# VITAE

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PLACE AND DATE OF BIRTH: Chicago, Illinois
June 13, 1940

CITIZENSHIP: U.S.

MARITAL STATUS: Married; one child

EDUCATION: Ph.D., Economics, University of California (Berkeley), June 1969
(Science Fellowship, U.C. Berkeley, 1966-67)
M.A., Economics, San Diego State University, August 1963
B.A., Economics, San Diego State University, June 1962

Ph.D. FIELDS OF SPECIALIZATION:

International Trade
Economic Development
Micro/Macro Theory

Ph.D. THESIS TOPIC:

The Effective Rate of Protection
In Argentina
(Chairman: Albert Fishlow)

AWARDS: Ekonomie hedersdoktorer, University of Gothenburg, Gothenburg, Sweden
October, 2000 (honorary doctorate in Economics).

OUTSIDE ACTIVITIES: Member of the Editorial Boards of the:
Journal of Payments Strategy & Systems

Visiting Fellow, Payment Cards Center, Federal Reserve Bank of Philadelphia

ACADEMIC EXPERIENCE:

Professor, Fannie Wilson Smith Eminent Scholar Chair in Banking, Department of Finance, Florida State University, Tallahassee, Florida. August 1991 - present.

Visiting Research Professor, University of Wales, Bangor Business School, Wales, U.K. Summers of 2007 and 2008.

Visiting Professor, Bertil Danielsson Guest Professor, School of Economics and Commercial Law, University of Gothenburg, and Stockholm School of Economics, Sweden, May, 1999.

Lecturer (Professor), Department of Economics, Virginia Polytechnic Institute and State University, Northern Virginia Graduate Program in Economics. January 1985 - June 1985.

Associate Professor, Department of Economics, Tulane University, New Orleans, Louisiana. July 1971 - May 1973.

Assistant & Associate Professor, Department of Economics, San Francisco State University, San Francisco, California. September 1967 - June 1971; September 1973 - June 1974.

Teaching Assistant, Department of Economics, University of California, Berkeley, California. September 1964 - June 1966.

TEACHING FIELDS:

| Undergraduate: | Graduate: |
|---|---|
| Multinational Financial Management | Financial Institutions |
| Short-Term Financial Management | Managerial Economics |
| Senior Seminar in Banking | Multinational Financial Management |
| International Trade | International Trade |
| Econometrics | Econometrics |
| Quantitative Methods in Business | |
| Micro/Macro Economic Theory | |

GOVERNMENT EXPERIENCE:

Vice President & Payments System Adviser, Federal Reserve Bank of Richmond, Richmond, Virginia, January 1986 - August 1991.

Duties: Policy work on payments system issues (systemic risk, changes in payments practices, and electronic payments) and research in micro banking (scale, scope, and product mix effects in banking).

Assistant Director, Division of Research and Statistics, Board of Governors of the Federal Reserve System, Washington, D.C., February 1985 - January 1986.

Duties: Policy work on micro-banking issues, such as payments system risks, bank failure, deposit insurance, and expansion of bank powers. Supervision of the Financial Studies and Financial Structure sections in the Research and Statistics Division (22 economists and 10 support personnel).

Economist and Chief, Financial Studies Section, Division of Research and Statistics, Board of Governors of the Federal Reserve System, Washington, D.C. February 1975 - February 1985. Assumed duties of Chief of the Section in 1980.

Duties: Research and policy work on micro-banking and payments system issues. Administrative duties as Section Chief involved the supervision of 8 economists and 3 support personnel.

Economist, Research and Analysis Branch, Interindustry Economics Division, U.S. Department of Commerce, Washington, D.C. May 1973 - August 1973; June 1974 - February 1975.

UNPUBLISHED WORKING PAPERS:

"A Frontier Measure of U.S. Banking Competition", 2014, revised (W. Bolt, joint author).

“Assessing Bank Competition for Consumer Loans”, 2014 (W. Bolt, joint author)

“Payment Costs, Competition, and Pricing”, 2009, European Central Bank working paper, December (No. 1136).

"Settlement Finality as a Public Good in Large-Value Payment Systems", 2005 (H. Pagès, joint author), European Central Bank working paper.

"Public Good Issues in Target: Natural Monopoly, Network Effects, Scale Economies and Cost Allocation", 2005 (W. Bolt, joint author), European Central Bank working paper.

RESEARCH IN PROGRESS:

Electronic Payments in Europe: Past gains, their Sources, and Future Limits (W. Bolt, joint author).

PUBLICATIONS:

“Competition in Bank-Provided Payment services”, Journal of Financial Market Infrastructures, 2, forthcoming 2014 (W. Bolt, joint author).

“Cost Savings from Check 21 Electronic Payment Legislation”, Journal of Money, Credit and Banking, 45, October 2013: 1415-1429 (R. Hunt, joint author).

"A Revenue-Based Frontier Measure of Banking Competition", in P. Molyneux (ed.), Bank Performance, Risk and Firm Financing, 2011 (S. Carbo and F. Rodriquez, joint authors): 135-153.

"Retail Payments: New Contributions, Empirical Results, and Unanswered Questions", Journal of Banking and Finance, 34, August 2010: 1729-1737.

"Bank Competition Efficiency in Europe: A Frontier Approach”, Journal of Banking and Finance, 34, August 2010: 1808-1817 (W. Bolt, joint author).

"Bank Size and the Trade-Off Between Cost Efficiency and Systemic Risk", Perspectivas del Sistema Financiero, 99, 2010: 1-18 (published in Spanish by Funcas).

"Efforts to Expand Sales Using Reward Programs", Cuadernos de Informacion Economica, 2010 (published in Spanish by Funcas).

"Payment Scale Economies from Individual Bank Data", Economics Letters, 105, December 2009: 293-295 (W. Bolt, joint author).

"Payment Systems", Oxford Handbook of Banking reference volume, A. Berger, P. Molyneux, and J. Wilson, editors, December 2009 (J. McAndrews, joint author).

"Estimating the Intensity of Price and Non-Price Competition in Banking”, Banks and Banking Systems, 4, Summer, 2009: 4-19 (S. Carbo, J. Fernandez, and J. Maudos, joint authors).

"Technological Innovation in Banking: The Shift to ATMs and Implicit Pricing of Network Convenience", in L. Anderloni, D. Llewellyn, and R. Schmidt (eds.), Financial Innovation in Retail and Corporate Banking, 2009: 89-110, Edward Elgar Publishing, U.K. (S. Carbo, joint author).

"Cross-Country Comparisons of Competition and Pricing Power in European Banking", Journal of International Money and Finance, February 2009:115-134 (S. Carbo, J. Maudos, and P. Molyneux, joint authors).

"A Cost-Benefit Analysis of a Two-Sided Card Market", Moneda y Credito, 227, Fall, 2008: 7-36 (in English: S. Carbo, J. Linares, and F. Rodriguez, joint authors).

“Reducing Payment Processing Costs: Scale Economies and SEPA", Journal of Payments Strategy & Systems, 2, April 2008: 250-258 (W. Bolt, joint author).

"The Effect of Transaction Pricing on the Adoption of Electronic Payments: A Cross-Country Comparison", International Journal of Central Banking, 4, March 2008: 89-123 (W. Bolt and R. Uittenbogaard, joint authors).

"Are Costs Lower or Revenues Higher When Bank Loans are Tied to Deposits?", Papeles de Economia Espanola, 114, 2007: 111-123.

"Payment Network Scale Economies, SEPA, and Cash Replacement", Review of Network Economics, 6, December 2007: 453-473 (W. Bolt, joint author).

"Do Cross-Country Differences in Bank Efficiency Support a Policy of 'National Champions'?", Journal of Banking and Finance, 31, July 2007: 2173-2188 (S. Carbo and R. Lopez, joint authors).

"Opening the Black Box: Finding the Source of Cost Inefficiency", Journal of Productivity Analysis, 27, March 2007: 209-220 (S. Carbo and R. Lopez, joint authors).

“Benefits from a Changing Payment Technology in European Banking", Journal of Banking and Finance, 30, June 2006: 1631-52 (M. Willesson, G. Bergendahl, T. Lindblom, joint authors).

"Costs, Cash Substitution, Bank Benefits, and Pricing of Payment Cards", Papeles de Economia Espanola, Fundacion de las Cajas de Ahorros, Madrid, 2006: 46-58 (written in English, translated into Spanish, Proceedings of a Conference on Card Interchange Fees).

“Electronic Payments and ATMs: Changing Technology and Cost Efficiency in Banking”, in Balling, M., F. Lierman, and A. Mullineaux (eds.), Competition and Profitability in European Financial Services. Strategic, Systemic and Policy Issues, Routledge, Abingdon (UK), 2006: 96-113 (S. Carbo and R. Lopez, joint authors).

"Use and Substitution of Cash and Electronic Payments in Asia", Occasional Paper No. 42, South East Asian Central Banks (SEACEN) Research and Training Center, Kuala Lumpur, Malaysia, 2005 (T. Khiaonarong, joint author).

”Scale Economies, Bank Mergers, and Electronic Payments: A Spline Function Approach”, Journal of Banking and Finance, 28, July 2004: 1671-96 (B. Vale, joint author).

"The Future of Cash: Falling Legal Use and Implications for Government Policy", Journal of International Financial Markets, Institutions & Money, 14, July 2004: 221-33 (A. Kaloudis and G. Owre, joint authors).

“Replacement of Cash by Cards in U.S. Consumer Payments”, Journal of Economics and Business, 56, May/June 2004: 211-25.

“Predicted and Actual Costs from Individual Bank Mergers”, Journal of Economics and Business, 56, March-April, 2004: 137-57 (S. Carbo, joint author).

"Bank Deregulation is Better than Mergers", Journal of International Financial Markets, Institutions & Money, 13, December 2003: 429-49 (S. Carbo and F. Rodriguez, joint authors).

“The Falling Share of Cash Payments in Spain", Moneda y Credito, No. 217, 2003: 167-89 (S. Carbo and R. Lopez, joint authors).

”The Euro’s Effects on Payment Systems”, in J. Donges (editor), The Financial System in the Europe of the

Euro, Foundation ICO, Madrid, Spain, 2003.

"What Does it Cost to Make a Payment?", Review of Network Economics, June 2003, 159-74 (M. Willesson, T. Lindblom, G. Bergendahl, joint authors).

"Deregulation, Bank Competition, and Regional Growth", Regional Studies, May 2003, 227-37 (S. Carbo and F. Rodriguez, joint authors).

"Bias in Malmquist Index and Cost Function Productivity Measurement in Banking", International Journal of Production Economics, January 2002, 177-88 (A. Lozano, joint author).

"Sweep Accounts, Reserve Management, and Interest Rate Volatility", Journal of Economics and Business, July/August 2001, 387-404 (D. VanHoose, joint author).

"Substitution of Noncash Payment Instruments for Cash in Europe", Journal of Financial Services Research, April/June 2001, 131-45 (J. Snellman and J. Vesala, joint authors).

"Realizing the Gains from Electronic Payments: Costs, Pricing and Payment Choice", Journal of Money, Credit and Banking, May 2001, 216-234 (M. Kim and B. Vale, joint authors).

"Central Banks and the Payment System", in Santomero, Viotti, and Vredin (editors), Challenges for Modern Central Banking. Kluwer, 2001.

"The Check's in the Mail: Why the U.S. Lags in the Adoption of Cost-Saving Electronic Payments", Journal of Financial Services Research, February 2000, 17-39 (L. Pulley and J. Vesala, joint authors).

"Cost Reductions in Electronic Payments: The Roles of Consolidation, Economies of Scale, and Technical Change", Journal of Banking and Finance, February 1999, 391-421 (D. Hancock and J. Wilcox, joint authors).

"Advances in Financial Market Clearing and Settlement", Brookings-Wharton Papers on Financial Services, 1998.

"Consistency Conditions for Regulatory Analysis of Financial Institutions: A Comparison of Frontier Efficiency Methods", Journal of Economics and Business, March/April 1998, 85-114 (P. Bauer, A. Berger, and G. Ferrier, joint authors).

"Payment Transactions, Instruments, and Systems: A Survey", Journal of Banking and Finance, December 1997, 1573-1624 (D. Hancock, joint author).

Cost Recovery and Pricing of Payment Services: Theory, Methods, and Experience, The World Bank, Washington, D.C., October 1997 (R. Keppler and F. Montes-Negret, joint authors).

"Efficiency of Financial Institutions: International Survey and Directions for Future Research", European Journal of Operational Research, April 1997, 175-212 (A. Berger, joint author). Republished in J. Hall (ed.), The Regulation and Supervision of Banks, Elsevier Science Ltd., 2000, and in P. Harker and S. Zenios (eds.), Performance of Financial Institutions, Cambridge University Press, 2000.

"The Effects of Megamergers on Efficiency and Prices: Evidence from a Bank Profit Function", Review of Industrial Organization, February 1997, 95-139 (J. Akhavein and A. Berger, joint authors).

"Banks' Responses to Deregulation: Profits, Technology, and Efficiency", Journal of Money, Credit, and Banking, February 1997, 73-93 (L. Pulley, joint author). Republished in M. Hall (editor), The Regulation and Supervision of Banks, Edward Elgar Publishing Limited, United Kingdom, 2000.

"Computing DEA/AR Efficiency and Profit Ratio Measures with an Illustrative Bank Application", Annals of Operations Research, Volume 68, 1996, 303-27 (R. Thompson, P. Dharmapala, W. Taylor, and R. Thrall, joint authors).

"Do Consumers Pay for One-Stop Banking? Evidence from an Alternative Revenue Function", Journal of Banking and Finance, November 1996, 1601-21 (A. Berger and L. Pulley joint authors).

"Cash, Paper, and Electronic Payments: A Cross-Country Analysis", Journal of Money, Credit, and Banking, November 1996, Part II, 914-39 (L. Pulley and J. Vesala, joint authors).

The Evolution of Payments in Europe, Japan, and the U.S.: Lessons for Emerging Market Economies, The World Bank, Washington, D.C., October 1996 (S. Sato, M. Tsurumi and J. Vesala, joint authors).

"Assessing the FDIC's Premium and Examination Policies Using 'Soviet' Put Options", Journal of Banking and Finance, May 1996, 699-721 (T. Epps and L. Pulley, joint authors).

Transforming Payment Systems: Meeting the Needs of Emerging Market Economies, The World Bank, Washington, D.C., 1995 (S. Sato, joint author).

Payment Systems: Principles, Practices, and Improvements, The World Bank, Washington, D.C., 1995 (translated into Japanese by S. Sato and republished in Japan).

"The Role of Fixed Costs and Cost Complementarities in Determining Scope Economies and the Cost of Narrow Banking Proposals", Journal of Business, July 1993, 437-62 (L. Pulley, joint author).

"Cost and Technical Change: Effects of Bank Deregulation", Journal of Productivity Analysis, June 1993, 9-34.

"Bank Efficiency Derived from a Profit Function", Journal of Banking and Finance, April 1993, 317-47 (A. Berger and D. Hancock, joint authors).

"Efficiency and Productivity Growth in U.S. Banking", in Harold Fried, C.A. Knox Lovell, and Shelton Schmidt (Editors), The Measurement of Productive Efficiency: Techniques and Applications, Oxford University Press, Oxford, England, 1993, 386-413 (P. Bauer and A. Berger, joint authors).

"Measurement and Efficiency Issues in Commercial Banking", in Zvi Griliches (Editor), Output Measurement in the Service Sectors, National Bureau of Economic Research, Studies in Income and Wealth, Volume 56, University of Chicago Press, 1992, 245-79 (A. Berger, joint author).

"Megamergers in Banking and the Use of Cost Efficiency as an Antitrust Defense", The Antitrust Bulletin, Fall 1992, 541-600 (A. Berger, joint author).

"Flow Versus Stock Indicators of Banking Output: Effects on Productivity and Scale Economy Measurement", Journal of Financial Services Research, August 1992, 115-35.

"Bank Mergers", in The New Palgrave Dictionary of Money and Finance, Peter Newman, Murray Milgate, and John Eatwell (Editors), Macmillan Press Reference Books, London, England, 1992.

"The Dominance of Inefficiencies Over Scale and Product Mix Economies in Banking", Journal of Monetary Economics, August 1991, 117-48 (A. Berger, joint author).

"Market Failure and Resource Use: Economic Incentives to Use Different Payment Instruments", in The U.S. Payments System: Efficiency, Risk, and the Role of the Federal Reserve, David Humphrey (Editor), Kluwer Academic Publishing, Norwell, MA, 1990 (A. Berger, joint author).

"New Banking Powers: A Portfolio Analysis of Bank Investment in Real Estate", Journal of Banking and Finance, July 1989, 355-66 (R. Rosen, P. Lloyd-Davies, and M. Kwast joint authors).

"Interstate Banking and the Payments System", Journal of Financial Services Research, January 1988, 131-45 (A. Berger, joint author).

"Competitive Viability in Banking: Scale, Scope, and Product Mix Economies", Journal of Monetary Economics, December 1987, 501-20 (A. Berger and G. Hanweck, joint authors).

"Payments System Risk, Market Failure, and Public Policy", in Electronic Funds Transfers and Payments: The Public Policy Issues, Elinor Solomon (Editor), Kluwer-Nijhoff Publishing, Boston, 1987, 83-109.

"Payments Finality and Risk of Settlement Failure", in Technology and the Regulation of Financial Markets, Anthony Saunders and Lawrence White (Editors), Lexington Books/Solomon Brothers Center Series on Financial Institutions and Markets, New York, 1986, 97-120.

"The Role of Interstate Banking in the Diffusion of Electronic Payments Technology", in Technological Innovation, Regulation, and the Monetary Economy, Colin Lawrence and Robert Shay (Editors), Ballinger Publishing, Cambridge, MA, 1986, 13-52 (A. Berger, joint author).

"Resource Use in Federal Reserve Check and ACH Operations After Pricing", Journal of Bank Research, Spring 1985, 45-53.

"Costs and Scale Economies in Bank Intermediation", in R. Aspinwall and R. Eisenbeis (Editors), Handbook for Banking Strategy, Wiley & Sons, New York, 1985, 745-83.

The U.S. Payments System: Costs, Pricing, Competition and Risk, Monograph Series in Finance and Economics, New York University, New York, Nos. 1 & 2, 1984, 1-135.

"Scale Economies in Banking: A Restructuring and Reassessment", Journal of Money, Credit, and Banking, November 1982, 435-56 (G. Benston and G. Hanweck, joint authors).

"Scale Economies at Automated Clearinghouses", Journal of Bank Research, 12, Summer 1981, 71-81.

"Intermediation and Cost Determinants of Large Bank Liability Composition", Journal of Banking and Finance, June 1981, 167-85.

"Economies to Scale in Federal Reserve Check Processing Operations", Journal of Econometrics, January 1981, 155-73.

"Bank Use of Downstreamed Commercial Paper and the Impact of Reserve Requirements in Controlling Liability Usage", Journal of Economics and Business, Winter 1980-81, 109-14 (D. Savage, joint author).

"Feedback Effects in the Market Regulation of Bank Leverage: A Time-Series and Cross-Section Analysis", Review of Economics and Statistics, May 1980, 277-80 (B. Gendreau, joint author).

"Are there Economies of Scale in Check Processing at the Federal Reserve?", Journal of Bank Research, 11, Spring 1980, 8-19.

"Comments" on M.F. Mohr, "The Long-Term Structure of Production, Factor Demand, and Factor Productivity in U.S. Manufacturing Industries", in J. Kendrick and B. Vaccara (Editors), New Developments in Productivity Measurement and Analysis, Studies in Income and Wealth, Vol. 44, National Bureau of Economic Research, 1980, 229-38.

"Branch Laws and Banking Offices", Journal of Money, Credit, and Banking, May 1979, 227-30 (D. Savage, joint author).

"Large Bank Intra-Deposit Maturity Composition: CDs and Small Time Deposits 1970-77", Journal of Banking and Finance, April 1979, 43-66.

"Bank Examination Data as Predictors of Net Loan Losses", Journal of Money, Credit, and Banking, November

1978, 491-504 (D. Graham, joint author).

"Substitution in an Input-Output Table", Journal of Economics and Business, Fall 1977, 38-45.

"Substitutions Among Energy Inputs in U.S. Manufacturing", Atlantic Economic Journal, July 1977, 43-52.

"100% Deposit Insurance: What Would It Cost?", Journal of Bank Research, 7, Autumn 1976, 192-8.

"Substituting Intermediates for Capital and Labor with Alternative Functional Forms: An Aggregate Study", Applied Economics, 8, 1976, 59-68 (B. Wolkowitz, joint author).

"Substitution Among Capital, Labor and Natural Resource Products in American Manufacturing", Journal of Political Economy, February 1975, 57-82 (J.R. Moroney, joint author).

"Estimates of Factor-Intermediate Substitution and Separability", Southern Economic Journal, January 1975, 531-534.

"Regional Multiplier and Effective Protection: A Synthesis", Journal of Regional Science, April 1972, 45-55.

"Effective Protection, Income Multipliers, and Regional Impact Analysis", in H.G. Johnson and H.G. Grubel (Editors), Effective Tariff Protection, General Agreements on Tariffs and Trade and Graduate Institute of International Studies, Geneva, Switzerland, 1971, 67-83.

"On Substitution and the Effective Rate of Protection", International Economic Review, October 1970, 488-96 (T. Tsukahara, Jr., joint author).

"Demand Inflation and Effective Protection", Southern Economic Journal, October 1970, 144-150.

"The Determinants and Structure of Import Substitution", Western Economic Journal, September 1970, 246-258.

"Measuring the Effective Rate of Protection: Direct and Indirect Effects", Journal of Political Economy, September/October 1969, 834-44.

"Changes in Protection and Inflation in Argentina, 1953-1966", Oxford Economic Papers, July 1969, 196-219.

"Labor Productivity and Capital Intensity: A Note", Western Economic Journal, December 1968, 413-18.

"Note on Import Substitution: The Case of Brazil", Journal of Development Studies, October 1966, 76-86.

FEDERAL RESERVE AND OTHER PUBLICATIONS:

Credit Unions and Asset Accumulation by Lower-Income Households, Filene Research Institute and the Center for Credit Union Research, School of Business, University of Wisconsin-Madison, 1999 (J. Caskey, joint author).

"Unleashing Electronic Payments", Banking Strategies, November/December 1998, 58-68 (L. Pulley, joint author).

Prospective Changes in Payments: Implications for Credit Unions, Filene Research Institute and the Center for Credit Union Research, School of Business, University of Wisconsin-Madison, 1997.

"The Case for Downsizing the Fed", Banking Strategies, January/February 1997, 30-7 (G. Benston, joint author).

"Changes in Retail Payments: Will Banks Retain Control?", Journal of Retail Banking Services, Summer 1996, 51-6.

"The Economics of Electronic Benefit Transfer Payments", Federal Reserve Bank of Richmond Economic Quarterly, Spring 1996, 77-94.

"Delivering Deposit Services: ATMs Versus Branches", Federal Reserve Bank of Richmond Economic Quarterly, Spring 1994, 59-81.

"Bank Scale Economies, Mergers, Concentration, and Efficiency: The U.S. Experience", La Revue d' Economie Financiere, Winter 1993, 123-154 (A. Berger joint author--published in French).

"Productivity in Banking and Effects from Deregulation", Federal Reserve Bank of Richmond Economic Review, March/April 1991, 16-26.

"Why Do Estimates of Bank Scale Economies Differ?", Federal Reserve Bank of Richmond Economic Review, September/October 1990, 38-50.

"Market Responses to Pricing Fedwire Daylight Overdrafts," Federal Reserve Bank of Richmond Economic Review, May/June 1989, 23-34.

"The Check Processing Market After Interstate Banking", The Bankers Magazine, September/October 1988, 34-39 (A. Berger, joint author).

Controlling Risk in the Payments System, Board of Governors of the Federal Reserve System, August 1988 (D. Lindsey, M. Gelfand, C. Barrett, A. Gilbert, O. Ireland, J. Lyons, and J. Marquardt, joint authors).

"Future Directions in Payment Risk Reduction", Journal of Cash Management, March/April 1988, 8-14.

"The Impact of Risk-Based Capital on Bank Operations", The Bankers Magazine, March/April 1988, 22-7 (S. Humphrey, joint author).

"Daylight Overdrafts and Payments System Risk", Federal Reserve Bulletin, November 1987, 839-52 (T. Belton, M. Gelfand, and J. Marquardt, joint authors).

"Cost Dispersion and the Measurement of Economies in Banking", Federal Reserve Bank of Richmond Economic Review, May/June 1987, 24-38.

"Intraday Credit: Risk, Value, and Pricing", Federal Reserve Bank of Richmond Economic Review, January/February 1987, 3-14 (D. Mengle and B. Summers, joint authors).

"Reducing Interbank Risk on Large Dollar Payment Networks", Journal of Cash Management, September/October 1984, 20-7.

"Costs, Scale Economies, Competition, and Product Mix in the U.S. Payments Mechanism", Staff Studies, No. 115, Federal Reserve Board, April 1982, 1-18.

"Check Processing at Federal Reserve Offices", Federal Reserve Bulletin, February 1979, 97-103 (J. Brundy and M. Kwast, joint authors).

OUTSIDE CONSULTING:

Law firm (debit card scale economies, average payment costs, and the Durbin amendment)

Law firm (float issues related to check vs. ACH bill payment services)

Bank of France (bank merger analysis project)

European Central Bank (large value payment networks--Target2--project)

Competition Bureau, Canada (large bank mergers and propane gas merger projects)

Federal Reserve System (Functional Cost Analysis project)

U.S. Department of the Treasury (Electronic Benefit Transfer project)

National Automated Clearing House Association (projects dealing with ACH pricing, settlement risk on CHIPS, lockbox conversion of checks to ACH payments, same-day ACH settlement/finality)

RESEARCH VISITS OR CONTRACT RESEARCH:

University of Wales, Bangor, Wales, U.K., two summers as visiting research professor

De Nederlandsche Bank (Central Bank of the Netherlands), one month visit: estimation of effects of per transaction pricing on payment instrument use

Fundacion de las Cajas de Ahorros Confederadas (FUNCAS), Spain (six years of contract research dealing with a series of banking and payment topics with focus on Spain and Europe)

Fundacion BBVA , Spain (two-year grant with three other international researchers for banking research)

Bank of Canada (Central Bank of Canada--three day visit: presentation of payment and banking merger research)

Central Bank of Thailand (five day visit: presentation of payment research)

Norges Bank (Central Bank of Norway--three month visit: effects of banking mergers; legal use of cash)

Reserve Bank of Australia (Central Bank of Australia--two week visit: presentation of payment research)