

C. A. KNOX LOVELL

Curriculum Vitae

CURRENT POSITION:

C. Herman and Mary Virginia Terry Professor of Economics
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EDUCATION:

Postdoctoral Fellowship in Political Economy, University of Chicago, 1968-69

Ph.D., Duke University, 1966

A.B., College of William and Mary, 1963

PROFESSIONAL EMPLOYMENT:

2003- Adjunct Professor, University of the Sunshine Coast, Australia
2001, 2004 Visiting Academic, Productivity Commission, Melbourne, VIC, Australia
1999-2000 Professor and Director, Centre for Applied Economic Research, School of
Economics, University of New South Wales, Sydney, NSW, Australia
1995 Visiting Professor, Odense University, Denmark
1994- C. Herman and Mary Virginia Terry Professor, Department of Economics, Terry
College of Business, University of Georgia
1990-94 Visitor, CORE, Université Catholique de Louvain, Louvain-la-Neuve, Belgium
1989 Visiting Professor, University of Adelaide, SA, Australia
1983-84 Visiting Professor, University of Pennsylvania
1977-93 Professor, University of North Carolina
1975-76 Visiting Associate Professor, University of British Columbia
1971-77 Associate Professor, University of North Carolina
1971 Visiting Associate Professor, The Economics Institute, University of Colorado
1968-71 Assistant Professor, University of North Carolina
1966-68 Assistant Professor, State University of New York at Binghamton
1965-66 Visiting Instructor, North Carolina Central University

TEACHING EXPERIENCE:

Undergraduate Principles, Intermediate Theory, Labor Economics, Quantitative Methods
Graduate Microeconomic Theory, Quantitative Methods, Productivity Analysis
Short courses: University of Queensland, Brisbane, QLD, Australia, 2003

Universitat Autònoma de Barcelona, Spain, 2003
CORE (Université Catholique de Louvain), 1991, 1992, 1993
Central European University (Prague), 1993
New South Wales Treasury, 1994

FUNDED RESEARCH:

Co-Principal Investigator, "Collaborative US-USSR Research in Stochastic Frontier Production and Cost Functions as an Aid in Managerial Control," National Science Foundation, 1977-1981

Principal Investigator, "Estimating Stochastic Production Frontiers," National Science Foundation, 1978

Principal Investigator, "Estimating Technical and Allocative Inefficiency Relative to Stochastic Transformation and Profit Frontiers," National Science Foundation, 1980

Senior Researcher, "The Methodology and Practice of Economic Impact Analyses for Climate Change and Variation," National Science Foundation, 1981

Co-Principal Investigator, "Specification and Estimation of Multiproduct Technologies: An Application to Indian Agriculture," National Science Foundation, 1984

Principal Investigator, "Economies and Efficiencies in Banking: An Evaluation of Alternative Analytical Approaches," National Science Foundation, 1987

Co-Principal Investigator, "Economic Efficiency and the Reform Potential of the Soviet Economy," National Science Foundation, 1988

Co-Principal Investigator, "Economic Efficiency in Soviet Industry," National Science Foundation, 1989

"Revising Multifactor Productivity Growth Indexes for U.S. Agriculture to Account for Environmental Impacts," U.S. Department of Agriculture, 1991

Co-Principal Investigator, "Evaluating the Performance of Credit Unions," "Development of a Procedure for Evaluating the Performance of Individual Credit Unions," "Credit Union Mergers and Efficiency," "Technology and Management Strategies at Best Practice Credit Unions: Today, the Near Future and the Far Future," and "Scale Economies at Credit Unions," The Filene Research Institute, 1991, 1992, 1994, 1996, 1998

Co-Principal Investigator, "Efficiency Analysis of the Spanish Banking System," Fundacion Bilbao-Vizcaya, 1994

Co-Principal Investigator, "Indice de Rendimiento Macroeconomico: Aplicacion al Analisis de Paises Iberoamericanos," Instituto Valenciano de Investigaciones Economicas, 1994

Co-Principal Investigator, "Beneficios y Productividad: Análisis Teórico y Aplicación Empírica a la Banca Española," Fondo para la Investigación Económica y Social, 1995

Co-Principal Investigator, "Best Practice Performance in Exporting," The Australian Trade Commission, 1996

Co-Principal Investigator, "Cost and Productivity in Spanish Electricity Distribution," Comisión del Sistema Eléctrico Nacional, 1998

Co-Investigator, "Evaluating Non-Mandatory Workload and Optimizing Staffing," Department of Veterans Affairs, Veterans Health Administration, 2001

Co-Principal Investigator, "Análisis de las fuentes de las variaciones productivas y su distribución a nivel de impresas," Fundación BBVA (Spain), 2003

Co-Principal Investigator, "Robust Productivity Measurement: An Econometric Distance Function Approach," Australian Research Council, 2003-2005

PUBLISHED RESEARCH:

Books:

The Measurement of Efficiency of Production (with R. Färe and S. Grosskopf). Boston: Kluwer-Nijhoff Publishing, 1985.

International Applications of Productivity and Efficiency Analysis (edited with T.R. Gullledge). Boston: Kluwer Academic Publishers, 1992.

The Measurement of Productive Efficiency: Techniques and Applications (edited with H. O. Fried and S. S. Schmidt). New York: Oxford University Press, 1993.

Production Frontiers (with R. Färe and S. Grosskopf). New York: Cambridge University Press, 1994.

Economic Efficiency and Productivity Growth in the Asia Pacific Region (edited with T.-T. Fu and C. J. Huang). Cheltenham, UK: Edward Elgar Publishing Ltd., 1999.

Stochastic Frontier Analysis (with S. C. Kumbhakar). New York: Cambridge University Press, 2000, paperback edition 2003.

Productivity and Economic Performance in the Asia-Pacific Region (edited with T.-T. Fu and C. J. Huang). Cheltenham, UK: Edward Elgar Publishing Ltd., 2002.

The Measurement of Productive Efficiency: Techniques and Applications, Second Edition (edited with H. O. Fried and S. S. Schmidt). New York: Oxford University Press, forthcoming.

Public Goods, Environmental Externalities and Fiscal Competition (edited with P. Chander, J. Drèze and J. Mintz). Boston: Kluwer Academic Publishers, forthcoming.

Book Reviews:

Economic Analysis and Economic Policy, by Pan A. Yotopoulos; *Kyklos* 2:3 (1968), 611-12.

Mathematics and Computers in Soviet Economic Planning, edited by John P. Hardt *et. al.*; *Southern Economic Journal* 35:2 (October 1968), 195-96.

The Soviet Quest for Economic Efficiency, by George R. Feiwel; *Kyklos* 22:1 (1969), 175-76.

The Industrial Composition of Income and Product, edited by John W. Kendrick; *Kyklos* 23:2 (1970), 387-88.

The Neoclassical Theory of Production and Distribution, by C.E. Ferguson; *Kyklos* 24:1 (1971), 135-36.

Production Economics: A Dual Approach to Theory and Applications, 2 Vols., edited by Melvyn Fuss and Daniel McFadden; *Journal of Political Economy* 88:6 (December 1980), 1265-69.

Marxism, Central Planning, and The Soviet Economy: Economic Essays in Honor of Alexander Erlich, edited by Padma Desai; *Journal of Economic Literature* 22:2 (June 1984), 582-83.

Sources of Productivity Growth, edited by David G. Mayes; *Journal of Economic Literature* 35:3 (September 1997), 819-21.

Production Efficiency in Domesday England 1086, by John McDonald; *Economic Record* 74:226 (September 1998), 319-20.

Articles:

"Capital, Profit and Bonus in Soviet Industry: A Comment," *Economica* 33:130 (February 1966), 88-91.

"On the Choice of Exogenous Variables in Estimating the Elasticity of Substitution," *Indian Journal of Economics* 48:189 (October 1967), 123-42.

"Profits and Cybernetics as Sources of Increased Efficiency in Soviet Planning," *Southern Economic Journal* 34:3 (January 1968), 392-405.

"Capacity Utilization and Production Function Estimation in Postwar American Manufacturing," *Quarterly Journal of Economics* 82:2 (May 1968), 219-39.

"The Role of Private Subsidiary Farming During the Soviet Seven-Year Plan, 1959-65," *Soviet Studies* 10:1 (July 1968) 46-66.

"Problems of Efficiency in the Soviet Economy," *Mercurio* 11:10 (October 1968), 83-86.

"Biased Technical Change and Factor Shares in United State Manufacturing," *Quarterly Review of Economics and Business* 9:3 (Autumn 1969), 17-33.

"Estimating the Elasticity of Substitution: A Correction and Some Further Results" (with J. Moroney), *Southern Economic Journal* 39:3, (January 1973), 437-41.

"CES and VES Production Functions in a Cross-Section Context," *Journal of Political Economy* 81:3 (May/June 1973), 705-20.

"Technology and Specification Error," *Southern Economic Journal* 40:1 (July 1973), 110-16.

"A Note on Aggregation Bias and Loss," *Journal of Econometrics* 1:3 (October 1973), 301-11.

"Estimation and Prediction with CES and VES Production Functions," *International Economic Review* 14:3 (October 1973), 676-92.

"Homotheticity and the Average Cost Function," *Western Economic Journal* 11:4 (December 1973), 506-13.

"Specification Error in Generalized Production Function Models" (with D. Guilkey), *International Economic Review* 16:1 (February 1975), 161-70.

- "Extended Hicks Neutral Technical Change" (with C. Blackorby and M. Thursby), *Economic Journal* 86:4 (December 1976), 845-52.
- "Formulation and Estimation of Stochastic Frontier Production Function Models" (with D. Aigner and P. Schmidt), *Journal of Econometrics* 6:1 (July 1977), 21-37.
- "The Impact of Adjusted Factor Cost Valuation on the CES Interpretation of Soviet Economic Growth" (with S. Rosefielde), *Economica* 44:176 (November 1977), 381-92.
- "A Two Stage Model of Discriminatory Pricing," *Canadian Journal of Economics* 11:1 (February 1978), 56-68.
- "An Investigation of the Kmenta Approximation to the CES Function" (with J. Thursby), *International Economic Review* 19:2 (June 1978), 363-77.
- "Measuring the Technical Efficiency of Production" (with R. Färe), *Journal of Economic Theory* 19:1 (October 1978), 150-162.
- "On Ray-Homothetic Production Functions" (with R. Färe and L. Jansson), in B. Carlson, G. Eliasson and I. Nadiri, eds., *The Importance of Technology and the Permanence of Structure in Economic Growth*. Stockholm: Almqvist & Wiksell (1978), 228-37.
- "Estimating Technical and Allocative Inefficiency Relative to Stochastic Production and Cost Frontiers" (with P. Schmidt), *Journal of Econometrics* 9:3 (February 1979), 343-66.
- "On the Flexibility of the Translog Approximation" (with D. Guilkey), *International Economic Review* 21:1 (February 1980), 127-47.
- "A Survey of Frontier Production Functions and of Their Relationship to Efficiency Measurement" (with F. Førsund and P. Schmidt), *Journal of Econometrics* 13:1 (May 1980), 5-26. [Translated as "Una rassegna sulla frontiere di produzione e il loro legame con la misurazione dell'efficienza," *Problemi de Amministrazione Pubblica* Vol. 10, 1985, 267-302.]
- "Estimating Stochastic Production and Cost Frontiers when Technical and Allocative Inefficiency are Correlated" (with P. Schmidt), *Journal of Econometrics* 13:1 (May 1980), 83-100.
- "Some Neglected Stackelberg Duopoly Models" (with D. Chambers), *Atlantic Economic Journal* 9:2 (July 1981), 25-29.
- "Price Discrimination in Related Markets" (with K. Wertz), *Economic Inquiry* 19:3 (July 1981), 488-94.
- "Measuring the Technical Efficiency of Production: Reply" (with R. Färe), *Journal of Economic Theory* 25:3 (December 1981), 453-54.
- "Normative and Stochastic Methods of Measurement and Control of the Efficiency of Firms and Enterprises" (with S. Danilin, I. Materov and S. Rosefielde), *Ekonomike i Matematicheskie Metody* 18:1 (January 1982), 86-93.
- "On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Model" (with J. Jondrow, I. Materov and P. Schmidt), *Journal of Econometrics* 19:2/3 (August 1982), 233-38.
- "Testing Efficiency Hypotheses in Joint Production: A Parametric Approach" (with R. Sickles), *Review of Economics and Statistics* 65:1 (February 1983), 51-58.

"The Structure of Technical Efficiency" (with R. Färe and S. Grosskopf), *Scandinavian Journal of Economics* 85:2 (1983), 181-90. [Reprinted in F.R. Førsund, ed., *Topics in Production Theory*. London: Macmillan, 1984.]

"A Comparison of the Performance of Three Flexible Functional Forms" (with D. Guilkey and R. Sickles), *International Economic Review* 24:3 (October 1983), 591-616.

"Measuring the Technical Efficiency of Multiple Output Production Technologies" (with R. Färe and K. Zieschang), in W. Eichhorn, R. Henn, K. Neumann and R. Shephard, eds., *Quantitative Studies on Production and Prices*. Wurzburg and Vienna: Physica-Verlag (1983), 159-71.

"Affinely Homothetic Production Technology" (with R. Färe), *Methods of Operations Research* 48 (1984), 197-205.

"Microeconomic Analysis" (with V.K. Smith), in R.W. Kates, ed., *Climate Impact Assessment: Studies of the Interaction of Climate and Society*. New York: John Wiley & Sons (1985), 293-321.

"Measuring Enterprise Efficiency in the Soviet Union: A Stochastic Frontier Analysis" (with S. Danilin, I. Materov and S. Rosefelde), *Economica* 52:206 (May 1985), 225-34.

"Third Degree Price Discrimination in Imperfectly Sealed Markets" (with K. Wertz), *Atlantic Economic Journal* 13:2 (July 1985), 1-11.

"Modeling Scale Economies with Ray-Homothetic Production Functions" (with R. Färe and L. Jansson), *Review of Economics and Statistics* 67:4 (November 1985), 624-29.

"Measuring Efficiency in Production: With an Application to Electric Utilities" (with R. Färe, S. Grosskopf, and J. Logan), in A. Dogramaci and N. Adam, eds., *Managerial Issues in Productivity Analysis*. Boston: Kluwer-Nijhoff Publishing (1985), 185-214.

"Scale Economies and Duality" (with R. Färe and S. Grosskopf), *Zeitschrift für Nationalökonomie* 46:2 (1986), 175-82.

"A Comparison of Alternative Approaches to the Measurement of Productive Efficiency" (with P. Schmidt), in A. Dogramaci and R. Färe, eds., *Applications of Modern Production Theory: Efficiency and Productivity*. Boston: Kluwer-Nijhoff Publishing (1987), 3-32.

"Nonparametric Disposability Tests" (with R. Färe and S. Grosskopf), *Zeitschrift für Nationalökonomie* 47:1 (1987), 77-85.

"Aggregation and Efficiency" (with R. Färe), in W. Eichhorn, ed., *Measurement in Economics*. Heidelberg, Berlin, New York, Tokyo: Physica-Verlag (1987), 639-48.

"Testing for Aggregation Bias in Efficiency Measurement" (with A. Sarkar and R. Sickles), in W. Eichhorn, ed., *Measurement in Economics*. Heidelberg, Berlin, New York, Tokyo: Physica-Verlag (1987), 187-206.

"Estimating Economies and Efficiencies in Production" (with G. Ferrier), *Proceedings of the Business and Economic Statistics Section*, American Statistical Association (1987), 222-25.

"The Effect of Unionization on Labor Productivity: Some Additional Evidence" (with R. Sickles and R. Warren), *Journal of Labor Research* 9:1 (Winter 1988), 55-63.

"The Effect of Unions on Productivity: U. S. Surface Mining of Coal" (with P. Byrnes, R. Färe and S. Grosskopf), *Management Science* 34:9 (September 1988), 1037-53.

"Scale Elasticity and Scale Efficiency" (with R. Färe and S. Grosskopf), *Journal of Institutional and Theoretical Economics* 144:4 (September 1988), 721-29.

"An Indirect Efficiency Approach to the Evaluation of Producer Performance" (with R. Färe and S. Grosskopf), *Journal of Public Economics* 37:1 (October 1988), 71-89.

"Multilateral Productivity Comparisons When Some Outputs are Undesirable: A Nonparametric Approach" (with R. Färe, S. Grosskopf and C. Pasurka), *Review of Economics and Statistics* 71:1 (February 1989), 90-98.

"Some Economics of Content Protection" (with R. Färe and J. Logan), *Journal of Economics* 50:2 (1989), 171-80.

"Privatisation," *Economic Analysis and Policy* 19:2 (September 1989), 185-95.

"Comment (on John W. Kendrick, 'Policy Implications of the Slowdown in U.S. Productivity Growth')," in Stanley W. Black, ed., *Productivity Growth and the Competitiveness of the American Economy*. Boston: Kluwer Academic Publishers (1989), 111-19.

"Measuring Cost Efficiency in Banking: Econometric and Linear Programming Evidence" (with G. Ferrier), *Journal of Econometrics* 46:1/2 (October/November 1990), 229-45.

"The Allocation of Consumer Incentives to Meet Simultaneous Sales Quotas: An Application to U.S. Army Recruiting" (with R. C. Morey), *Management Science* 37:3 (March 1991), 350-67.

"Cost-Efficient Military Recruiting: An Econometric Approach" (with R. Morey and L.L. Wood), *Defence Economics* 2 (1991), 339-51. [Reprinted in K. Hartley and T. Sandler, eds., *The Economics of Defense*. Cheltenham, UK: Edward Elgar Publishing Ltd. (2000).]

"Indirect Productivity Measurement" (with R. Färe and S. Grosskopf), *Journal of Productivity Analysis* 2:4 (February 1992), 283-98.

"Monitoring the Performance of Soviet Cotton Refining Enterprises: Sensitivity of Findings to Estimation Techniques" (with L.L. Wood), *Atlantic Economic Journal* 20:1 (March 1992), 25-31.

"The CET-CES-Generalized Leontief Variable Profit Function: An Application to Indian Agriculture" (with J. Behrman, R. Pollak and R. Sickles), *Oxford Economic Papers* 44:2 (April 1992), 341-54.

"Variation in Productive Efficiency in French Workers' Cooperatives" (with J. Defourny and A.G.M. N'Gbo), *Journal of Productivity Analysis* 3:1/2 (June 1992), 103-117.

"Evaluating the Performance of U.S. Credit Unions" (with H. Fried and P. Vanden Eeckaut), *Journal of Banking and Finance* 17:2/3 (April 1993), 251-65.

"Productive Efficiency Under Capitalism and State Socialism: The Chance Constrained Programming Approach" (with K. Land and S. Thore), *Public Finance/Finances Publiques* 47:5 (1993), 109-21.

"Derivation of Shadow Prices for Undesirable Outputs: A Distance Function Approach" (with R. Färe, S. Grosskopf and S. Yaisawarng), *Review of Economics and Statistics* 75:2 (May 1993), 374-80.

"Production Frontiers and Productive Efficiency," Chapter 1 in H. O. Fried, C. A. K. Lovell and S. S. Schmidt, eds., *The Measurement of Productive Efficiency: Techniques and Applications*. New York: Oxford University Press (1993), 3-67.

"Frontier Tales: DEA and FDH" (with P. Vanden Eeckaut), in W. E. Diewert, K. Spremann and F. Stehling, eds., *Mathematical Modelling in Economics*. Heidelberg, Berlin, New York, Tokyo: Springer-Verlag (1993), 446-57.

"Trade and Efficiency Effects of Domestic Content Protection" (with J. Beghin), *Review of Economics and Statistics* 75:4 (November 1993), 623-31.

"Chance-Constrained Data Envelopment Analysis" (with K. Land and S. Thore), *Managerial and Decision Economics* 14:6 (November/December 1993), 541-54.

Evaluating the Performance of Credit Unions (with H. O. Fried). Madison, WI: The Filene Research Institute, 1993.

"Incorporating Undesirable Outputs into Models of Production: An Application to U.S. Agriculture" (with E. Ball, R. Nehring and A. Somwaru), *Cahiers d'Economie et Sociologie Rurales* 31:2 (1994), 60-74.

"Productive Efficiency Under Capitalism and State Socialism: An Empirical Inquiry Using Chance-Constrained Data Envelopment Analysis" (with K. Land and S. Thore), *Technological Forecasting and Social Change* 46 (1994), 139-52.

Credit Union Service Oriented Peer Groups (with H. O. Fried). Madison, WI: The Filene Research Institute, 1994.

"Enhancing the Performance of Credit Unions: The Evolution of a Methodology" (with H. O. Fried), *Recherches Economiques de Louvain* 60:4 (1994), 1-17.

"Resources and Functionings: A New View of Inequality in Australia" (with S. Richardson, P. Travers and L. L. Wood), in W. Eichhorn, ed., *Models and Measurement of Welfare and Inequality*. Berlin, Heidelberg, New York: Springer-Verlag (1994), 787-807.

"The Contribution of Operations Research Techniques to the Evaluation of Electric Utility Performance" (with J. T. Pastor), *Top* 2:1 (1994), 167-73.

"Economías de Escala y Cambios en la Productividad: El Caso de Las Casadse Ahorros Españolas" (with E. Grifell-Tatjé), *Perspectivas del Sistema Financiero* 48 (1994), 123-31.

"Linear Programming Approaches to the Measurement and Analysis of Productive Efficiency," *Top* 2:2 (December 1994), 1-50.

"Comments on Validation and Generalization of DEA and its Uses," *Top* 2:2 (December 1994), 309-14.

"Stratified Models of Education Production Using Modified DEA and Regression Analysis" (with L. C. Walters and L. L. Wood), in A. Charnes, W. W. Cooper, A. Y. Lewin and L. M. Seiford, eds., *Data Envelopment Analysis: Theory, Methodology and Applications*. Boston, Dordrecht, London: Kluwer Academic Publishers (1994), 329-51.

"A DEA Approach to the Problem of New and Disappearing Commodities in the Construction of Price Indexes" (with K. Zieschang), in A. Charnes, W. W. Cooper, A. Y. Lewin and L. M. Seiford, eds., *Data Envelopment Analysis: Theory, Methodology and Applications*. Boston, Dordrecht, London: Kluwer Academic Publishers (1994), 353-67.

"Econometric Efficiency Analysis: A Policy-Oriented Review," *European Journal of Operational Research* 80:3 (February 1995), 452-61.

"A Note on the Malmquist Productivity Index" (with E. Grifell-Tatjé), *Economics Letters* 47:2 (February 1995), 169-75.

"Measuring the Macroeconomic Performance of the Taiwanese Economy," *International Journal of Production Economics* 39:1 (1995), 165-78.

"Units Invariant and Translation Invariant DEA Models" (with J. T. Pastor), *Operations Research Letters* 18:3 (1995), 147-51.

"Measuring Macroeconomic Performance in the OECD: A Comparison of European and Non-European Countries" (with J. T. Pastor and J. A. Turner), *European Journal of Operational Research* 87:3 (1995), 507-18.

"Estrategias de Gestión y Cambio Productivo en el Sector Bancario Español" (with E. Grifell-Tatjé), *Papeles de Economía Española* 65 (1995), 174-84.

"Service Productivity in U.S. Credit Unions" (with H. O. Fried and P. Vanden Eeckaut), in P. Harker, ed., *The Service Productivity and Quality Challenge*. Boston, Dordrecht, London: Kluwer Academic Publishers (1995), 365-90.

"An Analysis of the Performance of University-Affiliated Credit Unions" (with H. O. Fried and J. Turner), *Computers and Operations Research* 23:4 (April 1996), 375-84.

"Deregulation and Productivity Decline: The Case of Spanish Savings Banks" (with E. Grifell-Tatjé), *European Economic Review* 40:6 (June 1996), 1281-1303. [Reprinted in M. J. B. Hall, ed., *The Regulation and Supervision of Banks*, Cheltenham, UK: Edward Elgar Publishing Ltd. (2000).]

"Applying Efficiency Measurement Techniques to the Measurement of Productivity Change," *Journal of Productivity Analysis* 7:2/3 (July 1996), 329-40.

"Production and Cost Functions," in A. Kuper and J. Kuper, eds., *Social Science Encyclopedia*, Second Edition. London and New York: Routledge, 1996.

Technology Strategies of Best Practice Credit Unions: Today, The Near Future, and The Far Future (with A. E. Burger and H. O. Fried). Madison, WI: The Filene Research Institute, 1997.

"Biased Technical Change and the Malmquist Productivity Index" (with R Färe, E. Grifell-Tatjé and S. Grosskopf), *Scandinavian Journal of Economics* 99:1 (1997), 119-27.

"The Relative Efficiencies of Market and Planned Economies" (with J. R. Moroney), *Southern Economic Journal* 63:4 (April 1997), 1084-93.

"Target Setting: An Application to a Bank Branch Network" (with J. T. Pastor), *European Journal of Operational Research* 98:2 (April 16, 1997), 290-99.

"The Impact of Liberalization on the Productive Efficiency of Indian Commercial Banks" (with A. Bhattacharyya and P. Sahay), *European Journal of Operational Research* 98:2 (April 16, 1997), 332-45.

"The Sources of Productivity Change in Spanish Banking" (with E. Grifell-Tatjé), *European Journal of Operational Research* 98:2 (April 16, 1997), 364-80.

"A DEA-Based Analysis of Productivity Change and Intertemporal Managerial Performance" (with E. Grifell-Tatjé), *Annals of Operations Research* 73 (1997), 177-89.

"Doelmatigheidsonderzoek in de Publieke Sector," *Openbare Uitgaven* 30:1 (January 1998), 6-13.

- "Weather and Pollution Abatement Costs" (with J. Leightner), *The Energy Journal* 19:2 (1998), 165-89.
- "The Impact of Financial Liberalization on the Performance of Thai Banks" (with J. Leightner), *Journal of Economics and Business* 50:2 (March/April 1998), 115-31. [Reprinted in M. J. B. Hall, ed., *The Regulation and Supervision of Banks*, Cheltenham, UK: Edward Elgar Publishing Ltd., (2000).]
- "The Impact of Regulation On Operating Cost and Substitution Possibilities" (with G. Granderson), *Southern Economic Journal* 65:1 (July 1998), 83-97.
- "A Quasi-Malmquist Productivity Index" (with E. Grifell-Tatjé and J. T. Pastor), *Journal of Productivity Analysis* 10:1 (July 1998), 7-20.
- "The Impact of Mergers on Credit Union Service Provision" (with H. O. Fried and S. Yaisawarng), *Journal of Banking and Finance* 23:2-4 (February 1999), 367-86.
- "Econometric Estimation of Technical and Environmental Efficiency: An Application to Dutch Dairy Farms" (with S. Reinhard and G. J. Thijssen), *American Journal of Agricultural Economics* 81:1 (February 1999), 44-60.
- "Editors' Introduction" (with T.-T. Fu and C. J. Huang), in T.-T. Fu, C. J. Huang and C. A. K. Lovell, eds., *Economic Efficiency and Productivity Growth in the Asia Pacific Region*. Cheltenham, UK: Edward Elgar Publishing Ltd. (1999), 1-18.
- "An Alternative Tale of Two Cities" (with Y. P. Tang), in T.-T. Fu, C. J. Huang and C. A. K. Lovell, eds., *Economic Efficiency and Productivity Growth in the Asia Pacific Region*. Cheltenham, UK: Edward Elgar Publishing Ltd. (1999), 23-41.
- "A Generalized Malmquist Productivity Index" (with E. Grifell-Tatjé), *Top* 7:1 (June 1999), 81-101.
- "Profits and Productivity" (with E. Grifell-Tatjé), *Management Science* 45:9 (September 1999), 1177-93.
- "Radial DEA Models Without Inputs or Without Outputs" (with J. T. Pastor), *European Journal of Operational Research* 118:1 (October 1, 1999), 46-51.
- "Evaluating the Performance of Agricultural Bank Management: The Impact of State Regulatory Policies" (with B. K. N. Armah, Jr. and T. A. Park), *Journal of Agricultural and Applied Economics* 31:3 (December 1999), 437-48.
- "The Causes and Consequences of Expert Disagreement: Lessons from the *U.S v. AT&T* Case" (with R. Sickles), in D. Slottje, ed., *The Role of the Academic Economist in Litigation Support*. Amsterdam: North-Holland (1999), 189-205.
- How Credit Union Mergers Affect Service to Members* (with H. Fried and S.Yaisawarng). Madison, WI: The Filene Research Institute, 1999.
- "Environmental Efficiency with Multiple Environmentally Detrimental Variables: Estimated with SFA and DEA" (with S. Reinhard and G. J. Thijssen), *European Journal of Operational Research* 121:2 (March 2000), 287-303.
- "Cost and Productivity" (with E. Grifell-Tatjé), *Managerial and Decision Economics* 21:1 (January/February 2000), 19-30.

"Performance Assessment in the Public Sector" (with J. L. T. Blank), in J. L. T. Blank, ed., *Public Provision and Performance: Contributions from Efficiency and Productivity Measurement*. Amsterdam: North-Holland (2000), 3-21.

"Measuring Efficiency in the Public Sector," in J. L. T. Blank, ed., *Public Provision and Performance: Contributions from Efficiency and Productivity Measurement*. Amsterdam: North-Holland (2000), 23-53.

"Taxation and Economic Growth in New Zealand" (with J. Branson), in G. W. Scully and P. J. Caragata, eds., *Taxation and the Limits of Government*. Boston: Kluwer Academic Publishers (2000), 37-88.

"The Effects of Deregulation on the Performance of Financial Institutions: The Case of Spanish Savings Banks" (with S. C. Kumbhakar, A. Lozano-Vivas and I. Hasan), *Journal of Money, Credit and Banking* 33:1 (February 2001), 101-20.

"A Growth Maximizing Tax Structure for New Zealand" (with J. Branson), *International Tax and Public Finance* 8:2 (March 2001), 129-46.

"Looking Ahead: Future Research Opportunities in Efficiency and Productivity Analysis," in A. Alvarez Pinilla, ed., *La Medición de la Eficiencia y la Productividad*. Madrid: Pirámide (2001), 331-43.

"Graph Efficiency and Productivity Measures: An Application to U.S. Agriculture" (with J. L. Zofio), *Applied Economics* 33 (2001), 1433-42.

Greenhouse Gas Emissions and the Productivity Growth of Electricity Generators (with G. Murtough, D. Appels and A. Matysek), Productivity Commission Staff Research Paper, Ausinfo, Canberra, ACT, Australia (2001).

"Accounting for Environmental Effects and Statistical Noise in Data Envelopment Analysis" (with H. O. Fried, S. S. Schmidt and S. Yaisawarng), *Journal of Productivity Analysis* 17:1/2 (January 2002), 157-74.

"Performance Assessment in the Public Sector," in K. J. Fox, ed., *Efficiency in the Public Sector*. Boston: Kluwer Academic Publishers (2002), 11-35.

"Editors' Introduction" (with T.-T. Fu and C. J. Huang), in T.-T. Fu, C. J. Huang and C. A. K. Lovell, eds., *Productivity and Economic Performance in the Asia-Pacific Region*. Cheltenham, UK: Edward Elgar Publishing Ltd. (2002), 1-13.

"Analysis of Environmental Efficiency Variation" (with S. Reinhard and G. Thijssen), *American Journal of Agricultural Economics* 84:4 (November 2002), 1054-65.

"The Managers versus the Consultants" (with E. Grifell-Tatjé), *Scandinavian Journal of Economics* 105:1 (2003), 119-38.

"Equivalent Standard DEA Models to Provide Super-Efficiency Scores" (with A. P. B. Rouse), *Journal of the Operational Research Society* 54:1 (2003), 101-08.

"Efficiency and Productivity in the Public Sector: Dominant Themes in the Literature" (with M. A. Muñoz Pérez), *Papeles de Economía Española* 95 (2003), 47-65.

"The Decomposition of Malmquist Productivity Indexes," *Journal of Productivity Analysis* 20:3 (November 2003), 437-59.

"Excess Capacity and Expense Preference Behavior in National Health Systems: An Application to the Spanish Public Hospitals" (with A. Rodriguez-Alvarez), *Health Economics* 13:2 (February 2004), 157-69.

"World Health System Performance Revisited" (with D. B. Evans, J. A. Lauer and C. J. L. Murray), *BMC Health Services Research* 4:19 (July 2004).

"Decomposing the Dividend" (with E. Grifell-Tatjé), *Journal of Comparative Economics* 32:3 (September 2004), 500-18.

"Allocative Inefficiency and its Cost: The Case of Spanish Public Hospitals" (with A. R. Alvarez and V. F. Blanco), *International Journal of Production Economics* 92:2 (November 2004), 99-111.

"Incorporating Environmental Impacts in the Measurement of Agricultural Productivity Growth" (with V. E. Ball, H. Luu and R. Nehring), *Journal of Agricultural and Resource Economics* 29:3 (December 2004), 436-60.

"Michael James Farrell" (with E. Grifell-Tatjé) in J. Segura and C. Rodriguez Braun, eds., *An Eponymous Dictionary of Economics*. Cheltenham, UK: Edward Elgar Publishing Ltd. (2005)

"Frontier Analysis in Health Care," *International Journal of Healthcare Technology and Management*, forthcoming.

"Equitable Resource Allocation and Operational Efficiency Evaluation" (with J. Gao and J. Campbell), *International Journal of Healthcare Technology and Management*, forthcoming.

"Evaluating the Financial Performance of Bank Branches" (with J. T. Pastor and H. Tulkens), *Annals of Operations Research*, forthcoming.

"Production and Cost Frontiers," in A. Kuper and J. Kuper, eds., *Social Science Encyclopedia*, Third Edition. London and New York: Routledge, forthcoming.

"Environmental Productivity Accounting," in Productivity Commission, *Quantitative Tools for Microeconomic Policy Analysis*. Canberra: Ausinfo, forthcoming.

"Efficiency and Productivity," Chapter 1 in H. O. Fried and S. S. Schmidt, eds., *The Measurement of Productive Efficiency: Techniques and Applications, Second Edition*. New York: Oxford University Press, forthcoming.

"A Global Malmquist Productivity Index" (with J. T. Pastor), *Economics Letters*, forthcoming.

Working Papers:

"Malmquist and Törnqvist Productivity Indexes (Belatedly) Revisited" (with E. Grifell-Tatjé)

"Avoiding Unfeasibility in DEA Models with Weight Restrictions" (with M. P. E. Lins and A. C. M. da Silva)

"Why Greenhouse Gas Emissions Matter When Estimating Productivity Growth: An Application to Australian Electricity Generation" (with G. Murtough, D. Appels and A. Matysek)

"Efficiency Measurement with Undesirable Outputs: A Parametric Distance Function Approach" (with R. A. Cuesta and J. L. Zofio)

"Weight Restrictions, Super-Efficiency and Unobserved DMUs in DEA" (with M. P. E. Lins, D. A. Gonçalves and A. C. M. da Silva)

"Circularity of the Malmquist Productivity Index" (with J. T. Pastor)

"Productivity at the Post" (with E. Grifell-Tatjé)

PROFESSIONAL SERVICE:

Coordinator, NSF Conference on Parametric and Nonparametric Approaches to Frontier Analysis, University of North Carolina, 1988

Coordinator, Georgia Productivity Workshop, 1994, 1996, 1998

Scientific Advisory Committee, European Workshop on Efficiency and Productivity Analysis, 1991-

Advisory Committee, North American Productivity Workshop, 2000-

Organizing Committee, Taipei International Conference on Efficiency and Productivity Growth, 1997, 1999, 2002

Advisory Committee, Asia Pacific Productivity Workshop, 2003-

Southern Economic Journal
Board of Editors, 1972-74

Journal of Productivity Analysis
Advisory Board, 1989-91
Editor-in-Chief, 1992-2002
Co-editor (with O. B. Olesen and N. C. Petersen) of Special Issue on
"Efficiency and Frontier Analysis," 7:2/3 (July 1996)

Journal of Econometrics
Co-editor (with A.Y. Lewin) of Annals, "Frontier Analysis: Parametric and
Nonparametric Approaches," 46:1/2 (October/November 1990)

Management Science
Associate Editor, 1991-95

Top (Journal of the Spanish Statistical and Operations Research Society)
Advisory Board, 1994-

European Journal of Operational Research
Co-editor (with A.Y. Lewin) of Special Issue on "Productivity Analysis: Parametric and
Nonparametric Applications," 80:3 (February 1995).

Operations Research
Associate Editor, 1996-99

Managerial and Decision Economics
Editorial Board, 2000-

Business and Economics Letters / International Journal of Business and Economics
Editorial Board, 2001-

Academia Economic Papers

Co-editor (with T.-T. Fu and C. J. Huang) of Special Issue on "Efficiency and Productivity Growth," 32:3 (September 2004)

Refereeing (1998-present): *Agricultural Economics*, *Annals of Operations Research*, *Annals of Public and Cooperative Economics*, *Australian Journal of Regional Science*, *Business and Economics Letters*, *Contemporary Economic Policy*, *Econometrica*, *Economic Inquiry*, *Economic Systems*, *Economics Letters*, *Economics of Planning*, *Educational Evaluation and Policy Analysis*, *Empirical Economics*, *European Economic Review*, *European Journal of Operational Research*, *Growth and Change*, *International Economic Review*, *International Journal of Business and Economics*, *International Journal of Information Technology and Decision Making*, *International Journal of Production Economics*, *International Journal of Systems Science*, *International Tax and Public Finance*, *International Transactions in Operational Research*, *Journal of Agricultural and Applied Economics*, *Journal of Agricultural Economics*, *Journal of Applied Econometrics*, *Journal of Asian Economics*, *Journal of Banking and Finance*, *Journal of Comparative Economics*, *Journal of Econometrics*, *Journal of Economic and Management Strategy*, *Journal of Economics and Business*, *Journal of Environmental Economics and Management*, *Journal of Environmental Management*, *Journal of Financial Services Research*, *Journal of Money, Credit and Banking*, *Journal of the Operational Research Society*, *Journal of Productivity Analysis*, *Journal of Public Economics*, *Journal of Risk and Insurance*, *Management Science*, *Managerial and Decision Economics*, *Omega*, *Resource and Energy Economics*, *Review of Economics and Statistics*, *Review of Income and Wealth*, *Scandinavian Journal of Economics*, *Socio-Economic Planning Sciences*, *Transportation Research*, US National Science Foundation, Australian Research Council, Belgian Fund for Scientific Research, Israel Science Foundation, World Bank, Industry Canada, Cambridge University Press, and Kluwer Academic Publishers.

CONFERENCE, SEMINAR AND WORKSHOP PRESENTATIONS (1992-present):

- 1992: ASSA Meetings, New Orleans, LA
Academia Sinica, Taipei, Taiwan, ROC
National Taiwan University, Taipei, Taiwan, ROC
National Tsing Hua University, Hsin-Chu, Taiwan, ROC
National Central University, Chung-Li, Taiwan, ROC
Université de Toulouse, France
EURO XII/TIMS XXXI Meetings, Helsinki, Finland
CORE/FORMEZ Workshop, Louvain-la-Neuve, Belgium
UNED Workshop, Denia, Spain
Financial Services Conference, Federal Reserve Bank of Atlanta, GA
Wageningen Agricultural University, Wageningen, The Netherlands
CORE/CERGE Workshop, Prague, Czechoslovakia
Université Saint-Louis, Brussels, Belgium
Wharton Conference on the Service Sector, Philadelphia, PA
Southern Economic Association Meetings, Washington, DC
Purdue University, West Lafayette, IN
- 1993: ASSA Meetings, Anaheim, CA
University of Georgia, Athens, GA
U.S. Department of Agriculture, Washington, DC
IFORS Meetings, Lisbon, Portugal
CORE/FORMEZ Workshop, Louvain-la-Neuve, Belgium
Odense University, Odense, Denmark
Union College, Schenectady, NY
Atlantic Economic Society Meetings, Philadelphia, PA
Third European Workshop on Efficiency and Productivity Measurement, CORE,

- Université Catholique de Louvain, Louvain-la-Neuve, Belgium
 Universität Hamburg, Hamburg, Germany
 Southern Economic Association Meetings, New Orleans, LA
 Universidad de Alicante, Alicante, Spain
 Workshop on Banking, Valencia, Spain
 Universitat Autònoma de Barcelona, Barcelona, Spain
- 1994: ASSA Meetings, Boston, MA
 University of Georgia, Athens, GA
 University of Pennsylvania, Philadelphia, PA
 TIMS XXXII Meetings, Anchorage, AK
 Workshop on Efficiency and Productivity, NSW Treasury, Sydney, Australia
 Commonwealth Bank, Sydney, NSW, Australia
 The Industry Commission, Melbourne, VIC, Australia
 University of Adelaide, Adelaide, SA, Australia
 Australasian Meetings of the Econometric Society, Armidale, NSW, Australia
 University of New South Wales, Sydney, NSW, Australia
 Universidad de Alicante, Alicante, Spain
 Filene Research Council, Phoenix, AZ
 Universitat Autònoma de Barcelona, Barcelona, Spain
 CORE, Université Catholique de Louvain, Louvain-la-Neuve, Belgium
- 1995: ASSA Meetings, Washington, DC
 University of Copenhagen, Copenhagen, Denmark
 Advanced Workshop on Efficiency Measurement, Odense University, Odense, Denmark
 European Economic Association Meetings, Prague, The Czech Republic
 University of Copenhagen, Copenhagen, Denmark
 University of Zagreb, Zagreb, Croatia
 Katholieke Universiteit Leuven, Leuven, Belgium
 Fourth European Workshop on Efficiency and Productivity Measurement, CORE,
 Université Catholique de Louvain, Louvain-la-Neuve, Belgium
 University of Sydney, Sydney, NSW, Australia
 New England Conference on Efficiency and Productivity, University of New England,
 Armidale, NSW, Australia
 University of New South Wales, Sydney, NSW, Australia
 University of Adelaide, Adelaide, SA, Australia
 University of Auckland, Auckland, New Zealand
 Workshop on Monitoring the Health of the Tax System, Inland Revenue Department,
 Wellington, New Zealand
 First Annual Seminar on Efficiency in New Zealand Industry, Wellington, New Zealand
- 1996: Workshop on Applying Efficiency Analysis to Engineering and the Social Sciences,
 Union College, Schenectady, NY
 University of New South Wales, Sydney, NSW, Australia
 Filene Research Institute Research Council Meeting, San Diego, CA
 INFORMS Meetings, Washington, DC
 Filene Research Institute Research Council Meeting, Marina del Rey, CA
 Southern Economic Association Meetings, Washington, DC
 Workshop on Research in Cooperative Societies, Brisbane, QLD, Australia
- 1997: University of Nebraska, Lincoln, NE
 Central Queensland University, Sydney, NSW, Australia
 University of Canterbury, Christchurch, New Zealand
 Inland Revenue Department, Wellington, New Zealand
 Workshop on the Performance of Financial Institutions, Wharton Financial Institutions Center,
 University of Pennsylvania, Philadelphia, PA

- Workshop on the Health of the New Zealand Tax System, Inland Revenue Department,
Wellington, New Zealand
 Taipei International Conference on Efficiency and Productivity Growth, Taipei, Taiwan, ROC
 EURO/INFORMS Joint International Meeting, Barcelona, Spain
 Instituut voor Onderzoek van Overheidsuitgaven, The Hague, The Netherlands
 Fifth European Workshop on Efficiency and Productivity Analysis, Copenhagen, Denmark
 International Conference on Public Sector Efficiency, University of New South Wales,
 Sydney, NSW, Australia
 Academia Sinica, Taipei, Taiwan, ROC
 Council for Economic Planning and Development, Taipei, Taiwan, ROC
- 1998: Conference on Consolidation in the Financial Services Industry, Federal Reserve Bank of NY,
 New York, NY
 University of West Virginia, Morgantown, WV
 University of Georgia, Athens, GA
 Workshop on Efficiency and Productivity, Universidad de Oviedo, Spain
- 1999: University of New England, Armidale, NSW, Australia
 Baptist University of Hong Kong
 Taipei International Conference on Efficiency and Productivity Growth, Taipei, Taiwan, ROC
 Minisymposium on Efficiency, Firm Size and Productivity Growth, Wageningen Agricultural
 University, Wageningen, The Netherlands
 Sixth European Workshop on Efficiency and Productivity Analysis, Copenhagen, Denmark
 PhD Conference in Economics and Business, University of Western Australia, Perth, WA,
 Australia
 Productivity Commission, Melbourne, VIC, Australia
- 2000: Electricity Supply Association of Australia, Sydney, NSW, Australia
 International Conference on Sustainable Energy: New Challenges for Agriculture and
 Implications for Land Use, Wageningen University, Wageningen, The Netherlands
 Banking and Finance Workshop, Miguel Hernandez University, Alicante, Spain
 II Oviedo Workshop on Efficiency and Productivity, Universidad de Oviedo, Spain
 Tamkang University, Taipei, Taiwan, ROC
 Federal University of Rio de Janeiro, Brazil
 XXXII Brazilian Operations Research Society, Universidade Federal de Viçosa, Minas Gerais,
 Brazil
- 2001: World Health Organization Meeting on Health System Performance, New Orleans, LA
 Productivity Commission, Melbourne, VIC, Australia
 Workshop on DEA, Southern Denmark University, Odense, Denmark
 VII European Workshop on Efficiency and Productivity Analysis, Universidad de Oviedo, Spain
 University of Wisconsin, Madison, WI
- 2002: Easter 2002 Workshop on Efficiency and Productivity Analysis, University of Leicester
 Management Centre, Leicester, UK
 Aston Business School, University of Aston, Birmingham, UK
 Australasian Meetings of the Econometric Society, Queensland University of Technology,
 Brisbane, QLD, Australia
 University of Southern Queensland, Toowoomba, QLD, Australia
 Asia Conference on Efficiency and Productivity Growth, Academia Sinica, Taipei, Taiwan
 Federal University of Rio de Janeiro, Brazil
- 2003: University of Queensland, Brisbane, QLD, Australia
 Universitat Autònoma de Barcelona, Spain
 Universidad Miguel Hernandez, Spain
 Federal University of Rio de Janeiro, Brazil

VIII European Workshop on Efficiency and Productivity Analysis,
Universidad de Oviedo, Spain
Katholieke Universiteit Leuven, Leuven, Belgium
CORE, Université Catholique de Louvain, Louvain-la-Neuve, Belgium

2004: Université Laval, Quebec, Canada
Econometric Society Australasian Meetings, Melbourne, VIC, Australia
Asia Pacific Productivity Conference, Brisbane, QLD, Australia
Productivity Commission, Melbourne, Australia
Conference on "Quantitative Tools for Microeconomic Policy Analysis," Canberra, Australia