

**JOHN RUGGIERO, Ph.D.**  
**Edmund B. O’Leary Professor of Economics**

**Department of Economics and Finance**  
**University of Dayton**  
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**Education**

Ph.D.: Syracuse University, May 1995, Economics  
Dissertation Advisor: Dr. Jerry Miner

**Training Fields**

Public Finance, Urban and Regional Economics, Local Public Finance

**Research Interests**

Performance Evaluation, Applied Economics, Applied Econometrics

**Recent Courses Taught**

Microeconomics, Production Economics

**Editorial Positions**

Associate Editor, *Operations Research* (2013-2024)  
Regional Associate Editor, *JCC: The Business and Economics Research Journal* (2012-present)  
Senior Editor, *The DEA Journal* (2012-2023)

**Publications**

Jradi, Samah and John Ruggiero (2021), “Stochastic DEA Models: Estimating Production Frontiers with Composed Error Models,” *Data Envelopment Analysis Journal* 5, 395-411.

Olesen, Ole and John Ruggiero (2022), “The Hinging Hyperplanes: An Alternative Nonparametric Representation of Production Function,” *European Journal of Operational Research* 296, 254-266.

Jradi, Samah, Parmeter, Chris and John Ruggiero (2021), “Quantile Estimation of Stochastic Frontiers with the Normal-Exponential Specification,” *European Journal of Operational Research* 295, 475-483.

Jradi, Samah, Parmeter, Chris and John Ruggiero (2019), “Quantile Estimation of the Stochastic Frontier Model,” *Economics Letters* 182, 15-18.

- Jradi, Samah and John Ruggiero (2019), "Stochastic Data Envelopment Analysis: A Quantile Regression Approach to Estimate the Production Frontier," *European Journal of Operational Research* 278, 385-393.
- Olesen, Ole and John Ruggiero (2018), "An Improved Afriat-Diewert-Parkan Nonparametric Production Function Estimator," *European Journal of Operational Research* 264, 1172-1188.
- Collier, Trevor, Kelli Marquardt and John Ruggiero (2016), "Nonparametric Estimation of Production Functions," *The DEA Journal* 2, 35-52.
- Johnes, Geraint and John Ruggiero (2017), "Revenue Efficiency in Higher Education Institutions under Imperfect Competition," *Public Policy and Administration* 32, 282-295.
- Haelermans, Carla and John Ruggiero (2015), "Nonparametric Estimation of the Cost of Adequacy in Education: the Case of Dutch Schools," *Journal of the Operational Research Society* 234, 809-818.
- Olesen, Ole and John Ruggiero (2014), "Maintaining the Regular Ultra Passum Law in Data Envelopment Analysis in Data Envelopment Analysis," *European Journal of Operational Research* 235, 798-809.
- Brennan, Shae, Haelermans, Carla and John Ruggiero (2014), "Nonparametric Estimation of Education Productivity Incorporating Nondiscretionary Inputs with an Application to Dutch Schools," *European Journal of Operational Research* 234, 809-818.
- Blackburn, Vincent, Brennan, Shae and John Ruggiero (2014), "Measuring Efficiency in Australian Schools: A Preliminary Analysis," *Socio-Economic Planning Sciences* 48, 4-9.
- Collier, Trevor, Mamula, Aaron and John Ruggiero (2014), "Estimation of Multi-Output Production Functions in Commercial Fisheries," *Omega* 42, 157-165.
- Haelermans, Carla and John Ruggiero (2013), "Estimating Technical and Allocative Efficiency in the Public Sector: A Nonparametric Analysis of Dutch Schools," *European Journal of Operational Research* 227, 174-181.
- Estelle, Sarah and John Ruggiero (2012), "The Relative Contract Position of School Teachers: An Analysis of Public Union vs. Non-Union Schools," forthcoming in *Data Envelopment Analysis Journal*.
- Liu, Long, Ondrich, Jan and John Ruggiero (2012), "Estimating Multiple-Input Multiple-Output Production Functions with an Analysis of Credit Unions," *Applied Economics* 44, 1583-1589.
- Johnson, Andy and John Ruggiero (2011), "Nonparametric Measurement of Productivity and Efficiency in Education," forthcoming in *Annals of Operations Research*.

- Johnson, Andy and John Ruggiero (2011), "Allocative Efficiency Measurement with Endogenous Prices," *Economic Letters* 111
- Collier, Trevor, Johnson, Andy and John Ruggiero (2011), "Measuring Technical Efficiency in Sports," *Journal of Sports Economics* (12), 579-598.
- Collier, Trevor, Johnson, Andy and Ruggiero, John (2011), "Technical Efficiency Estimation with Multiple Inputs and Multiple Outputs Using Regression Analysis," *European Journal of Operational Research*, 208, 153 - 160.
- Estelle, Sarah, Johnson, Andy and John Ruggiero (2010), "Three-Stage DEA Models for Incorporating Exogenous Inputs," *Computers and Operations Research*, 37, 1087-1090.
- Gorman, Mike and John Ruggiero (2009), "Evaluating U.S. County Prosecutor Performance Using DEA: Are Disadvantaged Counties More Inefficient?," *European Journal of Law and Economics* 27, 275-283.
- Gorman, Mike and John Ruggiero (2008), "Evaluating U.S. State Police Performance Using Data Envelopment Analysis," *International Journal of Production Economics* 113, 1031-1037.
- Ruggiero, John (2007), "Measuring the Cost of Meeting Minimum Educational Standards: An Application of Data Envelopment Analysis," *Educational Economics* 15, 1 - 13.
- Ruggiero, John (2007), "A Monte-Carlo Analysis of DEA and the Stochastic Frontier Model Using Panel Data," *International Transactions in Operations Research* 14, 259-266.
- Mohan, Nancy and John Ruggiero (2007), "Pay Differences Between Male and Female CEOs for Publicly Traded Firms," *Applied Economics* 39, 1107-1113.
- Ruggiero, John (2006), "Measurement Error, Education Production and Data Envelopment Analysis," *Economics of Education Review* 25, 327-333.
- Muñiz, Manuel, Paradi, Joseph, Ruggiero, John and Zijiang Wang (2006), "Evaluating Alternative DEA Models Used to Control for Non-Discretionary Inputs," *Computers and Operations Research* 33, 1173-1183.
- Hadley, Lawrence, and John Ruggiero (2006), "Final Arbitration in Major League Baseball: A Nonparametric Analysis," *Annals of Operations Research* 145, 201-109.
- Ruggiero, John (2005), "Input Selection in DEA Models," *International Journal of Information Technology and Decision Making* 4(3), 359-368.
- Ruggiero, John (2004), "Data Envelopment Analysis with Stochastic Data," *Journal of the OR Society* 55: 1008-1012.

- Ruggiero, John (2004), "Performance Evaluation When Non-Discretionary Inputs Correlate With Technical Efficiency," *European Journal of Operational Research* 159: 250-257.
- Ruggiero, John (2003). "Rejoinder: Comment on Estimating School Efficiency," *Economics of Education Review* 22(6), 639-640.
- Ruggiero, John (2003). "Comment on Estimating School Efficiency," *Economics of Education Review* 22(6), 631-634.
- Mohan, Nancy and John Ruggiero (2003), "Compensation Differences Between Male And Female CEOs For Publicly Traded Firms: A Nonparametric Analysis," *Journal of the OR Society* 54 (12), 1242-1248.
- Letavec, Craig and John Ruggiero (2002), "A Mathematical Programming Algorithm for the N-queens Problem," *INFORMS Transactions for Education* 2(3).
- Ruggiero, John, Jerry Miner and Lloyd Blanchard (2002), "Equity vs. Efficiency in the Provision of Educational Services," *European Journal of Operational Research* 142(3): 642-652.
- Ondrich, Jan and John Ruggiero (2002), "Outlier Detection in Data Envelopment Analysis: An Analysis of Jackknifing," *Journal of the OR Society* 53: 342-346.
- Ruggiero, John (2001). "Determining The Base Cost of Education: An Analysis of Ohio School Districts," *Contemporary Economic Policy*, 19:3, 268-279.
- Hadley, Larry, Marc Poitras, John Ruggiero and Scott Knowles (2000). "Performance Evaluation of National Football League Teams," *Managerial and Decision Economics* 21: 63-70.
- Ondrich, Jan and John Ruggiero (2001). "Efficiency Measurement in the Stochastic Frontier Model," *European Journal of Operational Research* 129, 434-442.
- Ruggiero, John (2000). "Nonparametric estimation of Returns to Scale in the Public Sector with an Application to the Provision of Educational Services," *Journal of the Operational Research Society* 51: 906-912.
- Ruggiero, John (2000). "Measuring Technical Efficiency," *European Journal of Operational Research* 121: 138-150.
- Ruggiero, John and Don Vitaliano (1999). "Assessing the Efficiency of Public School Districts Using Data Envelopment Analysis and Frontier Regression," *Contemporary Economic Policy* 17(3): 321-331.
- Ruggiero, John (1999). "Efficiency Estimation and Error Decomposition In the Stochastic Frontier Model: A Monte Carlo Analysis," *European Journal of Operational Research* 115: 555-563.

Ruggiero, John (1998). "Non-Parametric Analysis of Educational Costs," *European Journal of Operational Research* 119: 605-612.

Ruggiero, John (1998). "A New Approach for Technical Efficiency Estimation in Multiple Output Production," *European Journal of Operational Research* 111: 369-380.

Ruggiero, John (1998). "Cost Efficiency in the Provision of Educational Services: An Application of Data Envelopment Analysis," *Journal of Cost Analysis* fall: 53-72.

Ruggiero, John (1998). "Non-Discretionary Inputs in Data Envelopment Analysis," *European Journal of Operational Research* 111: 461-469.

Ruggiero, John and Stuart Bretschneider (1998). "The Weighted Russell Measure of Technical Efficiency," *European Journal of Operational Research* 108: 438-451.

Duncombe, William, Jerry Miner and John Ruggiero (1997). "Empirical Evaluation of Bureaucratic Models of Inefficiency," *Public Choice* 93: 1-18.

Ruggiero, John, Larry Hadley, Gerry Ruggiero and Scott Knowles (1997), "A Note on the Pythagorean Theorem of Baseball Production," *Managerial and Decision Economics*.

Ruggiero, John (1996). "Efficiency of Educational Production: An Analysis of New York School Districts," *Review of Economics and Statistics* 78(3): 499 - 509.

Ruggiero, John (1996). "On The Measurement of Technical Efficiency in the Public Sector," *European Journal of Operational Research* 90: 553-565.

Ruggiero, John, William Duncombe and Jerry Miner (1995). "Measuring and Explaining Technical Inefficiency in the Public Sector," *Journal of Public Administration Research and Theory* 5: 403-428.

Duncombe, William, Jerry Miner and John Ruggiero (1995). "Potential Cost Savings from School District Consolidation: A Case Study of New York," *Economics of Education Review* 13:4.

## **Books**

Brennan, Shae, John Ruggiero and Vince Blackburn (2014), Nonparametric Estimation of Educational Production and Costs using Data Envelopment Analysis, Springer.

Ruggiero, John (2010), Frontiers in Major League Baseball: Nonparametric Analysis of Performance Using Data Envelopment Analysis, Springer.

## **Book Chapters**

Jradi, Samah and John Ruggiero (2022), “Stochastic DEA,” in P. Macedo, V. Moutinho and M. Madaleno (editors), Advanced Mathematical Methods for Economic Efficiency Analysis, Springer.

John Ruggiero (2019), “The Choice of Comparable DMUs and Environmental Variables,” in W. Greene and T. ten Raa (editors), Handbook of Economic Performance Analysis, Palgrave.

Flavin, Jaye Samantha, Ryan Murphy and John Ruggiero (2012), “A DEA Application Measuring Educational Costs and Efficiency of Illinois Elementary Schools,” in M. Johnson (editor), Community Based Operations Research, Springer.

Collier, Trevor, Andrew Johnson and John Ruggiero (2012), “Aggression in Mixed Martial Arts: An Analysis of the Likelihood of Winning a Decision,” in R. Todd Jewel (editor), Violence and Aggression in Sporting Contests: Economics, History and Policy, Springer.

Ruggiero, John (2007), “Nondiscretionary Inputs,” in J. Zhu and W.D. Cook (editors), Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis, Springer.

Ruggiero, John (2004), “Performance Evaluation in Education,” in W.W. Cooper, L. Seiford and J. Zhu (editors) Handbook on Data Envelopment Analysis, Kluwer.

Gustafson, Elizabeth, Lawrence Hadley and John Ruggiero (1999). “Alternative Econometric Models of Production in Major League Baseball,” in John Fizek, Elizabeth Gustafson and Lawrence Hadley (editors) Sports Economics: Current Research, Praeger (Westport, CT).

Duncombe, William, John Ruggiero and John Yinger (1996). “Alternative Approaches to Measuring the Cost of Education,” in Helen F. Ladd (editor), Holding Schools Accountable: Performance Based Reform in Education, *The Brookings Institute*.

Ruggiero, John, Lawrence Hadley and Elizabeth Gustafson (1996). “Technical Efficiency in Major League Baseball,” in John Fizek, Elizabeth Gustafson and Lawrence Hadley (editors) Baseball Economics: Current Research, Praeger (Westport, CT).

## **Conference Presentations**

Banker, Raiv, Jradi, Samah, Park, Han-Up and John Ruggiero (2022), “On the Estimation of Managerial Ability,” presented by coauthor at the 2022 National INFORMS Meetings, Indianapolis.

Jradi, Samah and John Ruggiero (2017), “Stochastic DEA,” presented at the 2017 National INFORMS Meetings, Houston.

- Jradi, Samah and John Ruggiero (2017), "Stochastic DEA: Measuring the Production Frontier in a Composed Error Model," 15<sup>th</sup> International Conference on Data Envelopment Analysis, Prague.
- Olesen, Ole and John Ruggiero (2016), "An Improved Afriat-Diewert-Parkan Nonparametric Production Function Estimator," presented by coauthor at 14<sup>th</sup> International Conference on Data Envelopment Analysis, Wuhan, China.
- Das, Abhiman, Olesen, Ole and John Ruggiero (2016), "Nonparametric Estimation of Bank Production and Efficiency in the Presence of Noise," presented by coauthor at 14<sup>th</sup> International Conference on Data Envelopment Analysis, Wuhan, China.
- John Ruggiero (2015), "Efficiency in Education: Interdisciplinary Based Research," Keynote Speech given at the 2015 LEER Workshop, Leuven, Belgium.
- John Ruggiero (2015), "Stochastic DEA," presented at the 2015 National INFORMS Meetings, Philadelphia.
- Anderson, Tim, Morawa, Monika and John Ruggiero (2015), "Malmquist Productivity Index: Validating through Baseball," presented by coauthor at the 2015 National INFORMS Meetings, Philadelphia.
- Collier, Trevor, Marquardt, Kelli and John Ruggiero (2014), "Estimating Production Functions Nonparametrically," presented at the 2014 National INFORMS Meetings, San Francisco.
- Haelermans, Carla and John Ruggiero (2014), "Nonparametric Estimation of the Cost of Adequacy: The Case of Dutch Schools," presented by coauthor at the 2014 North American Productivity Workshop, Ottawa.
- Blackburn, Vincent, Brennan, Shae and John Ruggiero, "Adequacy and Equity of Australian Schools," presented at the 2013 National INFORMS Meetings, Minneapolis.
- Blackburn, Vincent, Brennan, Shae and John Ruggiero, "Estimating Technical and Allocative Efficiency of Australian Schools," presented at the 26<sup>th</sup> European Conference on Operational Research, 2013, Rome.
- Blackburn, Vincent, Brennan, Shae and John Ruggiero, "Estimating Productivity of Australian Schools Using a Public Sector Malmquist Measure," presented by coauthor at 2012 Southern Economic Association Meetings, New Orleans.
- Haelermans, Carla and John Ruggiero, "Estimating Allocative Efficiency in Education: An Analysis of Dutch Schools," presented at 2012 Southern Economic Association Meetings, New Orleans.

Olesen, Ole and John Ruggiero, "Estimating a Nonparametric Non Input Homothetic S-Shaped Production Function," presented by coauthor at the 2012 National INFORMS Meetings, Phoenix.

Brennan, Shae, Haelermans, Carla and John Ruggiero, "Estimating Educational Productivity: An Analysis of Dutch Schools," presented at the 2012 National INFORMS Meetings, Phoenix.

Ruggiero, John, Panelist, "Opportunities and Challenges", 10<sup>th</sup> International Conference on DEA, Natal, Brazil.

Olesen, Ole and John Ruggiero, "Estimating Production Functions using DEA," presented at the 10<sup>th</sup> International Conference on DEA, Natal, Brazil.

Haelermans, Carla and John Ruggiero, "Estimating Technical and Allocative Efficiency in the Public Sector: A Nonparametric Analysis of Dutch Schools," presented by coauthor at 2012 North American Productivity Workshop, Rice University.

Olesen, Ole and John Ruggiero, "Maintaining the Regular Ultra Passum Law in Data Envelopment Analysis," presented by coauthor at 2012 North American Productivity Workshop, Rice University.

Collier, Trevor, Ole Olesen and John Ruggiero, "DEA and the Stochastic Frontier: A Two-Stage Model," 2011 National INFORMS meetings, Charlotte.

Collier, Trevor, Aaron Mamula and John Ruggiero, "Production and Efficiency Analysis in the Fishing Industry," 2011 National INFORMS meetings, Charlotte.

Ruggiero, John, "Steroids in Major League Baseball," Twelfth European Workshop on Efficiency and Productivity Analysis, 2011, Verona, Italy.

Collier, Trevor, Andy Johnson and John Ruggiero, "Nonparametric Efficiency Measurement: An Application to the Field of Soccer," 9<sup>th</sup> International Conference on Data Envelopment Analysis, Thessaloniki, Greece.

Collier, Trevor, Ole Olesen and John Ruggiero, "DEA and the Stochastic Frontier: A Two-Stage Model," 2011 National INFORMS meetings, Charlotte.

Ruggiero, John, "Nonparametric Estimation of Efficiency in MLB," 2010 Southern Economic Association meetings, Atlanta.

Flavin, Jaye, Murphy, Ryan and John Ruggiero, "Educational Costs and Efficiency of Illinois Schools: A Nonparametric Analysis," 2010 National INFORMS meetings, Austin.

Johnson, Andy and John Ruggiero, "Fixed Inputs and Returns to Scale Measurement," 2010 North American Productivity Workshop, Rice University.



Estelle, Sarah and John Ruggiero, "The Relative Contract Position of School Teachers: An Analysis of Public Union vs. Non-Union Schools," 2009 Southern Economic Association Annual meetings, San Antonio.

Collier, Trevor, Johnson, Andy and John Ruggiero, "Stochastic Production Frontier Analysis with Multiple Outputs: A Two-Stage Approach," 2009 National INFORMS meetings, San Diego.

Estelle, Sarah, Johnson, Andy and John Ruggiero, "Three Stage DEA Models for Incorporating Exogenous Inputs," 2009 National INFORMS meetings, San Diego.

Johnson, Andy and John Ruggiero, " $\epsilon$ -Substitutability, Slack and Data Envelopment Analysis," presented by Andy Johnson, 2009 National INFORMS meetings, San Diego.

Mohan, Nancy and John Ruggiero, "A Nonparametric Analysis of CEO Compensation," 2008 INFORMS National Meetings, Washington, D.C.

Ruggiero, John, "Productivity Measurement for Local Public Services," 2008 INFORMS National Meetings, Washington, D.C.

Douglas, Leslie, Kissell, Katie and John Ruggiero, "Analyzing NCAA Coaches Salaries: A Nonparametric Analysis," 2008 Western Economic Association International, Honolulu.

Liu, Long, Ondrich, Jan and John Ruggiero, "Estimating Multiple-Input Multiple-Output Production Functions with an Analysis of Credit Unions," 2007 INFORMS International Meetings, Puerto Rico.

Ruggiero, John, "Technical Efficiency Estimation with Multiple Inputs and Multiple Outputs Using Regression Analysis," 2006 INFORMS National Meetings, Pittsburgh.

Gorman, Mike and John Ruggiero, "Evaluating U.S. State Police Performance Using Data Envelopment Analysis," 2006 INFORMS National Meetings, Pittsburgh.

Ruggiero, John, "Measuring the Cost of Adequacy in Education," 2005 INFORMS National Meetings, San Francisco.

Ruggiero, John, "A Comparison of DEA and the Stochastic Frontier Model using Panel Data," presented at the 2005 IFORS International Meetings, Hawaii.

Ruggiero, John, "Let's Make a Deal (or At Least Simulate a Few)," presented at the 2005 IFORS International Meetings, Hawaii.

Ruggiero, John, "Measurement Error, Education Production and Data Envelopment Analysis," presented at the 2004 INFORMS National Meetings, Denver.

Ruggiero, John, "Measurement Error and Deterministic Models of Technical Efficiency," presented at the 2003 INFORMS National Meetings, Atlanta.

Ruggiero, John, "Requirements for Developing a Robust Education Finance System," presented at the 2003 Annual Meetings of the Minnesota Taxpayers Association, St. Paul.

Ruggiero, John, "Performance Evaluation When Non-Discretionary Inputs Correlate With Technical Efficiency," presented at the 2002 INFORMS National Meetings, San Jose.

Ruggiero, John, "Variable Selection in DEA," presented at the 2001 INFORMS National Meetings, Miami.

Ruggiero, John, "Are Costs Minimized in the Public Sector? A Nonparametric Analysis of The Provision of Educational Services," Proceedings of the 1994 Maxwell Colloquium, 75-82, presented at the 1994 Eastern Economic Association Conference.

Duncombe, William and John Ruggiero, "Inefficiency and the Distribution of School Aid: An Analysis of New York State," presented at the 1995 Allied Social Science Association Meetings.

Ruggiero, John, "Nonparametric Estimation of Returns to Scale in the Provision of Educational Services," presented at the 1994 Southern Economic Association Conference.

Duncombe, William and John Ruggiero, "Cost and Efficiency of Local Public Education: Case Study of New York," presented at the 1994 Eastern Economic Association Conference.

### **Conference Session Chair**

2019 INFORMS National Meetings, Seattle

2014 INFORMS National Meetings, San Francisco

2013 INFORMS National Meetings, Minneapolis

Southern Economic Association Annual Meetings (2012), New Orleans

Tenth International Conference on DEA, Natal, Brazil

Twelfth European Workshop on Efficiency and Productivity (2011), Verona

2007 INFORMS National Meetings, Seattle

2007 INFORMS International Meetings, Puerto Rico

2006 INFORMS National Meetings, Pittsburgh

PICMET '05 Program Committee

2005 INFORMS National Meetings, San Francisco

2004 INFORMS National Meetings, Denver

2003 INFORMS National Meetings, Atlanta

2001 INFORMS National Meetings

## **Journal Referee**

*Applied Economics, Annals of OR, Computers and Operations Research, Contemporary Economic Policy, Economic Inquiry, Economics of Education Review, Educational Evaluation and Policy Analysis, European Economic Review, European Journal of Operational Research, Expert Systems with Applications, IIE Transactions, International Journal of Computers and Applications, International Journal of Information Technology & Decision Making, International Transactions In Operational Research, Journal of Cost Analysis, Journal of Heuristics, Journal of Policy Analysis and Management, Journal of Productivity Analysis, Journal of Public Administration Research and Theory, Journal of Sports Economics, Managerial and Decision Economics, National Tax Journal, Omega, Operations Research, Operations Research Forum, Socio-Economic Planning Sciences, The Journal of the Operational Research Society*

## **Book Reviewer**

Principles of Microeconomics (Parkin), Pearson  
Managerial Economics (Maurice and Thomas), Irwin  
Principles of Economics (Colander)  
Principles of Microeconomics (for West Publishing Co.)