

Short Resume of
Subhash C. Ray

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Citizenship: U.S.

Education:

<u>Degree</u>	<u>Date</u>	<u>Institution</u>
Ph.D.(Economics)	1981	U. of California, Santa Barbara
Fellow in Management (equivalent to Ph.D.)	1976	Indian Institute of Management, Calcutta
MA (Economics)	1964	U. of Calcutta

Professional Experience:

1992 - : Professor of Economics, University of Connecticut, Storrs, CT.
1987-92: Associate Professor, Department of Economics, University of Connecticut, Storrs, CT.
1982-87 : Assistant Professor, Department of Economics, University of Connecticut, Storrs, CT.
1981-82 : Visiting Lecturer, Department of Economics, University of California, Santa Barbara, CA.
1977-81 : Teaching/ Research Assistant, Department of Economics, U.of California,
Santa Barbara, CA.
1976-77 : Faculty member (designated as Senior Training Officer) of the Management
Development Institute of Bharat Heavy Electricals Ltd.
1972-75 : Graduate student in the "Fellowship in Management" program at Indian Institute of
Management, Calcutta.
1967-72 and 1975-76: Lecturer in Economics (the Indian equivalent of an Assistant Professor),
University of Kalyani, India.

Visiting Positions:

Jan - Mar 1990: Visiting Scientist, Indian Statistical Institute, Calcutta, India.
Apr - May 1990: Visiting Faculty, Department of Econometrics, University of Sydney, Australia.
Feb - Mar 1997: Visiting Scholar, Dept. of Statistics and Operational Research, University of
Alicante, Spain.
Aug-Sept 2000: Visiting Fulbright Lecturer, Indian Institute of Management, Calcutta, India
Sept-Dec 2000: Visiting Fulbright Lecturer, Indian Institute of Management, Ahmedabad, India
Jan- Apr 2004: Visiting Scientist, Indian Statistical Institute, Calcutta
July-Dec 2005: Visiting Faculty, Indian Institute of Management Calcutta, India

Fields of Research Specialization:

Applied Micro (production analysis)
Data Envelopment Analysis
Applied Econometrics
Time Series Analysis

Selected Publications:

Book:

Data Envelopment Analysis: Theory and Techniques for Economics and Operations Research (Cambridge University Press 2004).

(edited with Subal Kumbhakar and Pami Dua) *Benchmarking for Performance Evaluation* (Springer 2015)

Edited Book in Progress

Handbook of Production Economics (with Robert Chambers and Subal Kumbhakar) under contract with Springer. Expected completion date: March 2018

Papers:

(with Kankana Mukherjee) A Reverse Directional Distance Function to reconcile between competing efficiency goals: An application to Indian manufacturing ;*Indian Economic Review* (2017, forthcoming)

(Subhash C. Ray and Kankana Mukherjee) Data Envelopment Analysis with Aggregated Inputs and a Test of Allocative Efficiency When Input Prices Vary Across Firms; *Data Envelopment Analysis Journal*, 2016, 2: 1–21

(Subhash C. Ray, Kankana Mukherjee, and Anand Venkatesh) Nonparametric measures of efficiency in the presence of undesirable outputs: a by-production approach; *Empirical Economics*; DOI 10.1007/s00181-017-1234-5

Cost efficiency in an Indian bank branch network: A centralized resource allocation model; *Omega* 65 (2016) 69–81

(Subhash C. Ray) Data Envelopment Analysis: An Overview; in R N Sengupta et al (eds) *Handbook of Decision Science* (2016, Taylor & Francis) pp 943-986

“Nonparametric measures of scale economies and capacity utilization: An application to U.S. manufacturing”; *European Journal of Operational Research* 245 (2015) 602–611

“On the Question of Land Acquisition for Private Development: Lessons from the United States, India,

and China”; *Emerging Economy Studies* Vol 1, No. 1; pp 71-89 (Sage)

(with Arnab Deb) “Total Factor Productivity Growth in Indian Manufacturing: A Biennial Malmquist Analysis of Inter-State Data”; *Indian Economic Review*, Vol. XLIX, No.1, 2014, pp. 53-77

(with Arnab Deb) “An Inter-State Analysis of Total Factor Productivity Growth in Selected Two-digit Industries in Indian manufacturing”; *Global Business Review*; Supplement to Volume 15 No. 4; 2014; pp 59S-86S

(with Arpita Ghose) “Production efficiency in Indian agriculture: An assessment of the post green revolution years” *Omega*, Volume 44, April 2014, Pages 58-6

(with Juan Aparicio and Jesus T. Pastor) “An Overall Measure of Technical Inefficiency at the Firm and at the Industry Level: The ‘Lost Return on the Dollar’ Revisited,” *European Journal of Operational Research* (2012).

(with Mainak Majumdar and Meenakshi Rajeev). “Sources of Heterogeneity in the Efficiency of Indian Pharmaceuticals Firms,” *Indian Economic Review* (2011)

(with Tryfon J. Beazoglou, Lei Chen, Vickie Lazar, Jackson Brown, Dennis Heffley, Rob berg, and Howard Bailit) “Expanded Function Allied Dental Personnel and Dental Practice Productivity and Efficiency”; *Journal of Dental Education* 2012 76:1054-1060

“Cost Efficiency and Scale Economies in Dental Care,” *Journal of the Operations Research Society* (2012) (with Lei Chen).

“Tools and Techniques for Evaluating Service Delivery,” in (with M.S. Kimenyi and Lei Chen) *Institutions and Service Delivery in Africa* (2012) in M.S. Kimenyi, editor(Nairobi, Kenya: African Research Consortium, 2012), 112-139

(with Anup Bhandari) “Technical Efficiency in the Indian Textiles Industry: A Nonparametric Analysis of Firm Level Data”; forthcoming in *Bulletin of Economic Research* (2011).

(with Yanna Wu) “Technical Efficiency and Stock Market Reaction to Horizontal Mergers”; in Bhattacharya, Basabi and Malabika Roy (eds) *A Collection of Essays in Finance* (Allied Publishers, Calcutta, 2010) pp 230-263.

“Data Envelopment Analysis with Bootstrap: A Beginner’s Guide”; forthcoming in Arpita Dhar (Ed) *Themes in Quantitative Economics* (Calcutta: Allied Publishers).

(with A. Das). Distribution of Cost and Profit Efficiency: Evidence from Indian Banking; *European Journal of Operational Research* 201 (2010) 297-307..

“Are Indian Firms too Small? A Nonparametric Analysis of Cost Efficiency and the Optimal Organization of

Industry in Indian Manufacturing”; *Indian Economic Review* Vol XXXXVI (2009) No.1 , 49-67.

(with Lei Chen and Kankana Mukherjee) “Input price variation across locations and a generalized measure of cost efficiency”; *International Journal of Production Economics*;116; (2008) 208-218.

(with A. Das and A. Nag) “Labor-Use Efficiency in Indian Banking: A Nonparametric Analysis of Branch-Level Data’, *OMEGA: The International Journal of Management Science*, (2009) 37; 411-425.

(with W.W. Cooper) “ A Response to M Stone: :”How Not to Measure the Efficiency of Public Services (and how one might)”; *Journal of the Royal Statistical Society, Series A.*;(2008); 171; Part 2; 433-448.

(with Yongil Jeon) “Reputation and Efficiency: A Nonparametric Assessment of America’s Top-rated MBA Programs”; *European Journal of Operational Research; Volume 189, Issue 1, 16 August 2008, Pages 245-268.*

“The Directional Distance Function and Measurement of Super-Efficiency: An Application to Airlines Data”; *Journal of the Operational Research Society* (2008)59, 788-797.

“Shadow Profit Maximization and a Measure of Overall Efficiency”; *Journal of Productivity Analysis.*(2007); 27: 231-236.

“Are Some Indian Banks Too Large? An Examination of Size Efficiency in Indian Banking”; *Journal of Productivity Analysis.*(2007); 27: 41-56.

(with Kankana Mukherjee and Yanna Wu)” Direct and Indirect Measures of Capacity Utilization : A Nonparametric Analysis of U.S. Manufacturing”; *The Manchester School* 2006

(with Kankana Mukherjee)“Technical Efficiency and its Dynamics in Indian Manufacturing: An Inter-state Analysis”; in *Indian Economic Review Vol XXXX, Number 2, 2005, pp 101-125.*

“A Simple Statistical Test of Violation of the weak Axiom of Cost Minimization”; *Indian Economic Review*, Jan-June 2004, pp 111-122.

(with Evangelia Desli) “A Bootstrap Procedure to Capture Unit Specific Effects in Data Envelopment Analysis”; *Indian Economic Review*, Jan-June 2004, pp 89-110.

(with Kankana Mukherjee) “Does the Presence of Surplus Labor Hinder Production in Indian Manufacturing?” in - Sugata Marjit and Nirmala Banerjee eds. *Development, Displacement, and Disparity – India in the Last Quarter of the Century*, Orient Longman.

(with Anasua Bhattacharya) “Surplus Labor in Indian Manufacturing: Evidence From the Annual Survey of Industries”; in an edited volume published by MacMillan.

(with T.T. Ram Mohan) “Comparing Performance of Public and Private Sector Banks”: A Revenue Maximisation Efficiency Approach”; *Economic and Political Weekly*, March 20, 2004; 1271-1276.

(with Evangelia Desli and Subal Kumbhakar) "Dynamic Stochastic Frontier Analysis" *Applied Economics Letters*; 2003; 10, 623-626.

(with Zhang Ping) "Technical Efficiency of the State Owned Enterprises in China (1980-1989): An Assessment of the Economic Reforms."; in Tendulkar, S.D., A. Mitra, K. Narayanan, and D.K. Das (eds) *India: Industrialisation in a Reforming Economy* (New Delhi: Academic Foundation, 2005).

"Did India's Economic Reforms Improve Productivity and Efficiency in Manufacturing?" *Indian Economic Review*; Vol 37, No 1; 2002, 23-57.

"William W. Cooper: A Legend in His own Times"; *Journal of Productivity Analysis*, 17, 1-2, 2002, pp 7-12.

(with Kankana Mukherjee and Steve M. Miller) "Productivity Growth in Large U.S. Commercial Banks: The Initial Post-Deregulation Experience"; *Journal of Banking and Finance*, 25 (2001), pp 913-939.

(with Kankana Mukherjee) "Decomposition of Cost-Competitiveness in U.S. Manufacturing: Some State-by-State Comparisons"; *Indian Economic Review*, Vol 35, No 2, 2000, pp 133-153.

"Measuring Scale Efficiency From a Translog Production Function", *Journal of Productivity Analysis*, vol 11, 1998, pp 183-194.

(with Kankana Mukherjee) "A Study of Size Efficiency in U.S. Banking: Identifying Banks that are too Large"; *International Journal of Systems Science* (1998), vol. 29, no. 11, pp 1281-1294.

(with Kankana Mukherjee) "Quantity, Quality, and Efficiency from a Partially Super-additive Cost Function: Connecticut Public Schools Revisited", *Journal of Productivity Analysis*, 10, 47-62, July 1998.

(with Evangelia Desli) "Productivity Growth, Technical Progress, and Efficiency Change in Industrialized Countries: Comment", *American Economic Review*, Vol 87, No. 5, Dec. 1997 pp 1033- 1039.

"A Weak Axiom of Cost Dominance: Nonparametric Measurement of Cost Efficiency Without Input Quantity Data"; *Journal of Productivity Analysis*, 8, 151-165, May 1997.

"Regional Variation in Productivity Growth in Indian Manufacturing: A Nonparametric Analysis", *Journal of Quantitative Economics*, 13, No, 1, 73-94, January 1997.

(with Xiaowen Hu) "On the Technically Efficient Organization of an Industry: A Study of U.S. Airlines", *Journal of Productivity Analysis*, 8, pp 5-18, March 1997.

(with Kankana Mukherjee) "Decomposition of the Fisher Ideal Index of Productivity: A Nonparametric Dual Analysis of U.S. Airlines Data"; *The Economic Journal*, Vol.106, N0. 439, pp 1659-1678, Nov. 1996.

(with Kankana Mukherjee) "Comparing Parametric and Nonparametric Estimates of Efficiency: A Reexamination of the Christensen-Greene Data"; *Journal of Quantitative Economics*, 1995 pp 155-168.

(with H-J Kim) "Cost Efficiency in the U.S. Steel Industry: A Nonparametric Analysis Using D.E.A. ;

European Journal of Operational Research, Vol. 80, 3, 1995, pp 654-671.

(with Dipasis Bhadra) "Non-Parametric Tests of Cost-Minimizing Behavior: A Study of Indian Farms" ; *American Journal of Agricultural Economics*, Vol 73, November 1993, pp 990-999.

"Resource-Use Efficiency in Public Schools: A Study of Connecticut Data"; *Management Science* Vol 37, No. 12, Dec 1991, pp 1620-1628.

(with A. Noulas and S.M. Miller) "Returns to Scale and input substitution for Large U.S. Banks" *Journal of Money, Credit, and Banking*; 1990, pp 94-108.

(with Kathleen Segerson) "A Profit Function Approach to Measuring the Rate of Technical Progress: An Application to U.S. Manufacturing"; *Journal of Productivity Analysis*, Vol 2, Dec 1990, 39-52.

"Methods of Estimating the Input Coefficients for Linear Programming Models"; *American Journal of Agricultural Economics* 1985 pp 155-160.

"Measurement and Test of Efficiency of Farms in Linear Programming Models: A Study of West Bengal Farms"; *Oxford Bulletin of Economics and Statistics* 1985 pp 371-385.

"A Translog Cost Function Analysis of U.S. Agriculture 1939-77"; *American Journal of Agricultural Economics*, 1982; pp 490-498.

Under Review

(Subhash C. Ray , Abhiman Das, and Kankana Mukherjee Labor-Cost Efficiency with Indivisible Outputs and Inputs: A Study of Indian Bank Branches; submitted to *European Journal of Operational Research*

Working Papers

Production Correspondence, Technical Efficiency, and the CCR Ratio;

(Subhash C Ray, John Walden, and Lei Chen) Economic Measures of Capacity Utilization in the Short Run: A Nonparametric Cost Function Analysis.

(with Shilpa Sethia) Efficiency in Power Generation and Emission Reduction in Thermal Power Plants in India: A State-Level Resource Allocation Model

Presentations in 2016-17

Tutorial on “Selection of Inputs and Outputs in DEA Models”; at DEA 2016: 14th International DEA Conference, in Wuhan China (May 23, 2016) (Presented)

“Nonparametric Measures of Efficiency in the Presence of Undesirable Outputs: An Inter-Country Analysis of GDP and Pollution”; at DEA 2016: 14th International DEA Conference, in Wuhan China (May 24, 2016) (Presented)

“Production Efficiency in Chinese Agriculture: An Assessment of Post Economic Reform years” (with Wenqiang Bao and Nataliya Plesha) at DEA 2016: 14th International DEA Conference, in Wuhan China (May 25, 2016) (Coauthor)

“Labor Cost Efficiency of Bank Branches in India” (With Kankana Mukherjee and Abhiman Das) at DEA 2016: 14th International DEA Conference, in Wuhan China (May 25, 2016) (Coauthor)

“Estimation of the Opportunity Cost of Pollution Abatement: Interstate Analysis of US Agriculture” (with Nataliya Plesha) at DEA 2016: 14th International DEA Conference, in Wuhan China (May 25, 2016) (Coauthor)

“Selection of Inputs and Outputs in DEA Models”; Seminar at Institute of Rural Management;, Anand, India (Jan 7, 2017)

“Selection of Inputs and Outputs in DEA Models”; Seminar at Indian Institute of Management;, Ahmedabad, India (Jan 10, 2017)

Award

Received the 2016 William W. Cooper Lifetime Contributions Award from the International Data Envelopment Society at DEA 2016 at Wuhan, China

Journal Editorship:

Senior Editor, *The DEA Journal*

Served as a guest editor of a special issue of *Indian Economic Review* 2010.

Served as a guest editor of a special issue (on Productivity and Efficiency) of *Indian Economic Review* 2004.

Served as a guest editor of a special issue of *Journal of Productivity Analysis* in 2002.

Major Conference Presentations:

World Econometric Congress, Barcelona (1990)

American Statistical Association, Houston (1980), Chicago(1985), New Orleans (1988)

International Regional Science Association, Boston (1990)

European Congress on Operational Research, Aachen, Germany (1991),
Helsinki, Finland (1992)

European Productivity Workshop, CORE, Belgium (1993)

Georgia Productivity Workshop, Athens, GA, (1994)

European Productivity Workshop, CORE, Belgium (1995)
 Georgia Productivity Workshop II, Athens, GA, (1996)
 Fifth European Productivity Workshop, Copenhagen, Denmark (1997)
 Georgia Productivity Workshop III, Athens, GA, (1998)
 6th European Workshop on Productivity and Efficiency Analysis, Copenhagen, Denmark (1999)
 North American Productivity Workshop, Union College, Schenectady, NY (2000)
 Econometrics Conference 2000, Delhi School of Economics, New Delhi, India, (2000)
 7th European Workshop on Productivity and Efficiency Analysis, Oviedo, Spain (2001)
 North American Productivity Workshop II, Union College, NY 2002.
 National Workshop on Technical Efficiency and Productivity Analysis, New Delhi, India Jan 2003.
 Annual Conference of The Indian Econometric Society, Calcutta, India, January 2005
 North American Productivity Workshop 4; New York City, NY June 2006
 5th International Conference on Data Envelopment Analysis, Indian School of Business, Hyderabad, India
 in January 2007
 10th European Workshop on Productivity and Efficiency Analysis, Lille, France, June 2007.
 North American Productivity Workshop 5; New York City, NY June 2008.
 Center for Development Economics-Swiss Re Workshop on Productivity and Efficiency Analysis;
 New Delhi, January 2009.
 6th International Conference on Data Envelopment Analysis, Philadelphia, PA in Summer 2009.
 7th International Conference on Data Envelopment Analysis, Beirut, Lebanon in Summer 2010.
 Annual Meetings of INFORMS, Nov 2010 held at Austin, TX.
 8th International Conference on Data Envelopment Analysis, Thessoliniki, Greece in Summer 2011.
 North American Productivity Workshop 6; Houston, TX June 2010.
 9th International Conference on Data Envelopment Analysis, Natal, Brazil in Summer 2012.
 10th International Conference on Data Envelopment Analysis, Samsun, Turkey in Summer 2013.
 11th International Conference on Data Envelopment Analysis, Kuala Lumpur, Malaysia in Summer 2014.
 North American Productivity Workshop 7; Ottawa, Canada June 2014.
 2015 Annual Conference of The Indian Econometric Society in Kozhikode, India 2015
 12th International Conference on Data Envelopment Analysis, Braunshweig, Germany in Summer 2015.
 13th International Conference on Data Envelopment Analysis, Wuhan, China in Summer 2016.
 14th International Conference on Data Envelopment Analysis, Prague, Czech Republic in Summer 2017.

Conducted 2-3 Day DEA Workshops at:

National Thermal Power Corporation, New Delhi
 Reserve Bank of India, Bombay
 Indian Institute of Technology, Bombay
 Delhi School of Economics, Delhi
 Indira Gandhi Institute for Development Research, Bombay
 Madras School of Economics, Madras (Chennai)
 Indian Institute of Management Ahmedabad
 Indian Institute of Management Calcutta
 Indian Institute of Management, Ranchi

Birla Institute of Management Technology, Delhi, India
Goa Institute of Management, Goa India
Institute for Rural management, Anand, India
University of Bombay (Mumbai)
Jadavpur University, Calcutta
Indian Statistical Institute Calcutta
Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil
Catholic University (PUFC), Lima, Peru
Pusan National University, Pusan, Korea
Wuhan University, Wuhan, China
Jiangnan University, Wuhan, China
Kadir Has University, Istanbul, Turkey
Durham University, Durham, UK
University of Queensland, Brisbane, Australia
Symbiosis International Institute of Management in Pune, India