

HANS-JOACHIM VOTH
DEPARTMENT OF ECONOMICS
UNIVERSITY OF ZURICH

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www.econ.uzh.ch/faculty/voth.html

Date of Birth: 31-3-1968

Citizenship: German

SUMMARY

Academic and Professional Appointments

University of Zurich, Economics Department	Full Professor (2014-)
UBS Center for Economics in Society	Affiliated Professor (2014-)
Catalan Institute for Advanced Study (ICREA)	Research Professor (2005-13; on leave)
Universitat Pompeu Fabra, Economics Department	Full Professor (2003-13) Associate Professor (2001-03) Assistant Professor (1998-2001)
Centre de Recerca en Economia Internacional (CREI)	Research Affiliate (2004-13; on leave)
Centre for History and Economics, King's College, Cambridge	Associate Director (1999-2003)
McKinsey & Company, Inc., Munich	Associate and Senior Associate (1996-97)
Clare College, Cambridge	Junior Research Fellow (1995-96)

Visiting Positions

Princeton University, Economics	Visiting Scholar (2007-08)
Stern School of Business, New York University, Economics Department	Visiting Professor of Economics (2004-05)
MIT, Economics Department	Visiting Professor of Economics (2001-02; 03-04)
Stanford University	Visiting Assistant Professor (1997-98)
<i>Shorter visits:</i> Yale SOM (2012); Australian National University, RISS (2001, 2002); Nuffield College (1999)	

Principal Distinctions and Honors

- Editor, *Explorations in Economic History* (from 2013).
- Associate Editor, *Quarterly Journal of Economics* (from 2011).
- Editor, *European Review of Economic History* (2008-12).
- Associate Editor, *Journal of Economic Growth* (from 2012).
- Advanced Investigator Grant, awarded by the European Research Council (ERC), for the project *Asset Returns in Times of Insecurity* (€ 2.1 mio, 2009-2014).
- Explorations Prize for the Best Article in 2010-11 in *Explorations in Economic History* (joint with Mauricio Drelichman).
- R.H. Tawney Memorial Lecture, Economic History Society Annual Conference, Cambridge, UK (April 2011).

Fellow of the Royal Historical Society (from 2009).

Listed in "Who Is Who in the World?" (from 2007).

Philip Leverhulme Prize Fellowship (£50,000) for outstanding researchers under the age of 36 (2001-04).

Ramon y Cajal Fellowship for research excellence, awarded by the Spanish Ministry of Education (2002-07).

Research Fellow, International Macroeconomics Program, CEPR, London (from 2001).

Gino Luzzatto Prize, awarded by the European Historical Economics Society for the best dissertation in economic history (1996-1999).

Postdoctoral Fellowship, Stanford University, Social Science History Institute (1997-98).

Alexander Gerschenkron Prize, awarded by the Economic History Association for the outstanding dissertation in international economic history (1996).

Research Interests

Origins and Persistence of Culture over the Long Run.

Long-Run Growth and Development.

Sovereign Debt in Historical Perspective.

Asset Market Volatility, Political Risk, and Economic Performance.

Living Standards, Labor Supply, and Productivity Growth During the Industrial Revolution.

The Great Depression and the German Interwar Economy.

Education

Nuffield College, Oxford University D.Phil.
(1994-96)

European University Institute, Florence Doctoral Student
(1993-94)

St. Antony's College, Oxford University M.Sc. in Economic History
(1992-93)

Freiburg University (1989-91) Student in Economics and History

Bonn University (1989) Student in Economics, History, Philosophy

SCHOLARSHIP

Main refereed articles

- [1] 2014 'Numeracy and the Impact of High Food Prices in Industrializing Britain, 1780-1850' [with Jörg Baten and Dorothee Crayen], *Review of Economics and Statistics*, forthcoming.
- [2] 2013 'How the West 'Invented' Fertility Restriction' [with Nico Voigtländer], *American Economic Review* 103(6): 2227-2264.
- [3] 2013 'The Three Horsemen of Riches: Plague, War and Urbanization in Early Modern Europe' [with Nico Voigtländer], *Review of Economic Studies* 80: 774-811.
- [4] 2012 'Persecution Perpetuated: The Medieval Origins of Anti-Semitic Violence in Nazi Germany' [with Nico Voigtländer], *Quarterly Journal of Economics* 127(3): 1339-1392.

- [5] 2011 'Lending to the Borrower from Hell: Debt and Default in the Age of Philip II, 1556-1598' [with Mauricio Drelichman], *Economic Journal* 121(557): 1205-1227 (lead article).
- [6] 2011 'Serial Defaults, Serial Profits: Returns to Sovereign Lending in Habsburg Spain, 1566-1600' [with Mauricio Drelichman], *Explorations in Economic History* 48(1): 1-19 (lead article).
- [7] 2010 'The Sustainable Debts of Philip II: A Reconstruction of Castile's Fiscal Position, 1566-1596' [with Mauricio Drelichman], *Journal of Economic History* 70(4): 813-42.
- [8] 2008 'Betting on Hitler: The Value of Political Connections in Nazi Germany' [with Thomas Ferguson], *Quarterly Journal of Economics* 123(1): 101-137.
- [9] 2008 'Interest Rate Restrictions in a Natural Experiment: Loan Allocation and the Change in the Usury Laws in 1714' [with Peter Temin], *Economic Journal* 118 (March): 743-58.
- [10] 2008 'Private Borrowing During the Financial Revolution: Hoare's Bank and its Customers, 1702-1724' [with Peter Temin], *Economic History Review* 61(3): 541-64 (lead article).
- [11] 2006 'Why England? Demographic Factors, Structural Change and Physical Capital Accumulation during the Industrial Revolution' [with Nico Voigtlaender], *Journal of Economic Growth* 11(4): 319-61.
- [12] 2005 'Credit Rationing and Crowding Out during the Industrial Revolution: Evidence from Hoare's Bank, 1702-1862' [with Peter Temin], *Explorations in Economic History* 42(3): 325-48.
- [13] 2004 'Riding the South Sea Bubble' [with Peter Temin], *American Economic Review* 94(5): 1654-68.
- [14] 2003 'With a Bang, Not a Whimper: Pricking Germany's "Stockmarket Bubble" in 1927 and the Slide into Depression', *Journal of Economic History* 63(1): 65-99.
- [15] 2003 'Factor Prices and Productivity Growth during the British Industrial Revolution' [with Pol Antràs], *Explorations in Economic History* 40(1): 52-77.
- [16] 2001 'The Longest Years – New Estimates of Labour Input in Britain, 1760-1830', *Journal of Economic History* 61(4):1065-82.
- [17] 2001 'Destined for Deprivation? Intergenerational Poverty Traps in Eighteenth-Century Britain' [with Sara Horrell, Jane Humphries], *Explorations in Economic History* 38(3): 339-65.
- [18] 1998 'Human Capital, Equipment Investment, and Industrialization' [with Jon Temple], *European Economic Review* 42(7): 1343-62.
- [19] 1998 'Time and Work in Eighteenth Century London', *Journal of Economic History* 58(1): 29-58.
- [20] 1996 'Did Smallpox Reduce Height? Stature and the Standard of Living in London, 1770-1873' [with Tim Leunig], *Economic History Review* 49: 541-60.
- [21] 1996 'Physical Exertion and Stature in the Habsburg Monarchy, 1730-1800', *Journal of Interdisciplinary History* 27: 263-75.
- [22] 1995 'Did High Wages or High Interest Rates Bring Down the Weimar Republic?', *Journal of Economic History* 55: 801-21.

Academic books

- [23] 2014 *Lending to the Borrower from Hell: Debt, Taxes, and Default in the Age of Philip II* [with Mauricio Drelichman], Princeton: Princeton University Press, forthcoming.
- [24] 2013 *Prometheus Shackled: Goldsmith Banks and England's Financial Revolution after 1700* [with Peter Temin], Oxford/New York: Oxford University Press.
- [25] 2001 *Time and Work in England, 1750-1830*, Oxford: Oxford University Press.

Other journal articles

- [26] 2014 'Debt, Default and Empire: State Capacity and Economic Development in England and Spain in the Early Modern Period' (2011 Tawney Lecture), *Economic History Review*, forthcoming.
- [27] 2013 'Gifts of Mars: Warfare and Europe's Early Rise to Riches' [with Nico Voigtländer], *Journal of Economic Perspectives*. 27(4), forthcoming.
- [28] 2013 'Married to Intolerance: Attitudes Towards Intermarriage in Germany, 1900-2006', *American Economic Review. Papers and Proceedings* 103(3): 1-9.
- [29] 2010 'Free Flows, Limited Diversification: Openness and the Fall and Rise of Stock Market Correlations, 1890-2001' [with Denis Quinn], *NBER-ISOM Macro Annual 2009*, vol. 6: 7-39 (lead article).
- [30] 2009 'Malthusian Dynamism and the Rise of Europe: Make War, not Love' [with Nico Voigtländer], *American Economic Review. Papers and Proceedings* 99(2): 248-54.
- [31] 2008 'A Century of Global Equity Market Correlations' [with Dennis Quinn], *American Economic Review. Papers and Proceedings* 98(2): 535-40.
- [32] 2008 'Debt Sustainability in Historical Perspective' [with Mauricio Drelichman], *Journal of the European Economic Association. Paper and Proceedings* 6(2-3): 657-67.
- [33] 2006 'Banking as an Emerging Technology: Hoare's Bank 1702-1724' [with Peter Temin], *Financial History Review* 13(2): 149-78.
- [34] 2003 'Living Standards During the Industrial Revolution: An Economists' Guide', *American Economic Review. Papers and Proceedings* 93(2): 221-226.
- [35] 2000 'The Grapes of War: Danish Shipping to the Mediterranean, 1750-1806' [with Dan Anderson], *Scandinavian Economic History Review* 48: 5-27.
- [36] 1998 'Stature and Relative Deprivation: Fatherless Children in Early Industrial Britain' [with Jane Humphries, Sara Horrell], *Continuity and Change* 13: 73-115.
- [37] 1995 'Infant Mortality during the First World War', *Annales de Démographie Historique*: 291-307.
- [38] 1995 'Work, Height, and Nutrition: Recasting the "Austrian Model"', *Journal of Interdisciplinary History* 26: 627-636.
- [39] 1994 'Seasonality of Conceptions as a Source for Historical Time-Budget Analysis: Tracing the Disappearance of Holy Days in Early Modern England', *Historical Methods* 27.
- [40] 1994 'Wages, Investment and the Fate of the Weimar Republic: A Long-Term Perspective', *German History* 11: 265-92.

Edited volumes, special issues

- [41] 2004 *Controlling Global Capital* [editor, joint with Barry Eichengreen]. Special issue of the *International Journal of Finance and Economics* 8.

Working papers

- [42] 2013 'Recreating the South Sea Bubble: Evidence from an Experiment in Financial History' [with Giovanni Giusti, Charles Noussair].
- [43] 2013 'Debt Into Growth: Why the Country that Borrowed the Most Industrialized First' [with Jaume Ventura].
- [44] 2013 'Exorcizing Hitler: Denazification and Anti-Semitism in Germany, 1933-2006' [with Nico Voigtländer], CEPR discussion paper 8935.
- [45] 2013 'Bowling for Fascism: Social Capital and the Rise of the Nazi Party in Interwar Germany' [with Shanker Satyanath, Nico Voigtländer]. NBER wp 19201.
- [46] 2013 'Leverage and Beliefs: Personal Experience and Risk Taking in the Amsterdam Repo Market, 1770-1775' [with Peter Koudijs].
- [47] 2011 'Risk Sharing with the Monarch: Excusable Defaults and Contingent Debt in the Age of Philip II, 1556-1598' [with Mauricio Drelichman]. *Revise and resubmit, Journal of Economic History*.
- [48] 2011 'Austerity and Anarchy: Budget Cuts and Social Unrest in Europe, 1919-2009' [with Jacopo Ponticelli], CEPR discussion paper 8513. revised October 2012.
- [49] 2011 'State Capacity and Military Conflict' [with Nicola Gennaioli]. CEPR discussion paper 8699. revised October 2012.
- [50] 2011 'Spinning Welfare: The Gains from Process Innovation in Cotton and Car Production' [with Tim Leunig]. LSE-CEP wp.
- [51] 2009 'Sweet Diversity: Colonial Goods and the Rise of European Living Standards after 1492' [with Jonathan Hersh], CEPR discussion paper 7286. revised June 2011.
- [52] 2007 'Political Risk and Stock Price Volatility: Evidence from the Interwar Period', MIT working paper, February 2002. revised March 2007.

Articles in edited volumes, other publications, comments

- [53] 2013 'Funding Empire: Risk, Diversification and the Underwriting of Early Modern Sovereign Loans' [with Mauricio Drelichman], in: *Festschrift for Joel Mokyr*. forthcoming.
- [54] 2012 'Tightening Tensions - Fiscal Policy and Civil Unrest in Eleven South American Countries, 1937-1995', in: Luis Céspedes, Jordi Galí (eds.), *Fiscal Policy and Macroeconomic Performance*, Santiago: Central Bank of Chile.
- [55] 2011 'Blowing Early Bubbles – Incentives for Exuberance in the South Sea and Mississippi Bubbles', in: William N. Goetzmann, Catherine Labio, K. Geert Rouwenhorst, and Timothy Young (eds.), *The Great Mirror of Folly: Finance, Culture, and the Crash of 1720*, New Haven: Yale University Press.
- [56] 2010 'Hoare's Bank in the Eighteenth Century', in: Laura Cruz and Joel Mokyr (eds.), *The Birth of Modern Europe: Culture and Economy, 1400-1800; Essays in Honor of Jan de Vries*, Leiden/Boston: Brill.

- [57] 2010 'Trading Silver for Gold: 19th Century Asian Exports and the Political Economy of Currency Union' [with Kris Mitchener], in: Robert Barro, Jong-Wha Lee (eds.), *Costs and Benefits of Regional Economic Integration*, Oxford: Oxford University Press.
- [58] 2010 'Understanding Growth in Early Modern Europe' [with Joel Mokyr], in: Broadberry, Stephen and Kevin O' Rourke (ed.). *The Cambridge Economic History of Europe*. Cambridge: Cambridge University Press.
- [59] 2008 'Institutions and the Resource Curse in Early Modern Spain' [with Mauricio Drelichman], in: Helpman, Elhanan (ed). *Institutions and Economic Performance*. Cambridge: Harvard University Press.
- [60] 2007 'South Sea Bubble', entry for Steve Durlauf and L. Blume, eds., *The New Palgrave Dictionary of Economics*.
- [61] 2006 'Comment on Oxley's "Seat of Death and Terror" ' [with Tim Leunig], *Economic History Review*.
- [62] 2004 'Capital Controls in Postwar Europe', CREI Opuscle No. 14 [in English, Castilian, and Catalan].
- [63] 2003 'Editors' Introduction: Symposium on Capital Controls' [with Barry Eichengreen], in: Barry Eichengreen, Hans-Joachim Voth (eds.), *Controlling Global Capital*. Special issue of the *International Journal of Finance and Economics*.
- [64] 2003 'Convertibility, Currency Controls and the Cost of Capital in Western Europe', in: Barry Eichengreen, Hans-Joachim Voth (eds.), *Controlling Global Capital*. Special issue of the *International Journal of Finance and Economics*.
- [65] 2003 'Labor Time', in: Joel Mokyr, ed., *Oxford Encyclopedia of Economic History*, Oxford: Oxford University Press.
- [66] 2003 'Living Standards and Urban Disamenities', in: R. Floud, P. Johnson (eds.), *Cambridge Economic History of Britain*, Cambridge: Cambridge University Press.
- [67] 2002 'Height and the High Life – What Future for a Tall Story?' [with Tim Leunig], in: P. David, M. Thomas (eds.), *Economic Challenges of the 21st Century*, British Academy.
- [68] 2001 'The Zollverein and the Bid for Economic Supremacy', in: P. Dwyer (ed.), *Modern Prussian History, 1830-1947*, London: Longman.
- [69] 2001 'Smallpox Really Did Reduce Height: A Reply to Razzell' [with Tim Leunig], *Economic History Review* 54.
- [70] 2001 'Economic History and the Messiness of Life', in: P. Hudson (ed.), *Living Economic and Social History*, Glasgow.
- [71] 2000 'German Banking and the Impact of the First World War', in: C. Wrigley (ed.), *The First World War and the International Economy*, London: Edward Elgar.
- [72] 1998 'Smallpox Did Reduce Height: Reply to Our Critics' [with Tim Leunig], *Economic History Review* 51.
- [73] 1998 'Work and the Sirens of Consumption in 18C London', in: M. Bianchi (ed.), *The Active Consumer. Novelty and Surprise in Consumer Choice*, London: Routledge.
- [74] 1997 'Time Use in Eighteenth Century London: Some Evidence from the Old Bailey'. Dissertation Summary. *Journal of Economic History* 57.

- [75] 1995 'Did Neutrality Pay? Danish Shipping in the Mediterranean, 1749-1790' [with D. Andersen], in: A. Monrad-Møller (ed.), *Folk og Erhverv. Festschrift for Hans-Christian Johansen*, Odense.
- [76] 1993 'Investitionen in den "Goldenen Jahren" der Weimarer Republik', *Zeitschrift für Wirtschafts- und Sozialwissenschaften* 113.

Popular books and edited volumes

- [77] 2006 *Invasion der Heuschrecken. Intriguen – Machtkämpfe - Marktmanipulation* [with Werner Seifert], Berlin: ECON.
- [78] 2002 *Krise des Kapitalismus und Neuorientierung der Wirtschaftspolitik* [collection of essays, with Werner Seifert], Frankfurt: Deutsche Börse.
- [79] 2001 *Performance ist kein Schicksal* [with Markus Habel et al.], Frankfurt: Campus.
- [80] 2000 *European Capital Markets* [with Werner Seifert et al.], Houndmills: Macmillan-Palgrave.
- [81] 1997 *Aktie, Arbeit, Aufschwung* [with Frank Mattern et al.], Frankfurt: Campus.

Book reviews and review articles

- [1] 2009 DeVries, Jan, *The Industrious Revolution: Consumer Behavior and the Household Economy, 1650 to the Present*, Cambridge: CUP 2008. EH.NET, May.
- [2] 2008 Clark, Gregory, *Farewell to Alms*, Princeton: PUP 2007. EUROPEAN REVIEW OF ECONOMIC HISTORY.
- [3] 2008 Glyn, Andrew, *Capitalism Unleashed*, Oxford: OUP 2006. ECONOMIC JOURNAL.
- [4] 2007 Strachan, Hew, *Financing the First World War*, Oxford: OUP 2006. EH.NET, January.
- [5] 2007 Broadberry, Stephen and Mark Harrison, eds., *The Economics of World War I*, Cambridge: CUP 2006. JOURNAL OF ECONOMIC HISTORY.
- [6] 2006 Eichengreen, Barry and Ricardo Hausmann, *Other People's Money: Debt Denomination and Financial Instability in Emerging Market Economies*, Cambridge: CUP 2005. EH.NET September.
- [7] 2005 Allen, Robert C., Tommy Bengtsson, and Martin Dribe, eds., *Living Standards in the Past*, Oxford: Oxford University Press 2005. ECONOMIC HISTORY REVIEW.
- [8] 2005 Wrigley, E.A., *Power, Progress, and Population*. Cambridge: Cambridge University Press 2004. ENGLISH HISTORY REVIEW.
- [9] 2004 Engerman, Stan et al. (eds), *Finance, Intermediaries, and Economic Development*, Cambridge: Cambridge University Press 2003, BUSINESS HISTORY REVIEW.
- [10] 2004 Balderston, Theodore, *Economics and Politics in the Weimar Republic*. Cambridge: Cambridge University Press 2002. JOURNAL OF ECONOMIC HISTORY.
- [11] 2003 Ritschl, Albrecht, *Deutschlands Krise und Konjunktur 1924-1934. Binnenkonjunktur, Auslandsverschuldung und Reparationsproblem zwischen Dawes-Plan und Transfersperre*. Berlin: Akademie Verlag, 2002, EH.NET March.

- [12] 2002 Widdig, Berndt, *Culture and Inflation in Weimar Germany*. Berkeley: University of California Press, 2001, EH.NET December.
- [13] 2001 de Haan, Jakob, ed., *The History of the Bundesbank. Lessons for the European Central Bank*. London: Routledge, 2000, EH.NET September.
- [14] 2000 Review article: "DM Nostalgia: Recent Writing on German Economic History", GERMAN HISTORY 18.
- [15] 1999 Liebermann, Ben, *From Stabilization to Catastrophe. Municipal Stabilization and Political Crisis in Weimar Germany*, New York: Berghahn Books, 1998, GERMAN HISTORY 17.
- [16] 1997 Kopper, Christopher, *Zwischen Marktwirtschaft und Dirigismus. Bankenpolitik im "Dritten Reich" 1933-1939*. Bonn: Bouvier, 1995, GERMAN HISTORY 15, pp. 296-7.
- [17] 1996 Feldman, Gerald D., *The Great Disorder. Politics, Economics, and Society in the German Inflation, 1914-1924*, Oxford: Oxford University Press, 1993, GERMAN HISTORY 14.
- [18] 1996 Ferguson, Niall, *Paper and Iron. Hamburg Business and German Politics in the Era of Inflation, 1897-1927*, Cambridge: Cambridge University Press, 1995, GERMAN HISTORY 14.
- [19] 1995 Schremmer, Eckart, ed., *Steuern, Abgaben und Dienste vom Mittelalter bis zur Gegenwart*, Stuttgart: Franz Steiner 1994, JOURNAL OF ECONOMIC HISTORY 56.
- [20] 1995 Schulz, Günter, *Wiederaufbau in Deutschland. Die Wohnungsbaupolitik in den Westzonen und der Bundesrepublik von 1945 bis 1957*. Düsseldorf: Droste 1994. EUROPEAN HISTORY QUARTERLY.
- [21] 1995 Diefendorf, Jeffrey M., Axel Frohn and Hermann-Josef Rupieper (eds.), *American Policy and the Reconstruction of West Germany, 1945-1955*. Cambridge: Cambridge University Press 1993. EUROPEAN HISTORY QUARTERLY.
- [22] 1997 Stokes, Raymond G., *Opting for Oil. The Political Economy of Technological Change in the West German Chemical Industry, 1945-1961*, Cambridge: Cambridge University Press, 1994, GERMAN HISTORY 15.
- [23] 1995 Fischer, Klaus P., *Nazi Germany. A New History*, Constable: London, 1995, TIMES HIGHER EDUCATION SUPPLEMENT.
- [24] 1995 Balderston, Theodore, *The Origins and Course of the German Economic Crisis, 1923-1932*, Berlin: Haude und Spener Verlag, 1993. EUROPEAN HISTORY QUARTERLY.

Other awards and distinctions

- 2013-18 Member, **European Economic Association Council**.
- 2013 Finalist for the **La Vanguardia Science Prize** (joint with Jacopo Ponticelli, UPF).
- 2013-15 **INET Grant** for "Political Instability and Liquidity" (\$122,000, with Kris Mitchener, University of Warwick).
- 2012 **Quarterly Journal of Economics** Excellence in Refereeing Award.
- 2009-11 **Ministerio de Ciencia y Tecnología Grant** for the project "Renegotiating Sovereign Debt: The Case of Philip II" (€23,000, joint with Mauricio Drelichman, University of British Columbia).

- 2009-11 **Canadian Social Science and Humanities Research Council Research Grant** (SSHRC) for the project “Rescheduling Sovereign Debt in Early Modern Europe: The Case of Spain, 1550-1600” (CAD 90,000, joint with Mauricio Drelichman, University of British Columbia).
- 2006-08 **Ministerio de Educación y Ciencia Grant** for the project “Defaults and the Origins of Sovereign Debt in the Age of Philipp II” (€ 42,000, joint with Mauricio Drelichman, University of British Columbia).
- 2006-09 **Canadian Social Science and Humanities Research Council Research Grant** (SSHRC) for the project “Sovereign Lending in Habsburg Spain” (CAD 81,217, joint with Mauricio Drelichman, University of British Columbia).
- 2005 **Honorable Mention (\$1,000), NYU Finance Department – Glucksman Institute Research Prize in Finance** for “Financial Repression in a Natural Experiment: Loan Allocation and the Change in Usury Laws in 1714” (with Peter Temin, MIT).
- 2002 **Financial Times Germany Prize** for the best book on financial markets and investing for *Performance ist kein Schicksal*.
- 1994-95 **ESRC Research Studentship** and Nuffield Studentship.
- 1993; 1995 **Sir John Hicks Travel Grant**, University of Oxford.
- 1992-93 **Placed First in Class and Awarded Distinction** in the M.Sc. in Economic and Social History, University of Oxford.
- 1991-94 **German Academic Exchange Service (DAAD) Scholarships** to Oxford and EUI, Florence.
- 1990-93 **German National Honours Foundation** (*Studienstiftung des deutschen Volkes*).

PROFESSIONAL SERVICE

Editor

Explorations in Economic History (from 2013).

European Review of Economic History (2008-2012).

Associate Editor

Quarterly Journal of Economics (from 2011).

Journal of Economic Growth (from 2012).

Editorial boards

The Journal of Economic History (2004-08); *Cliometrica* (from 2007); *Explorations in Economic History* (from 2008). *Financial History Review* (from 2010).

Press articles by me or about my work, interviews, and op-ed pieces

Wall Street Journal Europe; *Börsenzeitung*; *FAZ Weekly*; *ZEIT-Spezial*; *Frankfurter Rundschau*; *Handelsblatt*; *Frankfurter Allgemeine Zeitung*; *The National* (Abu Dhabi); *La Nación* (Buenos Aires) *Die ZEIT*; *Times Higher Education Supplement*. *VOX-EU*; *Berliner Zeitung*; *Der Spiegel*; *BBC-Radio 4*; *TV-3 Catalunya*; *The Guardian*; *El Mundo*; *Le Monde*; *Slate*; *The Atlantic*; *Wirtschaftswoche*; *CNN*; *Tagesspiegel*; *PBS*; *Clarín*; *La Vanguardia*; *Süddeutsche Zeitung*; *Kleine Zeitung – Salzburg*; *Radio France Internationale*; *The Economist*; *Politiken* (Copenhagen); *Swiss Radio*; *Radio Bayern*; *Haaretz*; *Vanguardia*.

Referee

Science; American Economic Review; Econometrica; Journal of Political Economy; Quarterly Journal of Economics; Review of Economic Studies; Economic Journal; Journal of Economic Geography; Journal of International Economics; Journal of Economic History; Explorations in Economic History; Economic History Review; Journal of Economic Growth; Journal of the European Economic Association; European Review of Economic History; Management Science; European Economic Review; Journal of Economic Behavior; Journal of Economic Literature; Research in Economic History; Population Studies; Oxford Economic Papers; Economic Inquiry; Eastern Economic Journal; Cambridge Journal of Economics; Cambridge Population Group Series in Historical Demography; Journal of Institutional Economics; Journal of International Money and Finance; Cliometrica; Princeton University Press; Oxford University Press; Cambridge University Press.

Evaluator

National Science Foundation (NSF), USA; European Research Council (ERC); Economic and Social Research Council (ESRC), UK; Leverhulme Trust; Israeli Science Foundation; Dutch Council for the Humanities (NOW); King's College, Cambridge, Research Fellowship Competition; Ministerio de Educación y Ciencia, Spain; Social Sciences and Humanities Research Council of Canada; Greek Ministry of Research and Education (Thalis).

University and other service

Placement Director, UPF-PhD program (2006-07; 2008-12).

Chair of the Junior Recruiting Committee, Economics Department, UPF (2009-10).

Director, Master of Science Program in International Trade, Finance and Development, Barcelona Graduate School (2007-2011).

Organizer, CREI Lectures in Macroeconomics (2008- 2013).

Budget Committee, Economics Department, UPF (2010-2013).

CREA board member, Barcelona (2006-07).

MBA Advisory Committee, Economics Department, UPF (2006-07).

Member, Academic Committee, Iberometrics Association (2004-05).

European Historical Economics Society Trustee (2004-).

Recruiting Committee, UPF (2000-03; 2006).

Director of Studies, Centre for History and Economics, King's College, Cambridge (1999-2001).

National Service as a conscientious objector (in lieu of military service, 1987-89).

Seminar/conference organizer

2011 IAE-CREI-CEPR Conference [with Matthias Doepke, Omar Licandro and David Delacroix] (October 28-29).

2010 CEPR/CREI Workshop on "Cornucopia Quantified" [with Robert J. Gordon], Barcelona (May 21-22).

EEA Meetings, Invited Session Convener, "Economic History".

IAE-CREI Workshop on "Towards Sustained Economic Growth: Evidence and Theory" [with Omar Licandro and David Delacroix] (October 29-30).

Co-Convenor, Fast Track Initiative, European Historical Economics Society, Lisbon (December 11-12).

- 2009 Programme Committee, European Economic Association Meetings, Barcelona.
- 2008 CEPR/CREI Workshop on “Rags to Riches – Education, Culture, and Fertility in the Transition to Self-sustaining Growth” [with Matthias Doepke and Nico Voigtländer], Barcelona (11-12. December).
Convenor, Fast Track Initiative, European Historical Economics Society, Paris (24.-26. April).
Programme Committee, European Economic Association Meetings, Milan.
- 2007 CEPR/CREI Workshop on “Financial Crises – Past, Policy, and Theory” [joint with Michael Bordo], Barcelona (8-9. June).
Programme Committee, European Economic Association Meetings, Budapest.
- 2006 CEPR/CREI Workshop on “Bubbles – Theory, Evidence and Policy Implications” [joint with Eugene White], Barcelona (19.-20. May).
Programme Committee, European Economic Association Meetings, Vienna.
- 2005 CEPR/CREI Workshop on “War and the Macroeconomy” [joint with Alan M. Taylor], Barcelona (29.-30. June).
Organizing Committee, Iberometrics meetings, Sigüenza, Spain, March 2005.
- 2004 Session Organizer, EHES invited session, Econometric Society/EEA European Summer Meeting, Madrid, August.
Economic History Association Program Committee, San José.
- 2003 Session Organizer, Economic History Society Conference, Durham, England (3.- 4. April).
- 2002-03, 05-07 UPF Economic History Seminar.
- 2002 Harvard Economic History Mini-Conference on Capital Markets and Asset Prices in Historical Perspective (12. April).
CEPR/CREI Conference on “Controlling Global Capital: Financial Liberalization, Capital Controls and Macroeconomic Performance” [joint with Barry Eichengreen], Barcelona, (14.-15. October).
- 2001-02 Harvard Economic History Workshop [joint with Jeff Williamson].
- 2000-02 Cambridge Seminar in Quantitative Economic History.
- 1995-96 German Studies Group, Cambridge.

INVITED PRESENTATIONS

Universities and Research Centres

- 2013** Harvard Economics; Stanford GSB; Stanford Economics; Berkeley Economics; Universitat Pompeu Fabra; University of British Columbia; CREI.
- 2012** Yale School of Management (SOM); Universitat Pompeu Fabra; IMT Lucca; LSE; University of Minnesota; Federal Reserve Bank of Minneapolis; University of Zurich; Economics Department, London School of Economics; London Business School; SciencePo, Paris.

- 2011** University of Warwick; Brown University; Harvard; Universitat Pompeu Fabra; Northwestern; Stanford; Royal Holloway; Rutgers; NYU-Stern; UCLA, Carlos III.
- 2010** London School of Economics; Ente Einaudi, Rome; IAE - U Autònoma de Barcelona; University of Warwick; Tel Aviv; Hebrew University; Ben-Gurion University; Mannheim University; St. Andrews; Pontifícia Universidade Católica do Rio de Janeiro (PUC).
- 2009** London School of Economics; European Central Bank/Bundesbank; Brown University; Bocconi; Asian Development Bank, Manila; UCLA-Anderson School of Management; University of Copenhagen; Universitat Pompeu Fabra; NYU-Stern School of Business; U Penn, Economics Department; CHW, Princeton.
- 2008** Center for Health and Well-being, Princeton University; Bendheim Center for Finance, Princeton; CEMFI, Madrid; Universitat Pompeu Fabra; Humboldt University; All Souls College, Oxford; Munich University
- 2007** Universitat Pompeu Fabra (3); Massachusetts Institute of Technology; Bank for International Settlement, Basel; University of British Columbia; NYU-Stern School of Business; UC Davis; Santa Clara University; UC San Diego; Brown University; Zürich University; HEI Geneva ; Princeton; Rutgers; Ohio State; Stanford; UC Berkeley; Federal Reserve Bank, New York.
- 2006** London School of Economics; European University Institute, Florence; Universitat Pompeu Fabra; Bocconi University; University of Antwerp; Humboldt University, Berlin; Universidad de Barcelona; Universität Bern; Tilburg University, Finance Department.
- 2005** Federal Reserve Bank, New York (2); NYU – Stern School of Business ; IIES, Stockholm; MPI for Collective Goods, Bonn; Rutgers; UC Berkeley; Stockholm School of Economics (2); Universitat Pompeu Fabra.
- 2004** University of British Columbia; Universitat Pompeu Fabra; Stanford University ; University of Toronto; Columbia University; UC Davis; UC Berkeley; NYU – Stern School of Business; University of Western Ontario; University of Southern California.
- 2003** London School of Economics; Universitat Pompeu Fabra; Trinity College, Dublin; Zurich University; Carlos III, Madrid; Harvard University; Massachusetts Institute of Technology; University of Kansas, Lawrence; Boston University; Northwestern University; NYU – Stern School of Business.
- 2002** Massachusetts Institute of Technology; Harvard; Rutgers; UC Berkeley; UCLA.
- 2001** RISS, Institute of Advanced Studies, Australian National University (2); EUI, Florence; Universitat Pompeu Fabra; GREMAQ-Toulouse; Zurich University; Ente Einaudi, Rome; University of New South Wales, Sydney; Reserve Bank of Australia, Sydney; University of Queensland, Brisbane; Massachusetts Institute of Technology (2); Duke University; Brown University; Stanford University; UC Davis; London Business School.
- 2000** NYU – Stern School of Business ; RISS, Institute of Advanced Studies,

- Australian National University (3); Humboldt-Universität Berlin; Nuffield College, Oxford; King's College, Cambridge; Universität Tübingen; Cambridge Group for Population Studies.
- 1999** Warwick; King's College, Cambridge; Universitat Pompeu Fabra; Institute for Historical Research, London; Universidad de Valencia; All Souls College, Oxford; London School of Economics; University of Manchester .
- 1998** Stanford University; UCLA; UC Berkeley; Northwestern University; Joint Stanford/Berkeley Seminar; OFCE, Paris ; Universitat Pompeu Fabra, Barcelona; Wirtschaftshochschule St. Gallen; Universidad Carlos III, Madrid.
- 1996** All Souls College, Oxford; Corpus Christi, Cambridge.
- 1993** EUI, Florence; St. Antony's College, Oxford.
- 1992** History Faculty, Oxford; Freiburg University.

Conferences and Summer Schools

- 2013** FMU Conference on "Long-term Persistence", Munich, November.
EHES Conference, London, September.
ASSA Meetings, San Diego, January.
INET Conference, Hongkong, April.
UC Berkeley Conference on the Future of the Euro, April.
Political Economy Conference, Lisbon, May (Keynote).
Summer Forum, Barcelona – Workshop on Conflict, June.
Summer Forum, Barcelona – Workshop on Experimental Economics, June.
Summer Forum, Barcelona – Workshop on Economic Growth, June.
- 2012** FRESH Meetings, London, December (Keynote).
EHA Annual Conference, Vancouver, September.
Drelichman-Voth book workshop on *Lending to the Borrower from Hell*, Vancouver, September.
NBER Summer Institute, Boston, July.
ASSA Meetings, Chicago, January.
NBER Political Economy Meeting, Boston, April.
INET Conference on "Paradigm Lost", Berlin, April.
UAB-MOVE Workshop on Social Economics, Barcelona, April.
- 2011** Economic History Society Conference, Cambridge, UK, April.
Royal Economic Society Conference, Invited Session on "State Capacity", London, April.
UCLA Mini-Conference in Economic History, Los Angeles, May.
ACLE Workshop, University of Amsterdam, May.
Swedish Economic History Conference, Göteborg, August.
EHES Conference, Dublin, September.
Asian Development Bank Conference, Harvard, Cambridge, MA, September [discussant].
EHA Annual Conference, Boston, September.
Temin-Voth book conference on *Prometheus Shackled*, Yale School of Management, New Haven, October.

- IAE-CREI-CEPR conference, Barcelona, October.
 All Souls conference in honor of Avner Offer, October.
 NBER conference on cultural economics, Cambridge, MA, November.
 ERC conference on “Economic Growth, Demographic Transition and Pensions”, Zurich, November.
- 2010** CREI-CEPR Conference on “The Political Economy of Economic Development”, Manresa, April.
 CREI-CEPR Conference on “Cornucopia Quantified: New Goods and Improvements in Living Standards”, May.
 EEA Meetings, Glasgow, UK, August.
- 2009** FRESH Meetings, St. Pierre, France, September.
 EHES Conference, Geneva, August.
 EEA Meetings, August.
 ISOM-NBER Conference, Limassol, Cyprus, June.
 Bank of England Monetary Policy Roundtable.
 ASSA Meetings, San Francisco, January.
 ADB Workshop on “Quantifying the Costs and Benefits of Regional Integration”, Hongkong, January.
- 2008** ASSA Meetings, New Orleans, January.
 Yale School of Management, Conference on the “Great Mirror of Folly – Financial Speculation in 1720 and its Representation”, New Haven, CT, April.
 European Cliometrics Meetings, Paris, April.
 CREI-CEPR Conference on International Finance, Barcelona, March.
 Paris School of Economics Conference on Sovereign Debt, May.
 Minnesota Macro Theory Workshop, July.
 Utrecht Financial History Conference, October.
 CREI-CEPR Conference on “Rags to Riches: Culture, Education and Fertility in the Transition to Self-Sustaining Growth”, December.
- 2007** NBER Conference on “The Evolution of the Global Economy”, Cambridge, MA, March.
 Tanaka Business School, Conference on “Trading Strategies and Financial Market Inefficiency”, March [session chair].
 Watson Institute, Brown University, Conference on Growth and Inequality, Providence, RI, April.
 BETA Workshop on Financial History, Strasbourg, May.
 Utrecht Workshop on Financial History, Utrecht, May.
 CEPR European Summer Symposium in Macroeconomics (ESSIM), Izmir, Turkey, May.
 CREI-CEPR Workshop on “Crises – Past, Policy, and Theory”, Barcelona, June.
 LBS-Hedge Fund Centre, Conference on “Hedge Fund Activism”, June.
 Judge Business School, Cambridge, UK, conference on “Exchange Rates: Choices and Consequences”, June [discussant].
 EHES Conference, Lund, June.
 EEA Conference, Budapest, August [invited session and paper].
 EHA Conference, Austin, TX, September.
 Hans-Boeckler-Stiftung Conference on “Made in Germany”, Berlin, October.

- CEPR Symposium on “Unifying the European Experience”, London, October.
International Political Economy Society Conference (IPES), Stanford, November.
- 2006 CREI-CEPR Conference on “Sovereign Risk”, Barcelona, December.
ASSA Meetings, Boston.
CEPR-EHI Summer School on Long Run Growth, EUI, Florence.
DEGIT-Minerva Conference on Growth, Jerusalem.
EEA Meetings, Vienna.
German Cliometrics Meetings, Tübingen.
German National Honors Foundation, Summer School on “Rich and Poor from the Stone Age to the Present”, Guidel, Bretagne.
European Banking History Association Summer School, Venice.
CEPR-ESF Conference on “Unifying the European Economic Experience”, Lund.
- 2005 CEPR European Summer Symposium in Macroeconomics (ESSIM), Limassol, Cyprus.
CEPR-EHI conference on “The Long Run Growth and Development of the World Economy: Measurement and Theory”, Venice.
CREI-CEPR workshop on “War and the Macroeconomy”, Barcelona.
European Historical Economics Society (EHES) Conference, Istanbul.
CEPR-Bank of Italy conference on “Building Blocks of Effective Financial Systems”, Rome.
- 2004 Economic History Association (EHA) Meetings, Toronto.
CEPR-CREI conference on “Asset Price Bubbles”, Barcelona.
12th Foro de Finanzas, Barcelona.
European Economic Association (EEA) Meetings, Madrid, invited session on “Financial History”.
- 2003 NBER Universities Conference on “Developing and Sustaining Financial Markets, 1800-2000”, Cambridge, MA.
ASSA Meetings, Session on “Assessing Living Standards: From the Pre-Columbian Era to the Present”, Washington, DC.
American Finance Association (AFA) Meetings, Session on “Empirical International Finance”, Washington, DC.
Economic History Society (EHS) Conference, Durham, UK.
European Historical Economics Society (EHES) Conference, Madrid, Spain.
- 2002 ASSA Meetings, Atlanta.
Harvard Mini-Conference on “Stock Markets and Equity Returns in Historical Perspective”, Cambridge, MA.
Cliometrics Conference, La Crosse, Wisconsin.
II Seminario Mediterraneo Sobre Cooperación y Desarrollo Internacional, Palma de Mallorca, Spain.
- 2001 CEPR Conference “Controlling Global Capital”, UPF, Barcelona.
Cambridge Group Workshop on Welfare, Demography and Development, Cambridge, UK.
Economic History Association (EHA) Meetings, Philadelphia.
Workshop on “Productivity, Trade in Foods, and Living Standards across Centuries and Countries”, UC Davis.

- Conference in preparation of the *Cambridge Economic History of England, 1700-2000*, Guildhall University, London.
- 2000** European Banking History Association (EBHA) Meeting, Warsaw.
EU Network on Technical Change, Economic Growth, and Convergence in Europe Workshop, Lund-Mölle.
European Historical Economics Society Session, European Association of Evolutionary Political Economy, Berlin.
- 1999** Economic History Society Conference, Oxford.
European Historical Economics Society (EHES), Lisbon.
German Cliometrics Conference, Toronto.
- 1997** All-University of California Economic History Conference, Davis, CA.
- 1996** Social History Conference, Glasgow.
Economic History Association (EHA) Meetings, Berkeley.
Economic History Society Conference, Leicester.
- 1995** Cliometrics Conference, Kansas City.

 TEACHING

- 2012** The Rise of the Global Economy (graduate course), Barcelona Graduate School of Economics.
- 2011** PhD Research Seminar on Financial Crises: Past, Present, Future, Economics Department, Universitat Pompeu Fabra.
The Rise of the Global Economy (graduate course), Barcelona Graduate School of Economics.
Financial Crises, CREI-Barcelona Macro Summer School, Economics Department, Universitat Pompeu Fabra.
- 2010** The Rise of the Global Economy (graduate course), Barcelona Graduate School of Economics.
Financial Crises, Crashes and Bubbles (graduate course), Economics Department, Universitat Pompeu Fabra and M.Sc. in International Finance, Trade, and Development, Barcelona Graduate School of Economics.
Guest lecturer, undergraduate course on the Industrial Revolution, Economic History Department, LSE (February).
Financial Crises, CREI-Barcelona Macro Summer School, Economics Department, Universitat Pompeu Fabra.
- 2009** PhD course on Financial Crises, Crashes and Bubbles, Economics Department, Copenhagen University, Department of Economics.
PhD Research Seminar in Financial and Economic History (graduate course), Economics Department, Universitat Pompeu Fabra.
The Rise of the Global Economy (graduate course), Economics Department, Universitat Pompeu Fabra.
Financial Crises, Crashes and Bubbles (graduate course), M.Sc. in International Finance, Trade, and Development, Barcelona Graduate School of Economics.
Financial Crises, CREI-Barcelona Macro Summer School, Economics Department, Universitat Pompeu Fabra.
- 2008** The Rise of the Global Economy (graduate course), Economics Department, Universitat Pompeu Fabra.
Convenor, Financial History Reading Group.

- Financial Crises, CREI-Barcelona Macro Summer School, Economics Department, Universitat Pompeu Fabra.
- 2007** Financial Crises and Bubbles (graduate course), Economics Department, Universitat Pompeu Fabra.
Sovereign Debt: Theory, History, Policy [joint with Jaume Ventura], CREI-Barcelona Macro Summer School, Economics Department, Universitat Pompeu Fabra.
- 2006** Financial Crises and Bubbles (graduate course), Economics Department, Universitat Pompeu Fabra.
The Economics of Financial Crises (MBA class), UPF-MBA program.
Financial Crises, Crashes and Bubbles, CREI-Barcelona Macro Summer School, Economics Department, Universitat Pompeu Fabra.
- 2005** PhD course on Financial Crises, Crashes and Bubbles, Economics Department, Stockholm School of Economics.
Global Perspectives on Business Enterprise (MBA class), Economics Department, Stern Business School.
Globalization: The Rise of the World Economy 1800-2000 (graduate course), Economics Department, Universitat Pompeu Fabra.
- 2004** Money and Power in the Modern World, 1700-2000 (MBA class), Economics Department, Stern Business School.
Topics in Economic History (graduate course), Economics Department, Universitat Pompeu Fabra.
- 2003** Capitalism and its Critics 14.72, Economics Department, MIT.
American Economic History 14.71, Economics Department, MIT.
Topics in Economic History (graduate course), Economics Department, Universitat Pompeu Fabra.
- 2002** Econometrics 14.32, Economics Department, MIT.
Capitalism and its Critics 14.72, Economics Department, MIT.
- 2001** Economics of European Integration, Universitat Pompeu Fabra.
Financial Institutions (graduate course), Universitat Pompeu Fabra.
Topics in Economic History (graduate course), Universitat Pompeu Fabra.
- 2000** Economics of European Integration, Economics Department, Universitat Pompeu Fabra.
European Capital Markets and Financial Centres, European Business School.
Financial Institutions (graduate course), Economics Department, Universitat Pompeu Fabra.
Estructura Economica International, Law Faculty, Universitat Pompeu Fabra.
[joint with A. Carreras, M. Kipping], Topics in Economic and Business History (graduate course), Universitat Pompeu Fabra.
- 1999** The German Interwar Economy, Faculty of Economics, University of Cambridge.
Financial Institutions (graduate course), Economics Department, Universitat Pompeu Fabra.
- 1998** Economic History, Economics Department, Universitat Pompeu Fabra.
European Economic History, Economics Department, Stanford University.
Economics of European Integration, Economics Department, Stanford University.

- 1996** The German Interwar Economy, lecture course, University of Cambridge.
- 1995-96** British Economic History (supervisions), Clare College, Cambridge and Robinson College, Cambridge.
- 1994-96** Lectures on German economic history as part of the 'Struggle for Mastery in Germany, 1740-1914' lecture series, History Faculty, University of Cambridge. Tutorial teaching of third-year undergraduates.
- 1994-95** Quantitative Methods, M.Sc./M.Phil. in Economic and Social History, University of Oxford.

DOCTORAL STUDENTS [principal advisor]

- Nico Voigtlaender, Ph.D. 2008, "Essays on Long-run Growth and Productivity" (Assistant Professor, tenure-track, **UCLA-Anderson School of Business**).
- Bernhard Silli, Ph.D. 2009, "Essays on Portfolio Management" (Associate, **Goldman Sachs, London**).
- Juan-Manuel Puerta, Ph.D. 2011, "Essays in Migration and Fertility" (**Inter-American Development Bank, Washington**).
- Peter Koudijs, Ph.D. 2011, "Trading and Financial Market Efficiency in Eighteenth-Century Holland" (Assistant Professor, tenure-track, Finance Department, **Stanford Graduate School of Business**).
- Diegowalter Pereira, Ph.D. 2011, "Inflation and Stock Markets" (**JP Morgan**).
- Mrdjan Mladjan, Ph.D. expected 2012, "Financial Dependence and the Severity of the Great Depression" (Assistant Professor, tenure-track, **European Business School, Frankfurt**).
- Jacopo Ponticelli, Ph.D. 2013, (co-advisor, with Nicola Gennaioli), "Essays on the Economics of Development" (Assistant Professor, tenure-track, **Booth Business School, University of Chicago**).
- Stefan Gissler, Ph.D. expected 2014, "Essays in Financial History."
- Marc Goni, Ph.D. expected 2014, "Institutional Innovation and Assortive Matching: The London 'Season', 1700-1914".
- Andrea Matranga, Ph.D. expected 2015, "Risk and Welfare in the Transition to Sedentary Agriculture".
- Vasiliki Fouka, Ph.D. expected 2015, "Essays in the Economics of Cultural Change: Evidence from Forced Integration."
- Jörg Stahl, Ph.D. expected 2016, "Capital Gain: The Economic Effects of Moving the German Capital to Berlin."

REFEREES

- NFR Crafts, Professor of Economics, Economics Department, Warwick University, Coventry, UK. n.crafts@warwick.ac.uk
- Paul David, Emeritus Professor of Economics, Department of Economics, Stanford University, Stanford, CA 94305-6072, USA. pad@stanford.edu
- Oded Galor, Professor of Economics, Brown University, RI 02912, USA. Oded.Galor@brown.edu
- Jane Humphries, Professor of Economic History, All Souls College, Oxford, OX1 4AL, UK. jane.humphries@all-souls.ox.ac.uk
- Joel Mokyr, Professor of Economics, Department of Economics, Northwestern University, Sheridan Road, Evanston, Illinois 60208, USA. j-mokyr@northwestern.edu

Christina Romer, Class of 1957 Professor, Economics Department, University of California at Berkeley, Berkeley, CA 94720-3880, USA. cromer@econ.berkeley.edu

Peter Temin, Elisha Gray II Professor Emeritus, MIT Economics Department, Cambridge, MA 02142, USA. ptemin@mit.edu