miranda (Federal University of Minas Gerais – UFMG – Brazil)
Olesen, Ole (University of Southern Denmark – Denmark)
Paradi, Joseph C. (University of Toronto – Canada)
Podinovski, Victor (Loughborough University – UK)
Pollitt, Michael (Cambridge University – UK)
Sherman, H. David (Northeastern University – USA)
Sickles, Robin C. (Rice University – USA)
Silva, Maria Conceição A. (Porto University – Portugal)
Simar, Léopold (Université catholique de Louvain – Belgium)
Ray, Subhash (University of Connecticut – USA)
Triantis, Kostas (Virginia Tech University – USA)
Wilson, Paul (Clemson University – USA)

LOCAL ORGANIZING COMMITTEE

Aston Business School, Aston University, UK

Anastasakis, Leonidas
Despic, Ozren
Dey, Prasanta
Emrouznejad, Ali
Giraleas, Dimitris
Knight, Jennifer
Simpson, Gary
Thanassoulis, Emmanuel

TRAVELING TO & IN BIRMINGHAM

Traveling by plane

Arriving at Birmingham International airport

Birmingham International Airport has flights within the UK and across Europe, the Indian subcontinent, the Middle East and North America. It is easy to get from Birmingham International Airport to Aston University. A free shuttle service runs between Birmingham International airport and the Birmingham International train station. Several trains an hour run from Birmingham International train station directly to New Street Station and take less than 10 minutes. Alternatively, the airport is approximately 20 minutes away by car or taxi.

Arriving at other UK airports

Aston University's central location in Birmingham means it is well connected by the coach and rail networks linking various parts of the UK. For passengers arriving at other airports including London Heathrow or Gatwick airport, the simplest means of transport is a coach.

Travelling to Aston University by car

From whichever direction you are approaching Birmingham, Aston University is best reached from the M6 motorway and A38M (not the M6 Toll, which bypasses the city). Our road map (PDF) shows the Birmingham city centre road system around campus. Our main generic address is Aston University, Aston Triangle, Birmingham, B4 7ET.

Please note that Parking is not normally available on campus for visitors but is available in pay car parks close by.

Travelling to Aston University by coach or bus

By coach: Coach services, including motorway services to London, operate from Digbeth coach station, which is a short taxi ride or 20 minutes' walk from the campus through the city centre. To plan your journey visit <http://www.nationalexpress.co.uk/> or call National Express enquiries: +44(0)990 80 80 80

By bus: Because of our central Birmingham location many bus routes pass close to the Aston University campus. To plan your journey, visit the Travel West Midlands website

Travelling to Aston University by train

Birmingham New Street Station is the nearest main-line station to Aston University, a short, flat 10-15 minutes walk away through the main shopping areas of the city along Corporation Street. The station has direct lines to most parts of the UK and many local services.

Some regional and national services arrive at Birmingham Snow Hill and Moor Street stations, which are a short ten minute walk from campus.

Walking to campus from Birmingham New Street Station

Exit New Street Station at the new "New Street Exit." Turn right along Stephenson Street, then left into Stephenson Place following signs to the City Centre. Cross New Street on to Corporation Street (you will see a Lloyds Bank and an Urban Outfitter on the left hand side once you have crossed New Street)

Follow Corporation Street for half a mile to the Aston University campus. You will pass a large House of Fraser department store on your left. Keep walking along Corporation Street (over any pedestrian crossings). After walking past the Square Peg pub (on the left), you will cross a large traffic roundabout (Old Square) and will see a Tesco Metro on your right. This road is the continuation of Corporation Street. Keep walking.

You will see a Pizza Express on the right and will pass the Victorian red brick Law Courts on your left. When you reach STA Travel (on the right hand corner) at the bottom of the road you should turn right into Ryder Street and walk to the pelican crossings over the dual carriageway (James Watt Queensway).

After crossing the dual carriageway, follow the signs into the Aston University campus, walk past the Lakeside Residences and then continue following the path (the lake will be on your right hand side) and the signs until you reach the Main Building with its large clock and its distinctive red and blue sky lifts. The Main Reception is within this building.

Taxis

Taxis (London-style black cabs seating 5) can be hired from the taxi rank at New Street Station and cost around £5 to £8 to the University. There is also a taxi rank on campus (on Aston Street by the mini roundabout) to get back to the station.

TRAVELING IN BIRMINGHAM



JOINING INSTRUCTIONS

The conference is being held at Conference Aston Meeting Suites (CAMS), Aston University Campus, Birmingham B4 7ET, England. For directions to Aston University Campus please visit

<http://www.conferenceaston.co.uk/attending-an-event/how-do-i-get-to-you/>

The map of Aston University Campus is reproduced on the next page where you will locate CAMS and Aston Business School.

1. If you are staying at Conference Aston or wish to Register on Sunday 15 April, once you are at Aston University Campus make your way to Aston Business School (The building labelled Conference Aston on the map). The entrance is as indicated on the map. Registration on Sunday 15th April will be between 16:15 and 18:00 in Lounge of Conference Aston (same building as Aston Business School).
2. From Monday morning Registration moves to CAMS within the Main Building. The entrance to CAMS is at the point indicated on the map on the next page. **You will need the code 5213 to enter.**
3. To walk to CAMS walk as the little green person shows (the one closest to the car Park 3 and the entrance to CAMS). Keep the fountain outside the Main Building to your left as you skirt round the Main Building which is to your left all the time. In front of you will see the Students Union Building (not shown on the map) and a blue overhead bridge connecting it to the Main Building. To your right at the far end of the campus you will see the pub 'Sacks of Potatoes'. Walk under the blue overhead bridge and keep left with the car park to your right. You will see the entrance to building straight ahead. Punch in the code 5213 to enter through the double panel glass doors.
4. Once you have entered turn left and climb up the steps. Then turn right to enter a large corridor area. Registration will be at this corridor on Monday 16th. Beyond the corridor is the Litchfield Lounge where the Welcome Reception will be held Monday 16th at 18.00. Registration will move to Litchfield Lounge from Tuesday morning on.
5. Note you will need the code 5213 to exit CAMS back the way you entered.

If in need please call Conference Aston on +44 121 2043000 for general Aston Conference reception (24 hours) and +441212043296 for Kecia (working hours) who looks after the DEA40 Conference.

MAP OF ASTON UNIVERSITY

The blue areas show on-site car parks.

You can book these online at

www.conferenceaston.co.uk

Please book your car parking for
Car Parks 3, 4 and 12, prior to arrival.

Entrance to
Aston
Business
School and
Conference
Aston
Admin.

Entrance to CAMS for
DEA40 Conference.
You need a code from
the conference
organisers

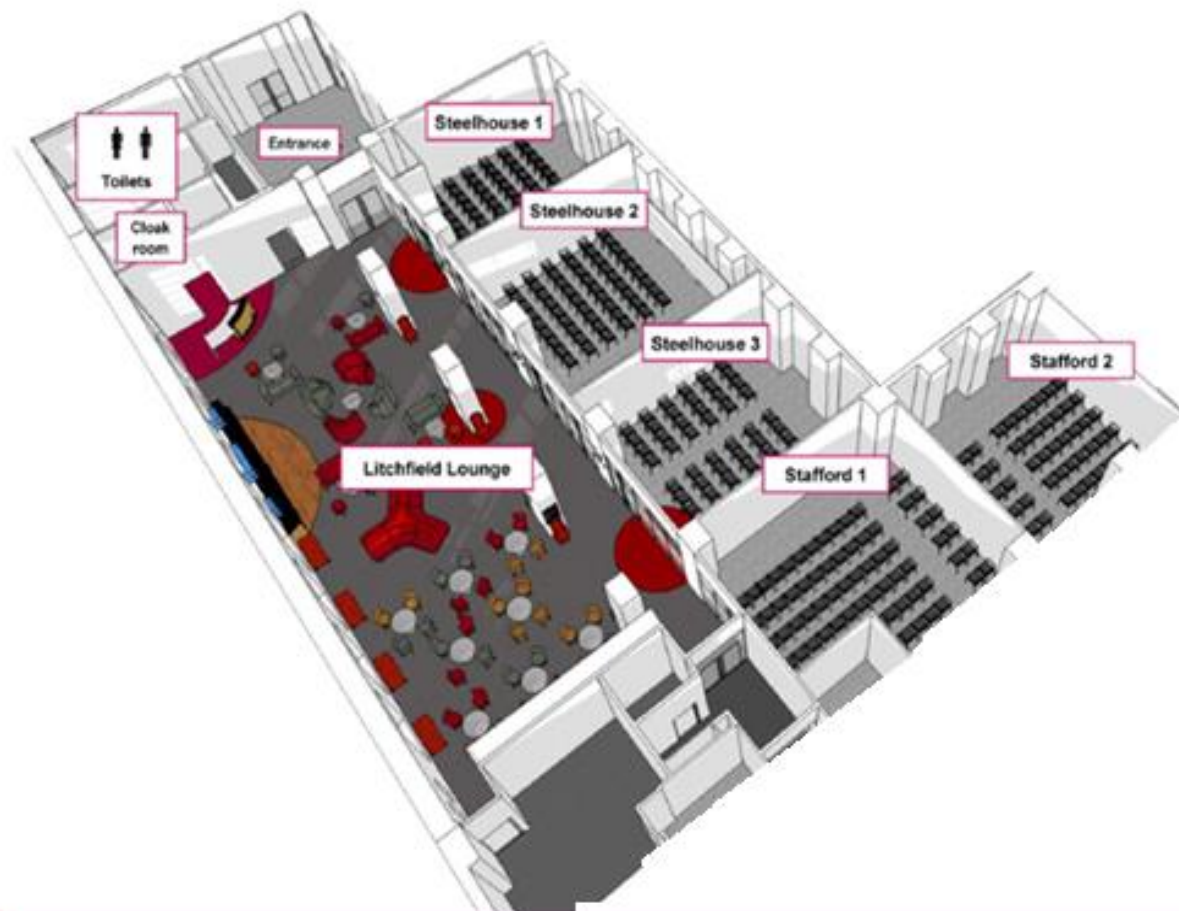


CONFERENCE ASTON MEETING SUITES (CAMS) - MAP OF MEETING ROOMS



The sessions will take place in STEELHOUSE 1-3 and STAFFORD 1-2.

Lunch and coffee breaks will be in the Litchfield Lounge.



REGISTRATION



Registration desk

When	Where
Sunday (15 th April): 16:15 – 18:00	Aston Business School, Aston Conference Hotel
Monday (16 th April): 07:30 – 17:00	Conference Aston Meeting Suites (CAMS)
Tuesday (17 th April): 08:00 – 17:00	
Wednesday (18 th April): 08:00 – 15:00	

All participants are required to register at the conference desk, **please see joining instructions**.

Name Badges

A name badge is provided at the conference desk and must be visible and worn at all sessions and social events throughout the conference.

Welcome reception

When:
Monday (16th April): 18:00 – 19:00

Where:
Aston Business School, Aston Conference Hotel

Gala dinner

When:
Tuesday (17th April): 19:00 – 23:00

Where:
Aston Business School, Aston Conference Hotel

COMMUNICATIONS & EMERGENCY

Internet Access

The login and password are available at the registration desk.

Emergency

Police: 999

Firefighters and Ambulance: 999

In case of significant problems concerning the conference (e.g. delay for presentations) please contact the registration desk or call to (Debashree De 00447823795241).

Website

<http://www.deaconference.com/dea40>

Email

DEA40@deaconference.com

Facebook

To share your moments on Facebook please join to the following group:

<https://www.facebook.com/groups/DEA40>

WhatsApp

To share your moments on WhatsApp please join to the following group:

<https://goo.gl/UpKuhW>

REMARKS FOR SPEAKERS & CHAIRS

- There are typically four talks in each session of 90 minutes. This gives 20 minutes for each speaker including questions, and 2–3 minutes for switching speaker.
- In each session, the last presenter will be Chairing the session.
- The session chairs identify the speakers at the start of the session.
- As a speaker, you should arrive at least 15 minutes before your session starts to check in with the session chair as well as to set up the computer and projector.
- Attendees are asked to turn off cell phones and mobile devices before the presentations begin.
- If you are a chair of a session, ensure that presentations are made in the order shown in the programme.
- If a speaker does not show up, the original time schedule should be adhered to rather than sliding every talk forward. This allows for effective session jumping.
- If the scheduled chair does not show up, the last speaker should take over the responsibility of chairing the session.

PUBLICATIONS

Special issue of journal:

**Annals of Operations Research: Special issue on
Advances in Data Envelopment Analysis: 40 years on**

Guest editors:

Emmanuel Thanassoulis, *Aston Business School, Aston University, Birmingham, UK*

Victor Podinovski, *Loughborough University, UK*

Maria Conceição Silva, *Católica Porto Business School, Porto, Portugal*



This special issue is to celebrate the 40th anniversary of the publication of the seminal paper on Data Envelopment Analysis (DEA) by Charnes, Cooper and Rhodes. The paper was a milestone in the broader area of efficiency and productivity analysis and it has given rise to a very large number of theoretical developments and empirical applications in the field. In this Special Issue we expect high quality original research papers. We would especially welcome contributions to the methodology of DEA as well as innovative applications of it to real life problems such as regulation, finance, healthcare and education to name but a few.

Manuscript Preparation

Please refer to the Journal Information and Author Guidelines for additional information on manuscript preparation at <http://www.springer.com/journal/10479>

All manuscripts should be submitted online at <http://anor.edmgr.com/>, when submitting the manuscript please select the article type **"SI: DEA: 40 years on"**

Submission Deadline: 31th May 2018

An ISBN book of Proceedings:

This is a post Proceedings and the deadline for full paper submission to appear in the proceedings is May 15, 2018.

ISBN: 978 1 85449 438 2

Submission should be sent to DEA40@deaconference.com

For details see: <https://deaconference.com/dea40/publications/>

PROGRAM OVERVIEW

Time	Sunday 15th April	Monday 16th April	Tuesday 17th April	Wednesday 18th April	Time
8.00		Registration	Registration	Registration	8.00
			Parallel Sessions T1	Parallel Sessions W1	9.00
9.30		Opening			
10.30		Coffee			10.30
11.00		Semi-plenary 1	Plenary on Stochastic DEA	Journal Editors Panel Discussion	11.00
11.45		Semi-plenary 2	Plenary on Regulation		Software Demonstration
12.30		Lunch			12.30
13.30		Parallel Sessions M1	Panel Discussion of Assessments in Regulation	Parallel Sessions W2	13.30
15.00		Coffee			15.00
15.30		Parallel Sessions M2	Parallel Sessions T2	Parallel Sessions W3	15.30
16.15	Registration				
18.00		Welcome Reception (18.00 to 19.00)			18.00
19.00			Gala Dinner (19.00-23.00)		19.00

MONDAY: APRIL 16TH, 2018



Monday 16th April 2018: 09:30 - 10:30

Monday 09:30 - 10:30		STEELHOUSE 1&2&3
09:30 - 10:30	Opening session	

Monday 16th April 2018: 11:00 - 12:30

Monday 11:00-12:30		Semi-plenary: Applications of DEA	STEELHOUSE 1&2&3
11:00-11:45	DEA and Econometric Methods in Education Using students' university scores to benchmark secondary schools: Is less more? Speaker: Maria Silva		
	DEA and Econometric Methods in Education Evaluating research performance in higher education with a super-efficiency BOD Model Speaker: Giannis Karagiannis		
11:45-12:30	DEA and Econometric Methods in Financial Services Chair: David Sherman Speaker: Joe Paradi		
Monday 11:00-12:30		Semi-plenary: Theory and modelling of DEA	STAFFORD 1&2
11:00-11:45	Recent developments of DEA model with ratio data Chair: Ole Bent Olesen Speaker: Victor Podinovski		
	Selection of Inputs and Outputs in Data Envelopment Analysis Chair: Ali Emrouznejad Speaker: Subhash Ray		
11:45-12:30			

[M1] -- Monday 16th April 2018: 13:30 - 15:00

Banking and finance		STEELHOUSE 1
6	A Data Analytics Approach for DEA Input-Output Variable Selection Imad Bou-Hamad	
31	Differences in efficiency between banks in financial conglomerates and other banks in the banking sectors in Visegrad countries Iveta Palecková	

85	Research on the Efficiency of China's Open-end Fund - Based on a Two-stage Network DEA Model Deyin Jia and Song Han
187	Measuring changes in the intensity of spatial competition using efficiency spillovers Anthony Glass, Karlighash Kenjegalieva and Thomas Weyman-Jones

Transportation		STEELHOUSE 2
80	Usage of Fuzzy DEA With Undesirable Factors in Improving Malaysia Airport Towards Becoming Pet Friendly Airport Nur Fatin Bari' Ah and Adam Baharum	
105	Efficiency of urban public transport companies in the Czech Republic and Slovakia Markéta Matulová and Hana Fitzová	
17	Joint measurement of efficiency and effectiveness of metro transport system: network data envelopment analysis approaches Chao-Tzung Kang	
139	A centralised DEA approach to resource reallocation in Spanish airports Ane Elixabete Ripoll-Zarraga and Sebastián Lozano	

Statistical Inference		STEELHOUSE 3
62	Statistical Inference in Nonparametric Frontier Estimation: recent developments and dynamic extensions Alois Kneip, Leopold Simar and Paul Wilson	
192	Direction Selection in Stochastic Directional Distance Functions Kevin Layer, Andrew L. Johnson, Robin C. Sickles and Gary D. Ferrier	
55	Technical, Allocative and Overall Efficiency: Inference and Hypothesis Testing Léopold Simar and Paul W Wilson	
74	The Endogenous Effect of Human Capital on World Technology Frontier Camilla Mastromarco and Leopold Simar	

Productivity at industry or state level		STAFFORD 1
67	Efficiency of Local Government Units in Northwestern Philippines as to the Attainment of the Millennium Development Goals Milagros Baldemor	
11	Conventional Procedure vis-à-vis Bootstrap-Based Corrections of Efficiency Analyses: A Case Study of Basic Metals Industry in India Vipin Valiyattoor and Anup Kumar Bhandari	
121	The Efficiency Improvement of selected Czech industries in 2009 - 2017 Jiri Franek	
160	Lost Glory: India's Productive Efficiency from the 1950s till Today Sumit Majumdar	

Education		STAFFORD 2
14	Assessing Efficiency of South African Public Universities using Non-parametric Approach Vuyolwethu Nkohla, Nyankomo Marwa and Syden Mishi	
27	Monitoring the performance of education systems: PCA-DEA approach Dovile Stumbriene and Audrone Jakaitiene	
127	Higher Education and Poverty in Mexico: An Efficiency Analysis with Environment Variables in Two Stages Cesar Lenin Navarro-Chavez and Odette V. Delfin-Ortega	
116	The effect of additional resources for disadvantaged students: Evidence from a conditional efficiency model Kristof De Witte, Mike Smet and Giovanna D'Inverno	

[M2] -- Monday 16th April 2018: 15:30 - 17:00

Banking and finance		STEELHOUSE 1
162	Banking Performance: How do DEA and Accounting Measures Compare? Mohamed Ariff and Ali Naserinia	
122	Efficiency evaluation of production units through DEA with interval dual-role factors at banking sector of Visegrad Group countries Jana Hanclova and Lucie Chytilová	
18	Determinants of Technical, Pure Technical and Scale Efficiencies in the Liberian Commercial Banking Industry: a Data Envelopment Analysis Approach Abraham Kiazolu Ii and Nyankomo Marwa	
102	Estimating differences in inefficiency contributions between family-dominated and non-family-owned banks in Bangladesh Mette Asmild, Dorte Kronborg, Kent Matthews and Tasmina Mahbub	

Target setting & index measures		STEELHOUSE 2
168	Review and Improvements on OECD Better Life Index Dimitris Sotiros, Gregory Koronakos, Yiannis Smirlis and Dimitris Despotis	
185	Measuring income inequalities: beyond Gini Eduard Nežinský and Mikulas Luptacik	
7	Efficiency improvement direction in data envelopment analysis with predefined input/output target Sahand Daneshvar and Mustapha Ibrahim	
93	In Search of MPS in VEA Panagiotis Ravanos and Giannis Karagiannis	

DEA applications		STEELHOUSE 3
193	Economic measures of capacity utilization: a nonparametric cost function analysis Subhash Ray	
87	Evaluation of the Dynamic Efficiency of Urban State Transport Undertakings with Accounting for Accidents as an Undesirable Output Sunil Kumar	
152	Total Factor Productivity Change based on partial productivities: An application to the measurement of input-specific productivity change Bernhard Mahlberg	
123	A Complex Adaptive Systems Approach for Productive Efficiency Analysis Formulations, Constrained Generating Procedures and Computational Issues Konstantinos Triantis, Glen Lyddane, Dougherty Francis and Nathan Ambler	
Cross efficiency computation and application		STAFFORD 1
39	DEA cross-efficiency aggregation method based on prospect theory Hui-Hui Liu, Guo-Liang Yang and Yao-Yao Song	
59	An Alternative Model for DEA Cross Efficiency Evaluation with Flexible Measures Santiago José Amézquita Rengifo, Sepideh Abolghasem Ghazvini, Lina Patricia Navas Castaño and Mehdi Toloo	
107	Cross-efficiency evaluation in DEA using full-dimensional hyperplanes Andreas Dellnitz and Elmar Reucher	
169	Game cross efficiency in NAFTA countries Francisco Vargas and Luis Rentería	
Education		STAFFORD 2
28	Time lag and output type selection concepts for a discipline-specific DEA university efficiency analysis Matthias Klumpp	
124	Should SCI be the sole criterion to evaluate the R&D performance: an application of DEA to the publication bubble in China Jing Fu	
50	Measuring the Evolution of Scientific Productivity in China based on the Malmquist Productivity index Yao-Yao Song, Hui-Hui Liu and Guo-Liang Yang	
146	Change of Optimal Scale of Norwegian Institutions of Higher Education 2004-2013 Dag Fjeld Edvardsen, Finn R Førsund and Sverre A. C. Kittelsen	

TUESDAY: APRIL 17TH, 2018



[T1] -- Tuesday 17th April 2018: 09:00 - 10:30

Banking and finance		STEELHOUSE 1
86	Intellectual Capital and Bank Performance: Evidence from India Abhay Pant and Ganesh K Nidugala	
131	A simple DEA model for measuring financial intermediation Martin Boda and Emilia Zimkova	
148	Modelling the efficiency of European banks: A robust approach to data uncertainty Emmanuel Kwasi Mensah, Mehdi Toloo, Simona Alfiero and Alfredo Esposito	
128	Measuring Short-Term Risk of Initial Public Offerings: A Hybrid Bayesian and Data-Envelopment-Analysis-Based Approach Joseph Paradi and Shabnam Sorkhi	

Regulation		STEELHOUSE 2
151	Direction of technical change and energy use efficiency – empirical evidences from emerging economies Ipsita Rakshit and Sabuj Kumar Mandal	
189	Dynamic Network DEA and Goal Programming: a hybrid approach for electrical sector regulation Livia Torres, Mariana Almeida, João Mello, Carlos Martinhon and Lidia Meza	
23	Factors Affecting Efficiency of Oil and Gas Companies in Indonesia Two Stage DEA Analysis Iswahyudi Sondi Putra and Dani Adinugraha	
175	A Discussion of the German Regulator's Model Development and Validation Approach for Efficiency Benchmarking of Electricity DSOs Srini Parthasarathy, Emmanuel Thanassoulis, Subal Kumbhakar and Silke Johanndeiter	

Agriculture		STEELHOUSE 3
95	The Comprehensive Competitiveness of Chinese Agricultural Companies Liyang Yang and Nan Zhu	
119	An Efficiency Analysis of Small Scale Wheat Farmers in Pakistan: A Case Study of Vehari District Muhammad Omer Chaudhry and Muhammad Waqas	
183	Spatial aggregation of land uses allocation and pesticide efficiency at landscape level A Multi-ware production approach K Hervé Dakpo, Jean-Philippe Boussemart and Vincent Martinet	

63	Dynamic Efficiency under Investment Spikes in Lithuanian Cereal and Dairy Farms Tomas Balezentis and Virginia Namiotko
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Returns to Scale		STAFFORD 1
72	GBM-bv: A Gap-Based measure of scale efficiency for use with non-radial models Fuh-Hwa Liu and Su-Chuan Shih	
130	Are scale economies for TBTF banks elusive or illusive? New evidence using profit efficiency and MPSS benchmarks Maryam Hasannasab, Dimitri Margariits and Paul Rouse	
75	A Linear Model For The Smooth DEA BCC Frontier João Carlos Soares de Mello and Luana C. Brandao	
165	Frontier visualization methods for estimating returns to scale in free disposal hull models Vladimir Krivonozhko, Andrey Lychev and Victor Podinovski	

Education		STAFFORD 2
133	Efficiency of Education Provision in Least Developed Countries Fritz Schiltz and Kristof De Witte	
60	Quality and its Impact on Productivity. The Case of European universities Cinzia Daraio, Leopold Simar and Paul W Wilson	
45	The Efficiency of the Educational Institutes in Pakistan Maaida Hashmi and Steve Bradley	
38	Vice Chancellors' Pay: Exploring the Value Conundrum Jill Johnes, Deborah Allcock and Swati Virmani	

Tuesday 17th April 2018 - 11:00 - 12:30

Tuesday 11:00-12:30: Semi-Plenary: DEA and its application		STEELHOUSE 1&2&3
11:00-11:45	Stochastic Data Envelopment Analysis Chair: Paul Wilson Speaker: Ole Bent Olesen	
11:45-12:30	(De)regulation of energy sector in Finland Chair: Peter Bogetoft Speaker: Timo Kuosmanen	

Tuesday 17th April 2018 - 13:30 - 15:00

Plenary on DEA and Econometric Methods in Regulation		STEELHOUSE 1&2&3
13:30 - 15:00	<p>Chair: Peter Bogetoft, Copenhagen Business School, Denmark</p> <p>Panellists: Eva Deuchert, Regulierungsmanager, Netze BW GmbH, Stuttgart, Baden-Württemberg, Germany Michael Pollitt, Business Economics, Cambridge University, UK Srini Parthasarathy, Principal, Oxera Consulting LLP, UK Tore Langset, Head of Section for Economic Regulation, Norwegian Water Resources and Energy Directorate (NVE), Norway</p>	

[T2] -- Tuesday 17th April 2018 - 15:30 - 17:00

Banking and finance		STEELHOUSE 1
188	<p>Assessment of Technical Efficiency and its Components of Indian Banks: A study from Cross-Sectional Perspective Surbhi Raina and Supran Kumar Sharma</p>	
53	<p>Visualizing Data Envelopment Analysis in the Banking Sector Steffen Hoffmann and Iveta Palecková</p>	
99	<p>Green Credit Efficiency and Output Biased Technological Change in Chinese Commercial Banks: Based on Non-radial Min DS Analytical Framework Renbian Mo and Nan Zhu</p>	
92	<p>Technical Efficiency of Sudan National Health Insurance Fund Branches in 2017 Almoghira Abdellah and Haidar Hashim</p>	

Regulation		STEELHOUSE 2
178	<p>Whether the Energy-Consuming Right Transaction System can achieve the dual control of both energy consumption and intensity? Peihao Lai, Bing Wang and Minzhe Du</p>	
125	<p>Impacts on efficiency of merging the Swedish district courts Per J. Agrell, Pontus Mattsson and Jonas Månsson</p>	
177	<p>The Impact of Urbanization on Energy Efficiency: Panel Data Evidence Considering Threshold Regression Model Qingyun Zhang and Bing Wang</p>	
100	<p>Plant Capacity and Attainability: Exploration and Remedies Kristiaan Kerstens, Jafar Sadeghi and Ignace Van de Woestyne</p>	

Network DEA		STEELHOUSE 3
94	<p>An exploration of SSA's disability determination process with multi-stage DEA method Qianqian Yuan</p>	

13	Technology Forecasting based on efficiency analysis of systems with interdependent sub components using Network Data Envelopment Analysis Franck Komi Adjogble, Nadja Leyendecker, Joachim Warschat, Antonino Ardilio and Thomas Fischer
77	Two-dimensional representation for some network DEA models Bruno Guimarães Torres, Juliana de Castro Reis and João Carlos Soares de Mello
30	Dominance at the divisional efficiencies level in network DEA: The case of two-stage processes Dimitris Despotis, Dimitris Sotiros and Gregory Koronakos

Discrimination in DEA		STAFFORD 1
81	A new type of Data Envelopment Analysis Deformation: Data Standard Analysis Wendi Ouyang	
49	A two-stage DEA-BSC model for museum evaluation with proportional virtual weight restrictions Antonella Basso and Stefania Funari	
126	Computational procedures for DEA models with weight restrictions Tatiana Bouzdine-Chameeva and Victor Podinovski	
129	Improving discrimination power in DEA models using deviation variables framework Joshua Ignatius and Mohammad Reza Ghasemi	

Bibliometric		STAFFORD 2
40	Eco-efficiency considering CO2 emissions and Data Envelopment Analysis: A critical and structured literature review Guoliang Yang, Ali Emrouznejad and Marianna Marra	
172	DEA Techniques in Efficiency and Productivity Analysis for Utilities: A Chronological Review & Current Conceptualization Abhinav Jindal	
52	40 years of research on Data Envelopment Analysis: A Scientometric Study Delaram Najmaei, Arash Najmaei and Masud Behnia	
196	The measurement of productivity efficiency a.k. Data Envelopment Analysis Martin Fieldhouse	

Tuesday 17th April 16:30–18:30

Brainstorming sessions on the use of DEA and SFA in Regulation 1		LOUNGE / STEELHOUSE 2
16:30–18:30	Treatment of heterogeneity and outliers in benchmarking; Best practice in model development procedure ('cost-driver analysis') Chair: OXERA	

WEDNESDAY: APRIL 18TH, 2018



[W1] -- Wednesday 18th April 2018 - 09:00 - 10:30

Banking and finance		STEELHOUSE 1
158	Financial inclusion and gender empowerment in MFIs in India: A two-stage double bootstrap approach Hazwan Bin Haji Haini and Zoë Anastasiou	
106	Combining multi-criteria and directional distances approaches to handle non-compensatory choices Thyago C. Nepomuceno, Cinzia Daraio and Ana Paula Costa	
76	Safety performance evaluation of drilling rigs based on IADC Incident Statistics Program Using Data Envelopment Analysis; A Case Study in Mobile Offshore Drilling Units (MODUs) Hadi Shirouyehzad, Reza Dabestani and Mazdak Khodadadi Karimvand	
132	Does financial sector performance and corruption matter for economic growth and development? An international exploratory study Abdel Latef Anouze and Abdel-Latef Anouze	

Regulation		STEELHOUSE 2
194	Benchmark electricity and gas TSOs and the practical difficulties experienced by the pan-European benchmarks George Anstey, Marco Schonborn	
143	Economic regulation and its impact over time Joseph Duffy, Alan Horncastle and Subal Kumbhakar	
37	On the effect of the public hearing in the Brazilian TSO sector regulation Ana Lúcia Miranda Lopes, Marcelo Azevedo Costa, Mohsen Afsharian, Heinz Ahn and Matheus Lambertucci	
34	Pitfalls in estimating the X-factor: The case of energy transmission regulation in Brazil Mohsen Afsharian, Heinz Ahn, Ana Lopes and Bruno Vilela	

Network DEA		STEELHOUSE 3
157	Competition strategies for two-stage systems with fixed-sum outputs Lijing Jiang and Menghan Chen	
82	Technology Forecasting using Network Data Envelopment Analysis use case: Electrical Vehicles Franck Komi Adjogble, Nadja Leyendecker, Joachim Warschat, Thomas Fischer and Antonino Ardilio	
104	Evaluating Urban Sustainability with Novel Dynamic Network Data Envelopment Analysis Model	

	Sadiye Sadanoglu
61	DEA Network Models for Inference and Estimation of Scientific Knowledge Production: a pseudo-likelihood approach Cinzia Daraio, Moriah Bostian, Rolf Fare, Shawna Grosskopf, Maria Grazia Izzo, Luca Leuzzi, Giancarlo Ruocco and William Weber

DEA applications		STAFFORD 1
110	Measuring Price Efficiency In Infant Milk Market Roxani Karagiannis and Giannis Karagiannis	
149	A two-step approach for identifying the optimal innovation policy direction Panagiotis Tziogkidis, Dionisis Philippas and Alexandros Leontitsis	
58	Exploring Regional Smart Specialization through Conditional Efficiency Analysis and Visual Analytics Marco Angelini, Cinzia Daraio, Francesco Leotta, Giuseppe Santucci and Pierluigi iToma	
16	An appraisal of DEA contribution in the Quality Function Deployment Process in conjunction with some recent advances using Markov stochastic processes Andreas Georgiou, Konstantina Kamvysi, Katerina Gotzamani and Andreas Andronikidis	

Health and hospital		STAFFORD 2
3	Estimating the scope for reducing length of stay in hospital for child empyema: An assessment using DEA Emmanuel Thanassoulis, Alexander Takamura-Tweedy, Mitul Patel and Satish Rao	
79	The sensitivity of DEA efficiency results with respect to the patient's medical evaluation method in musculoskeletal rehabilitation Tamás Koltai, Rita Veronika Dénes, Zoltán Dénes and János Erdei	
190	Regulatory models based upon efficiency analysis Misja Mikkers, Victoria Shestalova and Tessa Voesenek	
184	Being on the Productivity Frontier: Identifying "Triple Aim Performance" Hospitals Aleda Roth, Anita L. Tucker, Sriram Venkataraman and Jon Chilingirian	

Wednesday 18th April 2018 - 11:00 - 12:30

Wednesday 11:00-12:00	Editorial panel	STEELHOUSE 1&2&3
11:00 - 12:00	<p>Chair: Prof. Emmanuel Thanassoulis, Aston Business School, Birmingham, UK (AE European Journal of Operational Research and AE Journal of Productivity Analysis)</p> <p>Panellists: Prof. Robert Dyson, Warwick University, Coventry (Editor of European Journal of Operational Research) Prof. Victor Podinovski, Loughborough University, UK (Co-Editor Journal of Productivity Analysis and AE Omega) Prof. Robin Sickles, Economics and Statistics department, Rice University Houston, Texas, USA, Visiting Professor of Production Econometrics/Loughborough University (AE Journal of Econometrics, AE Empirical Economics, AE Journal of Chinese Economic and Business Studies and Former Editor-in-Chief, Journal of Productivity Analysis) Prof. Maria da Conceição Andrade e Silva, Católica Porto Business School, Portugal (AE Journal of Productivity Analysis and Former AE Omega)</p>	

Wednesday 12:00-12:30	Software demonstration	STEELHOUSE 1&2&3
12:00-12:30	<p>Demonstration of the PIM – DEA software Speaker: Ali Emrouznejad</p>	

Brainstorming sessions on the use of DEA and SFA in Regulation 2	STAFFORD 2
11:00 - 12:30	<p>Robust approaches to determine the general industry target ('Xgen'; 'dynamic efficiency'); Integrating cost assessment and outcomes Chair: OXERA</p>

[W2] -- Wednesday 18th April 2018 - 13:30 - 15:00

Banking and finance	STEELHOUSE 1
57	<p>Productivity and competitiveness in Luxembourg: a DEA application Chiara Peroni and Charles-Henri Dimaria</p>
155	<p>The allocation of fixed financial resource: A novel DEA method based on cross-evaluation Menghan Chen, Sheng Ang and Lijing Jiang</p>
120	<p>Analysis of Spanish Banking Sector Based on Basic Convex Nonparametric Least Squares Method and with the Effects of the Contextual Variables Lucie Chytilová and Jana Hanclova</p>
98	<p>On Operational Efficiency of Chinese Listed Companies with Big Data Based on Machine Learning Algorithms and DEA Method Nan Zhu, Chuanjin Zhu, Ali Emrouznejad and Luman Chen</p>

Brainstorming sessions on the use of DEA and SFA in Regulation 3		STEELHOUSE 2
13:30 - 15:00	Regulatory tools for Capital Expenditure Review and Approval; Total expenditure versus separate OPEX/CAPEX benchmarking; Determination of appropriate 'margin of error' Chair: OXERA	
DEA applications		STEELHOUSE 3
191	Metrics, Indicators and Analytics to Support Government Excellence in general and Smart-Transformation in specific: The case of Website Excellence Model (WEM) Hazza Alnuaimi	
78	Comparative assessment of software piracy based on the DEA method Leonid Galchynskyi and Vitalii Lugovets	
101	Evaluating the multi-period efficiency of state universities using data envelopment analysis and the Malmquist indexes Erhan Berk	
197	Measuring Regional Social Progress Vincent Charles	
DEA applications		STAFFORD 1
111	A two-stage DEA approach for multi-channel retail chain store efficiency analysis Cristina Ciobanu, Kristof Coussement and Koen W. De Bock	
15	A hybrid DEA-MCDM algorithmic approach for ranking DMUS USING OWA AGGREGATION operators with its application to educational institution Jolly Puri and Meenu Verma	
56	The Indispensable Role of Malmquist Production Index in determining and improving Port Productivity in Sub Saharan Africa. Adeola Oluwatoyin Osundiran, Felix Okonta and Harry Quainoo	
171	A Network Data Envelopment Analysis Model for Supply Chain of the Brazilian Electric Energy Adriana Marques, Mariana Almeida, Daniel Aloise, Livia Torres and João Mello	
DEA applications		STAFFORD 2
54	Study on Manufacturing Eco-Efficiency Evaluation and Its Influencing Factors under Environment Constraints Peng Zhang	
115	Evaluating the fractal behaviour of Virtual Networks with a Mixed Intertemporal Multiplicative DEA model Francisco Daladier Marques Júnior, Ali Emrouznejad, Kelvin Lopes Dias, Paulo Roberto Freire Cunha and Jorge Luiz de Castro E Silva	

12	Technical Efficiency of Indian States Aradhana Gandhi and Dipasha Sharma
71	Efficiency Evaluation of Welfare of Chinese Elderly from Economic Perspective Based on DEA Qing Li

[W3] -- Wednesday 18th April 2018 - 15:30 - 16:20

Banking and finance		STEELHOUSE 1
153	Regional differences in the efficiency of German savings banks Peter Reichling and Gordon Schulze	
164	Sri Lanka's post-conflict banking performance Bolanda Hewa Thilakaweera, Charles Harvie, Amir Arjomandi, Meryem Duygun and Vania Sena	

Stochastic Frontier		STEELHOUSE 3
195	Can we assess teaching quality on the basis of student outcomes? A Stochastic frontier application Dimitris Giriraleas	
108	Estimation of Persistent and Transient Inefficiency in the Presence of Endogeneity Subal Kumbhakar	

Fuzzy DEA		STAFFORD 1
159	Fuzzy rough DEA in the process of prospective analysis of technology Ewa Chodakowska	
66	An Intuitionistic fuzzy TOPSIS and DEA approach to evaluate retail sector performance Babek Erdebilili, Abdullah Yildizbasi and Metin Ozturk	

DEA applications		STAFFORD 2
69	An Efficiency Assessment of DMOs' Facebook Pages: A Benchmarking Study Bozana Zekan and Irem Önder	
24	Achieving the Closest Targets in Dynamic DEA Models under Inter-Temporal Dependency: An Application for Iranian Banks. Somayeh Razipour-Ghalehjough, Farhad Hosseinzadeh Lotfi, Gholamreza Jahanshahloo, Mohsen Rostamy-Malkhalifeh and Hamid Sharafi	

Wednesday 18th April 2018 - 16:30 - 17:00

Wednesday 18th April 2018: 16:30 - 17:00		LITCHFIELD LOUNGE
16:30 - 17:00	Closing session	

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