

## **RODNEY J. GARRATT**

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### **EDUCATION AND EMPLOYMENT**

Ph.D. (Economics) Cornell University, 1991

M.A. (Economics) Cornell University, 1990

Honours B.A. (Economics and History) University of Waterloo, 1986

### **Employment**

Senior Adviser, Bank for International Settlements, 2022-present

Maxwell C. and Mary Pellish Chair in Economics, Department of Economics, University of California, Santa Barbara, 2015-2021

Vice President, Money and Payment Studies Function, Federal Reserve Bank of New York, 2013-2015

Professor, Department of Economics, University of California, Santa Barbara, 2010-2013

Research Advisor, Bank of England, 2009-2010

Professor, Department of Economics, University of California, Santa Barbara, 2003-2009

Associate Professor, Department of Economics, University of California, Santa Barbara, 1997-2003

Assistant Professor, Department of Economics, University of California, Santa Barbara, 1991-1997

### **Affiliations and External Committees**

Academic Advisor for the Center for Latin American Monetary Studies (CEMLA) Research Project on Central Bank Digital Currencies, 2021-2022

CBDC Engagement Forum – CBDC working group initiated by the Bank of England and Her Majesty's Treasury, 2021-2022

Luohan Academy Fellow, 2021-2022

Research Associate, CEPR Research and Policy Network on Fintech and Digital Currencies, 2021-present

Dean's Investment Group Advisory Board, 2021-2022

World Economic Forum Working Group on Interoperability, 2021-2022

World Economic Forum, Digital Payments for Trade and Commerce Advisory Committee, 2021-2022

Member, CPMI Expert Group on RTGS Liquidity Analysis, 2018-2022

Chair, Knowledge Standards Advisory Board (Committee of payments industry professionals formed by the payments associations from five countries to develop knowledge standards for an International Payments Certification), 2019

Member, CPMI Working Group on Retail Payments, 2015

### **Visiting Positions**

Technical Advisor, Bank for International Settlements, 2017, 2019, 2021

Visiting Scholar in the Monetary and Capital Markets Department (off-site), International Monetary Fund, 2020-21

Research Advisor, Bank of Canada, September 1, 2018 to August 31, 2019

Research Associate, Federal Reserve Bank of Cleveland, 2018, 2019, 2020, 2021

One Bank Visitor Programme, Bank of England, 2018  
Occasional Visitor Program, Federal Reserve Bank of New York, 2007, 2010, 2018  
Visiting Scholar, Bank of Canada, 2010, 2017, 2018, 2020, 2021, 2022  
John Weatherall Visiting Fellow, Queen's University, 2016  
Visiting Scholar, De Nederlandsche Bank, 2011, 2012  
Visiting Professor, UCLA and CASSEL Experimental Laboratory, Winter and Spring 2003  
Visiting Professor, Department of Economics, University of Arizona, Spring 2000

## **PUBLICATIONS**

### **Journal Articles**

“Why Fixed Costs Matter for Proof-of-Work Based Cryptocurrencies,” with M. van Oordt, *Management Science*, forthcoming. (**Best Cryptoeconomics Paper**, The Third Toronto Fintech Conference, 2020)

“An Application of Shapley Value Cost Allocation to Liquidity Savings Mechanisms,” *Journal of Money, Credit and Banking*, September 2022, 54(6), 1875-1888.

“Dinero Electrónico: The Rise and Fall of Ecuador’s Central Bank Digital Currency,” with A. Arauz and D. F. Ramos F., *Latin American Journal of Central Banking*, June 2021, 2(2). (**Best Article Prize**, 2021)

“Entrepreneurial Incentives and the Role of Initial Coin Offerings,” with M. van Oordt, *Journal of Economic Dynamics and Control*, September 2022, 142.

“Privacy as a Public Good: A Case for Electronic Cash” with M. van Oordt, *Journal of Political Economy*, July 2021, 129(7), 2157-2180.

“Auctions with Speculators: An Experimental Study,” with S. Georganas, *Games and Economic Behavior*, July 2021, 128, 256-270.

“The Economics of Distributed Ledger Technology for Securities Settlement,” with E. Benos and P. Gurrola-Perez, *The Ledger*, 4, 2019.

“Let Me, or Let George? Motives of Competing Altruists,” with T. Bergstrom and G. Leo, *Games and Economic Behavior*, November 2019, 118, 269-283.

“Nonlinear Pricing and the Market for Settling Payments,” with A. Copeland, *Journal of Money, Credit and Banking*, February 2019 51(1), 195-226.

“Bitcoin 1, Bitcoin 2,...: An Experiment in Privately Issued Outside Monies,” with N. Wallace, *Economic Inquiry*, July 2018, 56(3), 1887-1897.

“Centralized Netting in Financial Networks,” with P. Zimmerman, *Journal of Banking & Finance*, December 2017.

“Central Bank Cryptocurrencies” with M. Bech, *BIS Quarterly Review*, September 2017; Also published in Spanish as “Criptomonedas de Bancos Centrales,” Boletín, cemla, octubre-diciembre de 2017, pp. 181-201.

“Project Jasper: Are Distributed Wholesale Payment Systems Feasible Yet?” with J. Chapman, S. Hendry, A. McCormack, and W. McMahon, *Financial System Review*, June 2017.

“Missing Links: A Global Study on Uncovering Financial Network Structure from Partial Data,” with K. Anand, I. van Lelyveld, Á. Banai, S. Friedrich, G. Halaj, B. Howell, I. Hansen, S. Martínez Jaramillo, H. Lee, J. L. Molina-Borboa, S. Nobili, S. Rajan, D. Salakhova, T. C. Silva, L. Silvestri and S. R. Stancato de Souza, *Journal of Financial Stability*, April 2017, 35, 107-119.

“Using Shapley’s Asymmetric Power Index to Measure Banks’ Contributions to Systemic Risk” with L. Webber and M. Willison, *Journal of Network Theory in Finance*, June 2016, 2(2), 35-55.

“Identification of Over and Under Provision of Liquidity in Real-Time Payment Systems,” with E. Dendee and P. Zimmerman, *Journal of Financial Market Infrastructures*, December 2015, 4(2), 1-19.

“Saving Lives with Stem Cell Transplants,” with T. Bergstrom and D. Sheehan-Connor, *Journal of Risk and Uncertainty*, August 2015, 51(1), 23-51.

“Mapping Change in the Interbank Money Market, with M. Bech, C. Bergstrom and M. Rosvall, *Physica A: Statistical Mechanics and its Applications*, April 2015, 424, 44-51.

“The Great Entanglement: The Contagious Capacity of the International Banking Network Just Before the 2008 Crisis,” with L. Mahadeva and K. Svirydenska, *Journal of Banking & Finance*, December 2014, 49, 367–385.

“The Role of Counterparty Risk in CHAPS Following the Collapse of Lehman Brothers,” with E. Benos and P. Zimmerman, *International Journal of Central Banking*, December 2014, 10(4), 143-171.

“Choosing Partners: A Classroom Experiment,” with C. Bergstrom and T. Bergstrom, *Journal of Economic Education*. January 2013, 44(1), 47-57.

“The State Street Mile: Age and Gender Differences in Competition-Aversion in the Field,” with Catherine Weinberger and Nick Johnson, *Economic Inquiry*, January 2013, 51(1), 806-815.

“Illiquidity in the Interbank Payment System Following Wide-Scale Disruptions,” with M. Bech, *Journal of Money, Credit & Banking*. August 2012, 44(5), 903-929.

“Stem Cell Matching for Patients of Mixed Race,” with T. Bergstrom and D. Sheehan-Connor, *The B.E. Journal of Economic Analysis & Policy: Contributions*, July 2012, 12(1), Art. 30, 1-25.

“Behavior in Second Price Auctions by Highly Experienced eBay Buyers and Sellers,” with J. Wooders and M. Walker, *Experimental Economics*, March 2012, 15(1), 44-57.

“Efficiency of Second Price Auctions: A New Look at Old Data,” with J. Wooders, *Review of Industrial Organization*, July 2010, 37, 43-50.

“Which Bank is the “Central” Bank?” with M. Bech and J. Chapman, *Journal of Monetary Economics*, April 2010, 57(3), 352-363.

“One Chance in a Million: Altruism and the Bone Marrow Registry,” with T. Bergstrom and D. Sheehan-Connor, *American Economic Review*, September 2009, 99(4), 1309-34.

“Collusion via Resale,” with T. Tröger and C. Zheng, *Econometrica*, July 2009, 77(4), 1095-1136.

“Bank Runs as Coordination Failures: An Experimental Study,” with T. Keister, *Journal of Economic Behavior & Organization*, August 2009, 71(2), 300-317.

“Speculation in Standard Auctions with Resale,” with T. Tröger, *Econometrica*, May 2006, 74(3), 753-769. See also “Supplement to Speculation in Standard Auctions with Resale,” which is published on the *Econometrica* web site.

“Potential Maximization and Coalition Government Formation,” with J. Parco, C.-Z. Qin, and A. Rapoport, *International Game Theory Review*, December 2005, 7(4), 407-429.

“A Tale of Two Cities and a Giffen Good,” *Canadian Journal of Economics*, February 2005, 38(1), 49-56.

“Comparing Sunspot Equilibrium and Lottery Equilibrium Allocations: The Finite Case,” with T. Keister and K. Shell, *International Economic Review*, May 2004, 45(2), 351-386.

“On Potential Maximization as a Refinement of Nash Equilibrium,” with C.-Z. Qin, *Economics Bulletin*, 2003, 3 (12), 1-11.

“On Cooperation Structures Resulting from Simultaneous Proposals,” with C.-Z. Qin, *Economics Bulletin*, 2003, 3 (5), 1-8.

“Equity Risk, Conversion Risk, and the Demand for Insurance,” with J. M. Marshall, *Journal of Risk and Insurance*, September 2003, 70(3), 439-460.

“The Intraday Liquidity Management Game,” with M. Bech, *Journal of Economic Theory*, April 2003, 109, 198-219.

“A Characterization of Robust Sunspot Equilibria,” with T. Keister, *Journal of Economic Theory*, November 2002, 107, 136-144.

“Equilibrium Prices when the Sunspot Variable is Continuous,” with T. Keister, C.-Z. Qin and K. Shell, *Journal of Economic Theory*, November 2002, 107, 11-38.

“Exclusions and the Demand for Insurance,” with J. M. Marshall, *Geneva Papers on Risk and Insurance Theory*, 2001, 25, 131-139.

“A Free Entry and Exit Experiment,” *Journal of Economic Education*, January 2000, 31(3), 237-243.

“On Market Games When Agents Cannot be Two Places at Once,” with C.-Z. Qin, *Games and Economic Behavior*, May 2000, 31(2), 165-173.

“On Bargaining for an Indivisible Good,” *Games and Economic Behavior*, 1999, vol. 26, 186-192.

“On a Market for Coalitions with Indivisible Agents and Lotteries,” with C.-Z. Qin, *Journal of Economic Theory*, November 1997, 77(1), 81-101.

“Indivisibilities, Inferior Goods and Giffen Goods,” *Canadian Journal of Economics*, February 1997, vol. 30, no.1, 246-251.

“Insurable Interest, Options to Convert and Demand for Upper Limits in Optimum Property Insurance,” with J. M. Marshall, *Journal of Risk and Insurance*, June 1996, vol. 63, no. 2, 185-206. (Finalist for Robert C. Witt Research Award for the best *JRI* Feature Article)

“Cores and Competitive Equilibria in an Exchange Model with Indivisibilities and Lotteries,” with C.-Z. Qin), *Journal of Economic Theory*, February 1996, 68(2), 531-543.

“Optimum College Admissions, Taxes, and Tuitions When Completion is Uncertain,” with J. M. Marshall, *Education Economics*, December 1995, 3(3), 219-234.

“Decentralizing Lottery Allocations in Markets with Indivisible Commodities,” *Economic Theory*, 1995, vol. 5, 295-313.

“Income Redistributions Without Catastrophes,” with A. Goenka, *Journal of Economic Dynamics and Control*, Jan/Feb 1995, 19(1&2), 441-455.

“Concavifiability and The Marginal Rate of Substitution,” with C.-Z. Qin, *Journal of Mathematical Economics*, 1994, 23, 395-397.

“Public Finance of Private Goods: The Case of College Education,” with J. M. Marshall, *Journal of Political Economy*, 1994, 102(3), 566-582.

“The Connectedness of the Set of Equilibrium Money Prices Depends on the Choice of the Numeraire,” *Journal of Economic Theory*, 1992, 56(1), 206-217.

### **Book Chapters**

“Methods for Evaluating Liquidity Provision in Real-Time Gross Settlement Payment Systems,” with E. Denbee and P. Zimmerman, in *Diagnostics for the Financial Markets – Computational*

*Studies of Payment System, Simulator Seminar Proceedings 2009–2011*, Chapter 3, Matti Hellqvist and Tatu Laine, (Eds) Scientific Monographs E:45, 2012.

“Lotteries and the Law of Demand,” in *New Insights into the Theory of Giffen Goods*, (W. Heijman and P. von Mouche, Eds.), Lecture Notes in Economics and Mathematical Systems 655, Springer-Verlag Berlin Heidelberg 2012.

“Supplemental Health Insurance,” with J. M. Marshall, in *Essays in Law and Economics: Financial Markets and Insurance*, (D. Heremans, P. Van Cayseele and R. Van den Bergh, Eds.), MAKLU Publishers, Antwerpen-Appeldoorn, 1996.

### **Book Review**

“Fabian Schär and Aleksander Berentsen: Bitcoin, Blockchain, and Cryptoassets: A Comprehensive Introduction” Springer Nature: Business Economics, 2021.

### **Central Bank and International Working Group Committee Reports**

“Defining and Measuring Payment Interoperability,” World Economic Forum white paper, April 2022 with Y. Xiao (lead author), U. Ahmed, Y. Gormez, A. Loke, K. Mammadova, S. M. Öztaner, B. Nolens, V. Sosa and B. Zheng Zhang.

“Investigating the impact of global stablecoins” report by the G7 Working Group, October 2019 (significant contributor).

“Project Jasper: A Canadian Experiment with Distributed Ledger Technology for Domestic Interbank Payments Settlement,” September 29, 2017 (technical white paper written by contributors from the Bank of Canada, Payments Canada and R3).

“Central bank digital currencies,” report submitted by working groups of the CPMI and Markets Committee, Bank for International Settlements, March 2018 (significant contributor).

“Digital currencies,” with fellow members of the CPMI working group on retail payments, Bank for International Settlements, November 2015.

### **Industry Reports**

“A Proposal for a Decentralized Liquidity Savings Mechanism with Side Payments,” with A. Furgal, Z. Guo, and D. Hudson, *R3 Reports*, June 2018.

“CAD-coin versus Fedcoin,” *R3 Reports*, November 2016.

### **UNPUBLISHED WORKING PAPERS**

“The Crypto Multiplier?” with M. van Oordt, BIS Working Papers No 1104, 2023.

“Optimal Bidder Selection in Clearing House Default Auctions,” with D. Murphy, T. Nesmith and X. Wu, Federal Reserve Board Finance and Economic Discussion Series, 2022-033.

“Intraday liquidity around the world,” with B. A. Kabadjova, A. Badev, S. B. Bastos, E. Benos , F. Cepeda-Lopéz, J. Chapman, M. Diehl , I. Duca-Radu, R. Heijmans, A. Kosse, A. Martin, T.

Nellen, T. Nilsson, J. Paulick, A. Pustelnikov, F. Rivadeneyra, M. Rubem do Coutto Bastos and S. Testi, BIS Working Papers No 1089, 2023.

“The Case for Convenience: How CBDC Design Choices Impact Monetary Policy Pass-Through,” with Jiaheng Yu and Haoxiang Zhu, BIS Working Papers No 1046, 2023.

“How Banks Create Gridlock to Save Liquidity in Canada’s Large Value Payment System,” with Z. Lu and P. Tian, Bank of Canada Staff Working Paper, 2023-26.

“Trust Bridges and Money Flows: A Digital Marketplace to Improve Cross-Border Payments,” with T. Adrian, D. He and M. Griffoli, IMF Fintech Notes No 2023/001.

“An Impossibility Result for Fully Decentralized Systems,” with C. Monnet, 2022.

“Regulatory Requirements of Banks and Arbitrage in the Post-Crisis Federal Funds Market,” with Sofia Priazhkina, Bank of Canada Staff Working Paper 2022-48.

“Monetizing Privacy with Central Bank Digital Currencies,” with M. Lee, 2021.

“Estimating Policy Functions in Payments Systems using Deep Reinforcement Learning,” with P. S. Castro, A. Desai, H. Du and F. Rivadeneyra, Bank of Canada Staff Working Paper, forthcoming. (**Best Paper Award, NeurIPS 2020**).

“Efficient Bilateral Trade,” with M. Pycia, 2020.

“Who Sees the Trades: The Effect of Information Structure on Liquidity in Inter-dealer Markets,” with M. Lee, A. Martin and R. Townsend, Federal Reserve Bank of New York Staff Report no. 892, July 2019.

“The Bank of Canada’s Exposure to Default Risk in Canada’s Large Value Transfer System,” with J. Chapman and N. Zhang, Bank of Canada Staff Working Paper Staff Working Paper, forthcoming.

“Auctions with Exogenous Default,” with T. Tröger, 2016.

“Segregated Balance Accounts” with A. Martin, J. McAndrews and E. Nosal, Federal Reserve Bank of New York Staff Report no. 730, May 2015.

“Does eBay’s Second Chance Offer Policy Benefit Sellers?” with T. Tröger, 2014.

“Ideal Bootstrapping and Exact Recombination: Applications to Auction Experiments,” with C. Bergstrom and T. Bergstrom, 2009.

“Property Insurance with Conversion Options: Upper Limits and Deductibles,” with J. M. Marshall, 1999.

“Health Care Contracts and Exclusions,” with J. M. Marshall, 1997.

“Further Evidence of the Necessity of Sunspots,” with K. Shell, UCSB Working Paper in Economics #6-93.

### **SHORT ARTICLES**

“The Case for Tokenized Bank Deposits” Project Syndicate, June 12, 2023.

“Stablecoins Versus Tokenized Deposits: Implications for the Singleness of Money,” with H. S. Shin, BIS Bulletin # 73, April 11, 2023.

“The Tokenization Continuum” with I. Aldasoro, S. Doerr, L. Gambacorta and P. Koo Wilkens, BIS Bulletin # 72, 11 April 2023

“The Future of Payments is not Stablecoins,” with M. Lee, A. Martin and J. Torregrossa, Liberty Street Economics, February 7, 2022.

“Monetizing Privacy with Central Bank Digital Currencies,” with M. Lee, Liberty Street Economics, November 23, 2020.

“COVID-19 and the Search for Digital Alternatives to Cash,” with M. Lee and A. Plesset, Liberty Street Economics, September 28, 2020.

“Token-or Account-Based? A Digital Currency Can Be Both,” with M. Lee, B. Malone and A. Martin, Liberty Street Economics, August 12, 2020.

“The International Sharing of Stem Cells,” Coalition Theory Network, From Theory to Application Series, Issue number13.2016.

“A Distributed Version of Repugnance as a Constraint on Markets,” Liberty Street Economics, September 1, 2015.

“Entry and Exit Leads to Zero Profit for Bitcoin Miners,” with R. Hayes, Liberty Street Economics, August 28, 2015.

“Bitcoin: How Likely Is a 51 Percent Attack?” with R. Hayes, Liberty Street Economics, November 24, 2014.

“Turnover in Fedwire Funds Has Dropped Considerably since the Crisis, but It’s Okay,” with A. Martin and J. McAndrews, Liberty Street Economics, August 25, 2014.

### **GRANTS AND AWARDS**

Best Article Prize, Latin American Journal of Central Banking, 2021

Best Paper Award, NeurIPS 2020: Virtual Workshop on ML for Economic Policy

Best Cryptoeconomics Paper, The Third Toronto Fintech Conference, 2020

BIS Research Fellowship, Bank for International Settlements, 2019

Economics & Social Research Council (ESRC), The Role of Speculators in Standard Auctions, September 2011-November 2012, co-PI, \$48,600



NSF - SES-0851357, Bone Marrow Registries and Donor Motives, August 2009-July 2012, co-PI, \$400,000

ISBER Social Science Research Grant, 2006-2007

UC MEXUS-CONACYT Collaborative Research Grant, 2002-2003

Academic Senate Faculty Research Grant, UCSB, 1991-99, 2002, 2006

Instructional Improvement Program, Mini-grant, UCSB, 1993

International Foundation for Research in Experimental Economics (IFREE) Fellowship, 1999

Regents' Junior Faculty Fellowship, 1992

## **STUDENTS**

### **Ph.D. Students**

Chair, Nir Chemaya, 2021-present

Member, Ganghua Mei, 2018-19

Member, Gregory Leo, 2015, Vanderbilt University

External review committee (University of Groningen), Ronald Heijmans, 2012

External review committee (Aalto University), Kimmo Soramäki, 2012

Member, Shane Bradely Parendo, 2011, Tiffin University

Chair, Matthew Daniel Lang, 2010, Xavier University (currently UC Riverside)

Member, Xiaojuan (Grace) Hu, 2008

Chair, Paul Leon Niemann, 2006

Member, Ekaterina Sergeevna Chernobai, 2005, Cal Poly Pomona

Member, Apollo Dionysos Lupescu, 2004, Dimensional Fund Advisors

Member, Morten Linnemann Bech, 2002, Federal Reserve Bank of New York (currently Bank for International Settlements)

Chair, Jin-Su Park, 2002, Bank of Korea

Member, Brian John Duncan, 1998, University of Colorado Denver

### **M.A. Student**

Daniel Längle (supervised Master's thesis during exchange visit from ETH Zürich, 2012)

## **PROFESSIONAL ACTIVITIES**

### **Editorial**

Associate Editor, *Digital Finance*, 2018-present

Editorial Board, *The Journal of Network Theory in Finance*, 2014-present

Editorial Board, *The Journal of Financial Market Infrastructures*, 2012-present

Associate Editor, *Journal of Public Economic Theory*, 2006-2018

Associate Editor, *Economics Bulletin*, 2003-2010

### **Conference Organizer\Program Committee**

Program Committee, Tokenomics 2023, Columbia GSB, October 27-28, 2023

Program Committee, 2023 Warwick Business School Gillmore Centre Conference on DeFi & Digital Currencies, The Shard, London, October 27-28, 2023

Program Committee, II Regional Conference of Payments and Financial Market Infrastructures, Bogotá, Colombia, September 21-23, 2023

Program Committee, 3rd Annual CBER Conference, May 5-6, 2023

Program Committee, Tokenomics 2022, Paris, France, December 12-13, 2022

Program Committee, 2nd Annual CBER Conference, May 12, 2022

Program Committee, Second Conference on the Interconnectedness of Financial Systems, Federal Reserve Board, December 2-3, 2021

Program Committee, Tokenomics 2021, Toulouse, France, November 18-19, 2021

Program Committee, Enhancing Digital and Global Infrastructures in Cross-border Payments, Bank of Italy, September 27-28, 2021

Program Committee, Second FRB Conference on the Interconnectedness of Financial Systems, December 2-3, 2021

Program Committee, EMLA-Banco de la República Conference on Payments and Financial Market Infrastructures in Emerging Economies, 2021

Program Committee, ESCB Day Ahead Conference, De Nederlandsche Bank, August 28, 2020

Program Committee, Federal Reserve Bank of Cleveland and the Office for Financial Research “2019 Financial Stability Conference,” November 21-22, 2019

Program Committee, Conference on the Economics of Central Bank Digital Currency – by the Bank of Canada and Sveriges Riksbank, October 17-18, 2019

Program Committee, 5th Joint Bank of Canada and Payments Canada Workshop on Innovations in Payment Systems: FinTech and Central Bank Digital Currencies, Bank of Canada, September 20-21, 2018

Program Committee, Banco de México, the University of Zurich, the Bank of Canada and the Journal of Financial Stability Second Conference on Network Models and Stress Testing for Financial Stability, Mexico City, September 26-27, 2017

Co-organizer, Bank of Canada/Payments Canada Workshop on the Modelling and Simulation of Payments and Other Financial Market Infrastructures, October 27-28, 2016

Program Committee & Discussant, Banco de México, CEMLA, the University of Zurich, the IMF, and the *Journal of Financial Stability* conference “Network models, stress testing and other tools for financial stability monitoring and macroprudential policy design and implementation” November 11-12, 2015

Program Committee, PET 10, Istanbul, Turkey, 2010

Program Committee, PET 09, Galway, Ireland, 2009

Co-Organizer, Payments and Networks, UCSB, December 12-13, 2008

Co-Organizer, 10<sup>th</sup> Annual Southwest Economic Theory Conference, UCSB, March 1-2, 2008

Organizer, Auctions with Resale, UCSB, April 20-21, 2007

### **Congressional Testimony**

“The Future of Money: Digital Currencies,” Testimony before the United States House of Representatives, Committee on Financial Services, Subcommittee on Monetary Policy and Trade, July 18, 2018.

### **Recent Presentations and Invited Lecture Series**

“Engineering or Economics? How to build a Liquidity Savings Mechanism,” Networks in Modern Financial and Payment Systems, Bank of Canada, **Keynote**, June 14, 2023

“Stablecoins versus tokenised deposits: implications for the singleness of money,” 2023 Fintech: Innovation, Inclusion, and Risks Conference, Santa Clara, February 24, 2023; In-house crypto coordination and communications group meeting, BIS, April 25, 2023; BIS-IIF meeting on tokenised deposits and CBDCs, May 3, 2023; CXIV Meeting of Governors of Central Banks of CEMLA, Cartagena Colombia, **Keynote**, May 6, 2023.

“Privacy and CBDC,” DC<sup>3</sup> Conference: from Cryptocurrencies to Central Bank Digital Currencies, January 26, 2023

“An Impossibility Result for Fully Decentralized Systems,” George Mason University, TEME Conference, October 28, 2022; Tokenomics 2022, Paris, December 12, 2022; ASSA Winter Meetings, New Orleans, January 8, 2023.

“Tokenised Deposits,” DeFi & Digital Currencies: The Challenges & Opportunities for Policy Makers, London, November 21, 2022.

“The Case for Convenience: How CBDC Design Choices Impact Monetary Policy Pass-Through,” Future(s) of Money Conference, Paris, June 16, 2022; University of Calgary, September 7, 2022; Riksbank, Sweden, November 22, 2022; Federal Reserve Bank of Cleveland, March 7, 2023; BIS Webinar Series, March 23, 2023.

“From Bitcoin to Stablecoins,” UCSB Alumni Event, Seattle, May 25, 2022.

“Rethinking Money in the Age of Cryptocurrencies,” University of the West, April 13, 2022.

“Stablecoins versus Traditional Cryptoassets: Distinctive Features, Market Evolution and Trends,” V Fintech Forum Meeting, CEMLA, **Keynote**, March 23, 2022.

“Privacy and Central Bank Digital Currencies,” Luohan Academy Webinar, January 17, 2022.

“Optimal Risk Sharing via Stablecoins,” Central Bank Research Association session at the ASSA winter meetings, January 9, 2022.

“Central Bank Digital Currencies” CEMLA-R3 Research Project Launch on Central Bank Digital Currencies, **Keynote**, December 16, 2021.

“Monetizing Privacy with Central Bank Digital Currencies,” Bank of Lithuania, May 7, 2021; CEMLA and Banco de la República Columbia Regional Conference on Payments and Market Infrastructures, **Keynote**, June 16, 2021; WEAI Virtual 96<sup>th</sup> Annual Meeting, June 30, 2021; MED seminar, BIS, October 26, 2021; Reserve Bank of Australia, November 2, 2021; Federal Reserve Bank of Cleveland, November 4, 2021; Federal Reserve Bank of Atlanta, November 15, 2021; Chinese Economic Association in North America & American Economic Association) session at the ASSA winter meetings, January 7, 2022.

“On Interest-Bearing Central Bank Digital Currencies,” Bank of Canada, January 18, 2021; WFE's Clearing & Derivatives Conference, **Keynote**, April 16, 2021; Canadian Economics Association Annual Meeting, June 3, 2021; University of Pennsylvania/Federal Reserve Bank of Philadelphia Workshop on the Economics of Digital Currencies, Sept 2, 2021; CB&DC seminar, September 24, 2021.

“Estimating Policy Functions in Payment Systems using Reinforcement Learning,” NeurIPS 2020: virtual workshop on ML for Economic Policy, December 11, 2020; AEA Poster Session, January 7, 2022.

“Why Fixed Costs Matter for Proof-of-Work Based Cryptocurrencies,” Ecole Polytechnique CREST Virtual Finance Theory Seminar Series, June 3, 2020; Crypto Economics Security Conference (CESC) 2020, July 9; Joint-School Online Digital-Economy Seminar: Renmin University, Hong Kong Baptist University, and National Taiwan University, July 23, 2020; CBER Webinar on Crypto and Blockchain, France, September 3, 2020; Federal Reserve Bank of Cleveland, October 1, 2020; UC Irvine, November 18, 2020; Stanford University Investment Club, January 25, 2021; University of Birmingham. March 16, 2022.

“Privacy as a Public Good: A Case for Electronic Cash,” TSE Sustainable Finance Inaugural Conference, Toulouse, France, December 8, 2019; ASSA Winter Meetings, San Diego, January 3, 2020.

“The Role of Trust in Publicly and Privately Issued Outside Monies,” CryptoEconomics Security Conference 2019, San Francisco Blockchain Week, October 28.

“Trust,” Payments Canada Summit 2019, Toronto, **Keynote**.

“The Role of Entrepreneurial Incentives in Initial Coin Offerings,” Purdue, April 11, 2019; University of Indiana, April 12, 2019; Tokenomics 2019, Paris; GDRR Program Blockchain Workshop, SAMSI, Durham NC, October 7, 2019; Center for Financial Mathematics and Actuarial Research, UCSB, February 10, 2020.

“The ‘Money Flower’ and the Fall of Cash,” Blockchain Unbound, Tokyo, Japan, **Keynote**, October 15, 2018.

“An Application of Shapley Value Cost Allocation to Liquidity Savings Mechanisms,” Bank of England. November 12, 2018; Bank of Canada, Ottawa, March 5, 2019; BIS mini-conference: Liquidity usage in large-value payment systems, Basel, Switzerland, September 8, 2020.

“Endogenous Liquidity and Inter-Dealer Trading in Over-The-Counter Markets” Federal Reserve Bank of Cleveland. September 26, 2018.

“Taxonomy of Money and Central Bank Digital Currencies,” CMF Technical Workshop, Central Bank Digital Currency: Progress and Challenges, Inter-American Development Bank, Washington, D.C., September 18, 2018.

“Paying for Payments,” Bank of Finland 16<sup>th</sup> Simulator Seminar, **Keynote**, August 2018.

“Will Cryptocurrencies Disintermediate Banks,” G20 Global Financial Stability Conference, Seoul Korea, June 14, 2018.

“Money in the Digital Landscape,” Decoding Digital Currency, Federal Reserve Bank of San Francisco, May 15, 2018.

“What do Central Banks Think of Cryptocurrencies?” Blockchain at UCSB, **Public Lecture**, May 2, 2018.

“Cryptocurrencies and Global Monetary Policy,” Business of Blockchain, MIT Media Lab, Cambridge, MA, April 23, 2018.

“Who sees the Trades: The Effect of Information Structure on Liquidity in Inter-dealer Markets” Division of Reserve Bank Operations and Payment Systems, Board of Governors, Washington, DC, March 26, 2018; Bank of Canada, Ottawa, ON, March 29, 2018; 9<sup>th</sup> Shanghai Microeconomics Workshop, Shanghai, China June 15, 2018; November 14, Bank of England.

“Cash, Cryptocurrencies and Digital Payments, Blockchain Unbound, San Juan, Puerto Rico, March 15, 2018; Board of Governors of the Federal Reserve System, Washington, DC, March 27, 2018; Redburn – The 2018 Banks Conference, Claridge’s, Brook Street, London, May 23, 2018; Twelfth Annual Risk Management Conference, **Plenary**, National University of Singapore and Risk Management Institute, Singapore, July 26, 2018.

“Decentralized Liquidity Savings Mechanisms,” Bank of Canada and Payments Canada Payments Research Symposium, Ottawa, October 11, 2017.

“Designing a Liquidity Savings Mechanism,” Bank of Canada, August 3, 2017.

“From Bitcoin to Central Bank Digital Currencies,” GRIT talk, UCSB, July 17, 2017.

“Bitcoin 1, Bitcoin 2,...: An experiment in privately issued outside monies,” Deutsche Bundesbank Spring Conference 2017: Frontiers in Central Banking, Frankfurt, Germany, June 13, 2017; Bank of Canada, August 2, 2017.

“Project Jasper Phase II: Distributed Ledger for Central Banking,” Payments Canada Summit, Toronto, Canada, May 25, 2017.

“What are Central Bank Digital Currencies and What are They Good For?” Global Interdependence Center (GIC)’s Payment Systems in the Internet Age, San Diego, CA, February 6; CPMI Fintech Series, Bank for International Settlements, May 4, 2017; R3 Regulator & Central Bank Conference, New York, New York, May 24, 2017.

“The Economics of Distributed Ledger Technology for Securities Settlement,” Financial Stability Board FinTech Issues Group Roundtable with Academics, Ottawa, Canada, March 22, 2017.

“Policy After the Financial Crash,” **Public Lecture** at SBCC hosted by The Economic Club of Santa Barbara, November 2016.

“Project Jasper -The Perspective From Central Banks, System Operators, and Commercial Banks,” Payments Canada, Ottawa, October 28, 2016.

“Centralized Netting in Financial Networks,” **Keynote**, Bank of Canada/Payments Canada Workshop on the Modelling and Simulation of Payments and Other Financial System Infrastructures, Oct 27, 2016; Monetary and Economic Development Seminar, Bank for International Settlements, May 19, 2017.

“Mini-Course on Auctions” Queen’s University,” September 12-16, 2016.

“Let Me, or Let George? Motives of Competing Altruists” Bay Area Behavioral and Experimental Economics Workshop, Haas School of Business, University of California Berkeley, May 7, 2016.

“Segregated Balance Accounts” Cornell/PSU Macro Workshop, Ithaca, NY, Sept 27, 2015; Bayreuth University, Germany, December 10, 2015, **Public Lecture**; Workshop in Honor of Jamie McAndrews, Federal Reserve Bank of New York, June 2016.

### **Recent Panels and Discussions**

Panelist, CBDCs, Tokenisation and DeFi – Exploring Opportunities with Project Mariana, Point Zero Forum Innovation Tour by BISIH, Zurich, June 28, 2023.

Invited Guest, Roundtable Discussion on Privacy in Digital Money from a Technology and Economic Perspective, Point Zero Forum, Zurich, June 26, 2023.

Invited Guest, Roundtable Discussion on Central bank Digital Currencies, His Majesty’s Treasury, London, UK, May 23, 2023

Discussant, CB & DC Virtual Seminar Series, December 16, 2022

Panelist, Economic Studies at Brookings, Hutchins Center & Center on Regulation and Markets discussion on stablecoin regulation, July 15, 2022

Panelist, Regulatory Issues of Stablecoins and Crypto-assets, Virtual Outreach Meeting, July 13, 2022

Panelist, New York Fed and Columbia SIPA Monetary Policy Implementation Workshop, June 1, 2022

IMF-BIS Workshop on Stablecoins (internal), May 12, 2022

Discussant, When Banks Meet the Official Sector, American Finance Association session at the ASSA winter meetings, January 7, 2022

Firestarter (Discussion leader), WEF-IDB Digital Payments in LAC workshop, November 16, 2021

Panelist, IBD LAB Forum, Massifying Digital Payments in Latin American and Caribbean Countries, October 27, 2021

Panelist, Emerging Risks, Digital technologies and Climate change, Meeting of Heads of Operational Risk in Central Banking, CEMLA, Mexico City, September 28, 2021

Session Chair, Enhancing Digital and Global Infrastructures in Cross-border Payments, Bank of Italy, September 27-28, 2021

Discussant, Bank of Canada: The Economics of Central Bank of Digital Currency, Canadian Economics Association Annual Meeting, June 3, 2021

Discussant, SNB-CIF Conference on Cryptoassets and Financial Innovation May 20, 2021

Moderator, CBDCs: Opportunities, Challenges and Design, Sapienza DLT Banking Virtual Conference, December 17, 2020

Panelist, Central Bank Digital Currency (CBDC) Roundtable, Farrer & Co, in collaboration with University College London and University of Cambridge and the Cambridge Blockchain Hub, November 12, 2020

Panelist, "The New Digitalization of International Finance and the Future of the International Monetary System," Dialogue of Continents 2020, The New Age of Imagination, Reinventing Bretton Woods Committee, November 5, 2020

Panelist, "Decentralized Finance and Central Bank Digital Currencies," Lehigh Quant Conference, September 25, 2020

Panelist, “Digital Currencies” Toulouse, France, December 9, 2019

Panelist, “Institutionalizing Digital Currency” Santa Barbara Blockchain Society, UCSB, November 23, 2019

Moderator and Discussant, “Emerging Technologies,” 2019 Financial Stability Conference: Financial Stability: Risks, Resilience, and Policy, Federal Reserve Bank of Cleveland, November 21, 2019

Panelist, “Private Digital Currencies or Central Bank Digital Currencies?” Third Annual Fintech Conference, Federal Reserve Bank of Philadelphia, November 15, 2019

Discussant, Bank for International Settlements conference on “Fintech and Digital Currencies,” September 27, 2019

Panelist, Bank for International Settlements Advisory Panel on “Macroeconomic and Financial Stability Implications for Financial Innovation,” September 26, 2019

Panelist, Bank for International Settlements Advisory Panel on “Financial Innovation and Digitisation: Implications for Central Banks and Regulators,” September 25, 2019

Discussant, “NBER conference on Blockchain,” MIT, 2019

Panelist, “Is There a Future for Digital Fiat Currency?” Ninth Annual Financial Services Symposium, Scalia Law School, George Mason University, April 4, 2019

Discussant, FRB Conference on the Interconnectedness of Financial Systems, Board of Governors, Washington, DC., March 7-8, 2019

Panelist, “Interconnectedness and Networks,” OFR-Cleveland Fed Conference on Financial Stability, Markets and Spillovers, Washington DC., November 29, 2018

Panelist, “A central banking view of CBDC,” 5th Joint Bank of Canada and Payments Canada Workshop on Innovations in Payment Systems: FinTech and Central Bank Digital Currencies, September 20, 2018

Panelist, “Cryptocurrencies and Global Monetary Policy” Business of Blockchain, MIT Media Lab, Cambridge, MA, 2018

Panelist, “Banking Bitcoin and Other Crypto Assets,” Blockchain Unbound, San Juan, Puerto Rico, March 15, 2018

Panelist, “Distributed ledger technology – possible use cases in clearing and settlement,” Financial Market Infrastructure Conference II: New Thinking in a New Era, An Interdisciplinary Conference for Policy-Makers, Practitioners and Academics, Amsterdam, June 7, 2017



Discussant, Deutsche Bundesbank International Conference on Payments and Settlement, November 9-10, 2016

Discussant, Monetary Implementation in the Long Run Conference, Federal Reserve Bank of Minneapolis, October 18-19, 2016

Panelist, Round Table Discussion on "Business and Regulation of P2P Financial Markets" at the 2nd International Workshop on P2P Financial Systems, University College London, UK, 2016

Discussant, Charles Kahn Festschrift Conference, Banff, Alberta, Canada, June 2016

### **University Service**

Committee on Academic Personnel, 2017-18, 2019-21

Central Recruitment Fellowship Committee, 2006-07

Campus Graduate Fellowship Committee, 2000, 2002

Chair, Fiscal Integrity Subcommittee (NCAA Athletics Certification), 1998-99

Member, Faculty Legislature, 1997-98

Member, Intercollegiate Athletic Review Committee, 1997-98

Member, Instructional Development Committee, 1996-97

Department Liaison, United Way, 1993

Member, Intercollegiate Athletic Policy Board, 1992-94, 1996

### **Consulting**

Chainlink 2021-22; IMF 2020-21; Bank of Canada 2017-21; Onai 2018, Blockchain Industries Inc. 2018; Chimes 2017; Payments Canada and R3 2016-17; Institute for Justice 2010

### **Referee**

NSF, *American Economic Review*, *Econometrica*, *Review of Economic Studies*, *Journal of Political Economy*, *International Economic Review*, *Journal of Economic Theory*, *Theoretical Economics*, *Journal of Monetary Economics*, *Journal of Money Credit and Banking*, *Games and Economic Behavior*, *Journal of Banking & Finance*, *International Journal of Central Banking*, *Journal of Financial Market Infrastructures*, *European Economic Review*, *American Economic Journal: Microeconomics*, *RAND Journal of Economics*, *Economic Theory*, *American Political Science Review*, *Review of Economic Dynamics*, *Canadian Journal of Economics*, *Journal of Economic Dynamics and Control*, *Economic Inquiry*, *Journal of Economic Education*, *Resource and Energy Economics*, *Journal of Public Economic Theory*, *Journal of Public Economics*, *Economics Bulletin*, *Review of Industrial Organization*, *Mathematical Population Studies*, *Economics Letters*, *European Journal of Finance*, *Journal of Financial Intermediation*