

# FINTECH: THE IMPACT ON CONSUMERS, BANKING, AND REGULATORY POLICY

SEPTEMBER 28–29, 2017

A JOINT CONFERENCE OF THE FEDERAL RESERVE BANK OF PHILADELPHIA,  
NYU STERN SCHOOL OF BUSINESS, AND THE *JOURNAL OF ECONOMICS  
AND BUSINESS*



FEDERAL RESERVE BANK OF PHILADELPHIA



NYU | STERN



This conference provides a platform for experts from academic institutions, regulatory agencies, and the financial industry to come together to discuss the various issues related to fintech and its impact on consumer choice, shadow banking and regulatory arbitrage, cost/benefits and efficiencies, macroprudential supervision, and stability and resiliency in the financial system.

Fintech has changed the financial landscape and has been quite disruptive.

On the supply side, nonbank fintech servicers have grown rapidly in response to more stringent and complex financial regulations following the recent crisis. Some have argued that with its technology platforms and ability to use alternative information sources for credit decisions and unconventional underwriting techniques, the fintech shadow banking sector has been able to offer faster, better, and cheaper services to its customers in processing times, automatic applications, minimal demands for financial documents, and funding as early as the same day.

On the demand side, as more millennials make up the pool of small business owners, they may be more comfortable with technology and may prefer dealing with an online lender versus an in-person loan officer. Given the speed of innovation to date, there is likely to be continued advancements in this space.

In addition, blockchain technology, which was initially used for Bitcoin transactions, also has the potential to create a major disruption in the financial landscape. Moreover, many countries (including Sweden, Korea, and China) have explored their own digital currencies. It remains unclear whether this sector will continue to grow (since it has not yet gone through the entire economic cycle) and what impact it will have on monetary policy and financial stability overall.

## **Conference Organizers and Journal Guest Editors**

Julapa Jagtiani (Managing Editor) — Federal Reserve Bank of Philadelphia

Robert M. Hunt — Federal Reserve Bank of Philadelphia

Kose John — NYU Stern School of Business

Ken Kopecky — *Journal of Economics and Business*

# Agenda

## Thursday, September 28

12:00 noon–12:40 p.m.

### Registration and Refreshments

12:40 p.m.–12:50 p.m.

### Welcome and Opening Remarks

**William G. Spaniel** (Senior Vice President, FRB Philadelphia)

12:50 p.m.–1:30 p.m.

### Industry Keynote Speeches

- **Robert Nichols** (President and Chief Executive Officer, American Bankers Association)
- **Brad Pennington** (Chief Risk Officer, Prosper Marketplace) – substitute for Ron Suber (previous President and Chief Executive Officer, Prosper)

1:30 p.m.–2:10 p.m.

### Topic Keynote — Fintech Lending and Roles of Alternative Informationw

Moderator: **Samuel Taussig** (Head of Global Policy, Kabbage, Inc.)

- **Tracy Basinger** (Executive Vice President, FRB San Francisco)
- **Spencer Robinson** (Head of Strategy, Kabbage)

2:10 p.m.–3:55 p.m.

### Research — Fintech Lending and Roles of Alternative Information

Moderator: **Kose John** (NYU Stern School of Business)

**Paper 1:** “FinTechs and the Market for Financial Analysis”

Roni Michaely (Cornell University) and **Jillian Popadak** (Duke University)

Discussant: **Itay Goldstein** (The Wharton School of the University of Pennsylvania)

**Paper 2:** “Fintech Lending: Financial Inclusion, Risk Pricing, and Alternative Information”

**Julapa Jagtiani** (FRB Philadelphia) and **Catharine Lemieux** (FRB Chicago)

Discussant: **Christine Cumming** (Columbia)

University School of International and Public Affairs)

**Paper 3:** “Fintech, Regulatory Arbitrage, and the Rise of Shadow Banks”

Greg Buchak (University of Chicago), Gregor Matvos (University of Texas at Austin), **Tomasz Piskorski** (Columbia University), and Amit Seru (Stanford University)

Discussant: **John Sedunov** (Villanova University)

3:55 p.m.–4:10 p.m.

Coffee Break

4:10 p.m.–4:50 p.m.

### **Topic Keynote — Bitcoin, Blockchain, and Cryptocurrencies**

Moderator: **William W. Lang** (Managing Director, Promontory Financial)

- **William Nelson** (Executive Managing Director, The Clearing House)
- **Jim Cunha** (Senior Vice President, FRB Boston)

4:50 p.m.–6:10 p.m.

### **Research — Bitcoin, Blockchain, Digital Currency, and Machine Learning**

Moderator: **Robert M. Hunt** (Senior Vice President, FRB Philadelphia)

**Paper 1:** “The Law of One Bitcoin Price?”

Alexander Kroeger and **Asani Sarkar** (FRB New York)

**Paper 2:** “Blockchain Disruption and Smart Contracts”

**Lin William Cong** and Zhiguo He (University of Chicago)

**Paper 3:** “The Price of a Digital Currency”

**Arash Aloosh** (NEOMA Business School)

**Paper 4:** “The Economics of Distributed Ledger Technology for Securities Settlement”

**Evangelos Benos** (Bank of England), Rod Garratt (University of California, Santa Barbara), and Pedro Gurrola-Perez (Bank of England)

# Agenda

6:10 p.m.–7:30 p.m. Cocktail Reception

7:30 p.m.–9:00 p.m. Speaker Dinner

## Friday, September 29

7:45 a.m.–8:45 a.m. Continental Breakfast

8:45 a.m.–9:55 a.m. **Research — Fintech and the New Financial Landscapes**

Moderator: **Ken Kopecky** (*Journal of Economics and Business*)

**Paper 1:** “Competition in the Financial Advisory Market: Robo versus Traditional Advisors”

**Antje Berndt**, Sevin Yeltekin, and Honglin Yu (Australian National University)

**Paper 2:** “Does FinTech Affect Household Saving Behavior?”

**Gregor Becker** (Goethe University)

**Paper 3:** “Integrating the Troublemakers: A Taxonomy for Cooperation between Banks and Fintechs”

Benedict Drasch, **André Schweizer**, and Nils Urbach (University of Bayreuth)

9:55 a.m.–10:45 a.m. **Topic Keynote – Fintech and the New Financial Landscapes**

Moderator: **Richard Neiman** (Head of Regulatory and Government Affairs, LendingClub)

- **Siddhartha Jajodia** (Chief Investment Officer, LendingClub)
- **Usman Ahmed** (Head of Global Public Policy, PayPal, Inc.)

10:45 a.m.–11:00 a.m. Coffee Break

11:00 a.m.–11:45 a.m. **A Conversation with Patrick T. Harker**

**Patrick T. Harker** (President and Chief Executive Officer, FRB Philadelphia)

Introduced by: **Richard Herring** (The Wharton School of the University of Pennsylvania)

Moderator: **Mukul Pandya** (Knowledge@Wharton)

11:45 a.m.–12:30 p.m. **A Fintech Conversation with OCC Comptroller**

**Keith A. Noreika** (Acting Comptroller of the Currency, OCC)

Introduced by: **Julapa Jagtiani** (FRB Philadelphia)

Moderator: **Richard Herring** (The Wharton School of the University of Pennsylvania)

12:30 p.m.–1:45 p.m. Lunch

1:45 p.m.–3:00 p.m. **Research — Machine Learning and Artificial Intelligence**

Moderator: **Robin A. Prager** (Federal Reserve Board)

**Paper 1:** “Some Financial Regulatory Implications of Artificial Intelligence”

**Larry Wall** (FRB Atlanta)

**Paper 2:** “Market Design with Blockchain Technology”

Katya Malinova and **Andreas Park** (University of Toronto)

**Paper 3:** “Between the Lines: Decipher the Firms’ Fundamentals with Artificial Intelligence”

**Yanzhen Chen**, Huaxia Rui, and Andrew B. Whinston  
(University of Texas at Austin)

3:00 p.m.–3:15 p.m. Coffee Break

3:15 p.m.–4:30 p.m. **Research — Marketplace Lending and Crowdfunding**

Moderator: **Paul Calem** (FRB Philadelphia)

**Paper 1:** “Law, Trust, and the Development of Crowdfunding”

**P. Raghavendra Rau** (University of Cambridge)

**Paper 2:** “Profit Sharing: A Contracting Solution to Harness the Wisdom of the Crowd”

**Jiasun Li** (George Mason University)

**Paper 3:** “Financing Efficiency of Securities-Based Crowdfunding”

**David C. Brown** (University of Arizona) and Shaun William Davies (University of Colorado)

4:30 p.m.–5:15 p.m. **Topic Keynote — Machine Learning and Artificial Intelligence**

Moderator: **Christine A. Parlour** (University of California, Berkeley)

- **John Schindler** (Federal Reserve Board)
- **Gurvinder Ahluwalia** (Founder of Digital Twin Labs, LLC; previously CTO Technical Solutioning and Blockchain, IBM)

5:15 p.m.–5:25 p.m. **Closing Remarks**

**James D. Narron** (First Vice President and Chief Operating Officer, FRB Philadelphia)



## **Gurvinder Ahluwalia**

**Founder  
Digital Twin Labs, LLC**

Gurvinder Ahluwalia founded Digital Twin Labs, LLC, in mid-2017. His lab produces new technologies that are interwoven with the cloud, the Internet of things (IoT), and machine learning for cohesive value. Previously, Ahluwalia was the chief technology officer for IBM's Technical Solutioning unit in the cloud, blockchain, and IoT. At Motorola, Ahluwalia deployed the second-largest enterprise network in the world at the beginning of the Transmission Control Protocol/Internet Protocol (TCP/IP). Ahluwalia is a frequent speaker at leading industry venues, including the Massachusetts Institute of Technology; Stanford University; the University of California, Berkeley; the Samsung Developer Conference; the Interop conference; and private workshops. His team at Digital Twin Labs is proving and building products and venture formations based on blockchain, the cloud, IoT, artificial intelligence, machine learning, cryptotokens, and other cryptoassets.



## **Usman Ahmed**

**Head of Global Public Policy  
PayPal, Inc.**

Usman Ahmed is the head of global public policy at PayPal, Inc. His work covers a variety of global issues, including financial services regulation, innovation, international trade, and entrepreneurship. He has presented on these subjects at conferences and universities around the world and has been published in the *World Economic Forum Global Information Technology Report*, MIT Press's *Innovations* journal, and the Boston University *International Law Journal*. Ahmed is also an adjunct professor of law at Georgetown University Law School, where he teaches fintech law and policy. Prior to PayPal, Ahmed worked at a number of policy think tanks in the Washington, D.C., area, focusing on governance issues. Ahmed has a J.D. from the University of Michigan, an M.A. from Georgetown University's School of Foreign Service, and a B.A. from the University of Maryland.



## **Arash Aloosh**

**Assistant Professor of Finance  
NEOMA Business School**

Arash Aloosh is an assistant professor of finance at the NEOMA Business School. Before joining NEOMA, he spent two

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years at Columbia Business School as a visiting scholar. His research interests are mainly in international finance, corporate finance, digital currencies, and financial markets and innovations. Aloosh has a Ph.D. in finance from the BI Norwegian Business School.



## **Tracy Basinger**

**Executive Vice President  
Federal Reserve Bank of San Francisco**

Tracy Basinger is executive vice president and director of the Financial Institution Supervision and Credit Division (FISC) at the Federal Reserve Bank of San Francisco. She is also an executive committee member at the San Francisco

Fed. Basinger started her career at the Bank in 1989 as an associate examiner and has held a number of positions with increasing responsibility during her 28-year tenure. In 2001, she became a Bank officer with responsibility for Consumer Compliance Supervision. She was promoted to vice president in 2008 and added oversight of the Safety and Soundness Examination Teams to her portfolio. Basinger was named group vice president in 2012 and took on additional responsibility for the division's Shared Support Services. In 2015, her responsibilities expanded to include oversight of the Bank's Regulatory Applications and Financial Technology (fintech) functions. Her leadership in the fintech arena extends beyond the Bank. She is a Federal Reserve representative on the Basel Committee on Banking Supervision's Task Force on Financial Technology and is leading the System's supervision initiative to research developments in fintech to better understand risks and opportunities and help shape the System's response.



## **Gregor Becker**

**Doctoral Candidate  
Goethe University**

Gregor Becker is a Ph.D. student of Andreas Hackethal, dean of the Goethe Business School at Goethe University, Frankfurt. His main research interest is the effect of emerging financial technology (fintech) on household saving

and consumption behavior. To answer his research questions, he works with a European bank and uses granular deidentified data from its proprietary fintech services. Before joining Hackethal's research team, Becker was a senior associate at McKinsey & Company's office in Cologne, Germany. He also gained working experience at Morgan Stanley, Deutsche Bank, Boston Consulting Group, and A.T. Kearney. Becker has an M.S. and a B.S. in business administration from the University of Mannheim. He also studied at the University of Washington and Mahidol University.



## **Evangelos Benos**

**Research Economist  
Bank of England**

Evangelos Benos is a research economist in the Markets Infrastructure Directorate of the Bank of England. His work spans a range of topics related to market structure, such as over-the-counter derivatives, securities markets, high-frequency trading, and payment systems. Benos has taught undergraduate and graduate courses at various universities in the U.S. and Europe. He has a Ph.D. in economics from the University of Illinois at Urbana-Champaign.



## **Antje Berndt**

**Professor of Finance  
Australian National University**

Antje Berndt is a professor in finance and the deputy director (research) at the Research School of Finance, Actuarial Studies, and Statistics at Australian National University (ANU). Before joining the ANU, Berndt held academic appointments at North Carolina State University, Carnegie Mellon University, and Cornell University. Her research focuses on the theoretical and empirical analysis of different sources of delinquency risk: corporate credit risk, mortgage default risk, and fiscal risk. She has published in many finance and economics journals, including the Wall Street Journal and for Reuters. She has also appeared on CNBC's Squawk Box and American Public Media's Marketplace. She has presented at National Bureau of Economic Research workshops; annual meetings of the American Finance Association, the Western Finance Association, the European Finance Association, and the Society for Economic Dynamics; and nearly 50 seminars. Berndt is an ANU Futures Fellow and was the recipient of the PNC Professorship in Computational Finance, the Global Association of Risk Professionals Risk Management Research Award, a Fulbright Enterprise Scholarship, Moody's Research Award, and National Science Foundation and National Security Agency funding. She has a Ph.D. from Stanford University and an M.A. from Columbia University.



## **David C. Brown**

**Assistant Professor of Finance  
University of Arizona**

David C. Brown is an assistant professor of finance at the Eller College of Management at the University of Arizona. His areas of research are asset management, crowd-funding,

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initial public offerings, and retirement taxation. His research has been published in the *Journal of Finance Economics*. Brown has a Ph.D. from the University of Colorado's Leeds School of Business and a B.S. in business from the University of Kansas.



## **Paul Calem**

**Vice President  
Supervision, Regulation, and Credit  
Federal Reserve Bank of Philadelphia**

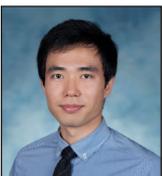
Paul Calem is vice president and chief of the Risk Identification section in the Supervision, Regulation, and Credit Department at the Federal Reserve Bank of Philadelphia. His current responsibilities include developing advanced quantitative tools for monitoring emerging risks in retail credit markets, quantitative support of bank examinations, and policy analysis and research. Previously, he was a senior economist in the Division of Banking Supervision and Regulation at the Federal Reserve Board. Calem transitioned to banking supervision after several years in mortgage market modeling and analytics in the private sector, including LoanPerformance and Freddie Mac, and he held positions in the Division of Research and Statistics at the Federal Reserve Board and the Research Department of the Philadelphia Fed. He has a Ph.D. in economics from Brown University and a B.A. in mathematics from Duke University.



## **Yanzhen Chen**

**Assistant Professor  
Hong Kong University of Science and Technology's  
Business School**

Yanzhen Chen is an assistant professor at Hong Kong University of Science and Technology's Business School. Her research focuses on artificial intelligence in transforming financial analytics. Her current projects include empirical studies on corporate finance and behavior asset pricing. Yanzhchen has a Ph.D. from the University of Texas at Austin.



## **Lin William Cong**

**Assistant Professor of Finance  
University of Chicago**

Lin William Cong is an assistant professor of finance and a Ph.D. advisor at the University of Chicago's Booth School

of Business, and a faculty member at the Center for East Asian Studies. He was a former doctoral fellow at the Stanford Institute for Innovation in Developing Economies, a George Shultz Scholar at the Stanford Institute for Economic Policy Research, and an academic committee member for the International Physics Olympiad. Cong is an advisor for the nonprofit Wall Street Blockchain Alliance and is a member of the Finance Theory Group, the American Economic Association, the American Finance Association, the European Finance Association, the Society of Financial Studies, the Western Finance Association, and the Econometric Society. Cong has a Ph.D. in finance and an M.S. in statistics from Stanford University, where he was the president of Ph.D. students. He also has dual degrees from Harvard University, where he graduated summa cum laude, with an A.M. in physics, an A.B. in math and physics, a minor in economics, and a language citation in French.



## **Christine Cumming**

**Adjunct Senior Research Scholar  
Columbia University School of International and  
Public Affairs**

Christine Cumming is an adjunct senior research scholar and an adjunct professor in the School of International and Public Affairs (SIPA) at Columbia University. She was appointed SIPA's first Central Banker in Residence. Before retiring in 2015 as first vice president and chief operating officer of the Federal Reserve Bank of New York, her 35-year career at the Bank included participating in international working groups on financial institution capital, liquidity, and risk management. When she retired, Cumming chaired the Financial Stability Board's Cross-Border Crisis Management Group, which coordinates resolution planning for global financial institutions. Cumming has a Ph.D. and a B.S. in economics from the University of Minnesota.



## **Jim Cunha**

**Senior Vice President  
Federal Reserve Bank of Boston**

Jim Cunha is senior vice president of the Treasury and Financial Services Group at the Federal Reserve Bank of Boston. His group's responsibilities include cash processing, payments/mobile strategies, and wholesale payment operations. The group is also responsible for two emerging payment businesses for the U.S. Treasury: stored value card (SVC) and invoice processing platform (IPP). SVC is a prepaid smartcard-based service used by the Department of Defense for domestic training bases, overseas peace-keeping bases, and (soon) the U.S. Navy. IPP helps automate the purchase order and

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invoice exchange processing for U.S. government agencies and their vendors and functions as a central repository for vendor payment-related information. The Payment Strategies group works with the industry to understand and remove barriers to adoption of mobile payments in the U.S. Cunha is also leading the Bank's applied research into distributed ledger technologies in financial services and studies digital currencies. He joined the Federal Reserve in 1984. Prior to that, Cunha worked at Fleet National Bank. He is a member of the board of directors of the New England ACH (NEACH) Association and the Justice Resource Institute (JRI). He has a B.S. in accounting and philosophy from Northeastern University and a B.A. in computer science from Rhode Island College.



## **Shaun William Davies**

**Assistant Professor of Finance  
University of Colorado**

Shaun William Davies is an assistant professor of finance at the Leeds School of Business at the University of Colorado. Davies is also a chartered financial analyst (CFA) charterholder. His areas of research are asset management, socially responsible investing (SRI), and crowdfunding. He has a Ph.D. from UCLA Anderson's Graduate School of Management, an M.A. in economics from UCLA, and a B.S. in applied mathematics and a B.A. in economics at the University of Colorado.



## **Itay Goldstein**

**Joel S. Ehrenkrantz Family Professor in the Finance  
Department  
The Wharton School of the University of Pennsylvania**

Itay Goldstein is the Joel S. Ehrenkrantz Family Professor in the Finance Department at the Wharton School of the University of Pennsylvania. He has been on the faculty of the Wharton School since 2004 and is the coordinator of the Ph.D. program in finance. His secondary appointment is as a professor of economics at the University of Pennsylvania. His research has been published in many academic journals, including the *American Economic Review*, the *Journal of Finance*, the *Journal of Financial Economics*, the *Review of Economic Studies*, and the *Review of Financial Studies*. His research has also been featured in the popular press in *The Economist*, the *Wall Street Journal*, the *Financial Times*, *Bloomberg*, *Forbes*, National Public Radio, and others. Goldstein is an editor of the *Review of Financial Studies*; he has been an editor of the Finance Department in *Management Science* and an editor of the *Journal of Financial Intermediation*. He has also been an academic advisor at the Federal Reserve Banks of New York, Philadelphia, and Richmond; the Bank of Canada; and the Committee

for Capital Markets Regulation. He was the cofounder and the first president of the Finance Theory Group. Before Wharton, Goldstein was on the faculty of Duke University's Fuqua School of Business. He also worked in the Research Department of the Bank of Israel. Goldstein has a Ph.D. in economics from Tel Aviv University.



## **Patrick T. Harker**

### **President and Chief Executive Officer Federal Reserve Bank of Philadelphia**

Patrick T. Harker took office on July 1, 2015, as the 11th president and CEO of the Federal Reserve Bank of Philadelphia. In 2017, he serves as a voting member of the Federal Open Market Committee (FOMC). Before taking office at the Philadelphia Fed, Harker was the 26th president of the University of Delaware. He was also a professor at the university's Alfred Lerner College of Business and Economics and a professor of civil and environmental engineering at the College of Engineering. Before joining the University of Delaware in 2007, he was dean of the Wharton School of the University of Pennsylvania. Prior to being appointed dean in 2000, Harker was the Wharton School's interim dean and deputy dean as well as the chair of its operations and information management department. In 1991, he was the youngest faculty member in Wharton's history to be awarded an endowed professorship as UPS Transportation Professor of the Private Sector. He has published/edited nine books and more than 100 professional articles. From 1996 to 1999, he was editor-in-chief of the journal *Operations Research*. In 2012, Harker was named a fellow of the Institute for Operations Research and the Management Sciences and a charter fellow of the National Academy of Inventors. He was also named a White House fellow by President George H.W. Bush in 1991 and served as a special assistant to FBI Director William S. Sessions from 1991 to 1992. Harker was also a nonbanking Class B director of the Philadelphia Fed from 2012 to 2015. He has a Ph.D. in civil and urban engineering, an M.A. in economics, and an M.S.E. and B.S.E. in civil engineering, all from the University of Pennsylvania.



## **Richard Herring**

### **Jacob Safra Professor of International Banking and Professor of Finance The Wharton School of the University of Pennsylvania**

Richard J. Herring is the Jacob Safra Professor of International Banking and professor of finance at the Wharton School of the University of Pennsylvania, where he is director of the Wharton Financial

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Institutions Center. He also was vice dean and director of the Wharton Undergraduate Division and director of the Lauder Institute. He is the author of more than 150 articles, monographs, and books on financial regulation, international banking, and international finance. At various times, his research has been funded by grants from the National Science Foundation, the Ford Foundation, and the Sloan Foundation. He was also cochair of the U.S. Shadow Financial Regulatory Committee and executive director of the Financial Economists Roundtable and is currently a member of the Federal Deposit Insurance Corporation (FDIC) Systemic Resolution Advisory Committee and the Systemic Risk Council. Herring is an independent director of the Deutsche Asset Management Mutual Fund Family, the Aberdeen Japan and Singapore Funds, and Barclays Bank Delaware.



## **Robert M. Hunt**

**Senior Vice President  
Federal Reserve Bank of Philadelphia**

Robert M. Hunt is a senior vice president at the Federal Reserve Bank of Philadelphia. He is associate director of the Consumer Finance Institute and director of the Payment Cards Center (PCC). Before joining the PCC, he was a senior economist in the Bank's Research Department. His research has focused on consumer payments, consumer finance, and the economics of innovation. His published research includes studies of payment cards, mortgage default, adoption of new payment technologies, consumer credit reporting, identity theft, credit counseling organizations, the collections industry, regulation, and antitrust issues in consumer payment networks. He has also published papers on topics in economic geography and intellectual property. Before joining the Bank in 1998, Hunt worked for the U.S. Congressional Budget Office. Before attending graduate school, he was an industry risk analyst for Bank One, Indianapolis. Hunt has a Ph.D. in economics from the University of Pennsylvania and a B.A. in political science and economics from Butler University.



## **Julapa Jagtiani**

**Senior Special Advisor  
Federal Reserve Bank of Philadelphia**

Julapa Jagtiani is a senior special advisor at the Federal Reserve Bank of Philadelphia. She joined the Philadelphia Fed as a special advisor in the Supervision, Regulation, and Credit Department in 2008. In this role, she has conducted research and participated in several supervisory policy and implementation projects. Previously, Jagtiani was a senior economist at the Chicago Fed and Kansas City Fed. Before joining the Federal Reserve System, she was an

associate professor in the Finance Department at Baruch College, the City University of New York, and an assistant professor in the Finance Department at Syracuse University's School of Management. She has published articles in top finance journals, including the *Journal of Financial Economics*; the *Journal of Money, Credit, and Banking*; and the *Journal of Banking and Finance*. Outside the Federal Reserve System, Jagtiani is on the board of the American Red Cross. She also was a Rockefeller Foundation Fellowship recipient and a fellow member of the University of Pennsylvania's Wharton Financial Institutions Center. She has a Ph.D. and an M.B.A. from New York University's Stern School of Business.



## **Siddhartha Jajodia**

**Chief Investment Officer  
LendingClub**

As chief investment officer at LendingClub, Siddhartha Jajodia is responsible for managing and monitoring performance on the LendingClub platform as well as the LendingClub Advisor funds and reports to investors on a frequent basis.

He has been at LendingClub since 2013, overseeing risk performance and investor returns across several loan products and leading risk management, underwriting, policy, and product development for the small business segment. Before joining LendingClub, Jajodia was a senior vice president at Capital One Bank and head of small business lending. Prior to working in small business banking at Capital One, he held various roles in the consumer and small business credit card segments. He has extensive experience in developing data-driven strategies for risk management, customer acquisition, and product development. He is also on the board of directors of the Small Business Financial Exchange. Jajodia has a master's degree from the Smeal College of Business at the Pennsylvania State University and a bachelor's degree from the School of Planning and Architecture.



## **Kose John**

**Charles William Gerstenberg Professor of Banking  
and Finance  
NYU Stern School of Business**

Kose John is the Charles William Gerstenberg Professor of Banking and Finance at the NYU Stern School of Business. He has also taught at the University of Chicago, Columbia

University, and the Institut d'Etudes Politiques de Paris (Sciences Po). He has won several awards, including the Batterymarch Fellowship in 1983 and the Jensen Prize for the best paper published in 2000 in the *Journal of*

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*Financial Economics*. He is on the nomination committee for the Nobel Prize in Economics for 2017. He is the author of two books on futures markets and dividend policy, and the editor of 22 books and special issues in finance journals on topics such as financial stability, financial distress, and valuation of distressed securities; corporate governance; and investments innovations in finance. He has published more than 103 research articles in major finance and economics journals. He was the president of the Financial Management Association International in 2014–15. He also is the program chair of the Association of Financial Economists and has been a mentor and advisor to 103 doctoral students who are finance professors and finance practitioners all over the world. He has a Ph.D. from University of Florida.



## **Ken Kopecky**

**Executive Editor**  
***Journal of Economics and Business***

Ken Kopecky is executive editor of the *Journal of Economics and Business* and a professor emeritus at Temple University. While at Temple, he was the W. D. Fuller Professor of Economics and Finance and chairman of the Department of Finance. Prior to joining Temple, Kopecky was a senior economist at the Federal Reserve Board and an assistant professor at Ohio State University. He has been published in the *Journal of Finance*; the *Journal of Macroeconomics*; the *Journal of Money, Credit, and Banking*; and the *Journal of Banking and Finance*, among others.



## **William W. Lang**

**Managing Director**  
**Promontory Financial Group**

William W. Lang is managing director of Promontory Financial Group, an IBM company. Before joining Promontory, Lang was executive vice president of the Federal Reserve Bank of Philadelphia, where he led its supervision of banking organizations and oversaw discount window lending. During 2010–11, Lang was assigned to the Federal Reserve Board as head of risk and cochair of the risk committee for systemically important banks. During that time, he prepared numerous briefings for the Board of Governors and wrote memos on bank supervisory issues for the Federal Open Market Committee. Lang created and led the quantitative group responsible for supervisory stress models and Basel II model assessments for the retail credit portfolio. He was also a major contributor to the Federal Reserve Board's Comprehensive Capital Analysis and Review (CCAR). Lang has published numerous articles in academic journals, including the *Journal of Finance*, the *Journal of Monetary Economics*,

the *Journal of Financial Intermediation*, and the *Journal of Money, Credit, and Banking*. He is a fellow of the Wharton Financial Institutions Center. Lang has a Ph.D. from Yale University and a B.A. from the City College of New York.



## **Catharine Lemieux**

### **Executive Vice President Federal Reserve Bank of Chicago**

Catharine Lemieux is executive vice president in charge of supervision and regulation at the Federal Reserve Bank of Chicago. She directs the supervision and regulation of more than 800 banking organizations, including bank holding companies, state-chartered member banks, bank and savings and loan holding companies, financial holding companies, and U.S. foreign bank branches within the Federal Reserve's Seventh District. She also cochairs the Supervision Performance and Planning Committee. Lemieux, who joined the Chicago Fed as a senior examiner, has assumed a number of management positions of increasing responsibility within the department. She has more than 30 years of experience in the industry as a lender, professor, policy analyst, and bank regulator. She has a Ph.D. from Texas A&M University.



## **Jiasun Li**

### **Assistant Professor of Finance George Mason University**

Jiasun Li is an assistant professor of finance at George Mason University. His main research interest focuses on the interaction of blockchain, crowdfunding, and smart contracts. He has presented his research at many institutions and conferences, including the Massachusetts Institute of Technology, the University of Michigan, Northwestern University, Yale University, the National Bureau of Economic Research, the Western Finance Association, and the Econometric Society. He was a winner of the 2016 Yihong Xia Best paper award at the China International Conference in Finance (CICF) and the 2014 Chicago Quantitative Alliance (CQA) academic paper competition. He is also a frequent speaker for investment professionals. He has a Ph.D. in finance from UCLA's Anderson School of Management and a B.S. in mathematics from Fudan University (Shanghai, China).

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## **James D. Narron**

### **First Vice President and Chief Operating Officer Federal Reserve Bank of Philadelphia**

James D. Narron joined the Federal Reserve Bank of Philadelphia in April 2016 as first vice president and chief operating officer. Previously, Narron was a senior vice president and product manager at the Federal Reserve Bank of San Francisco, where he led the Federal Reserve System's Cash Product Office. From 2003 to 2013, Narron was a senior vice president at the Federal Reserve Bank of New York. Before joining the New York Fed, Narron worked at the Federal Reserve Bank of Kansas City and the Board of Governors in Washington, D.C. He also worked at Productivity Systems International, a consulting firm specializing in projects for central banks. Narron speaks Spanish and has published a number of articles for the New York Fed's Liberty Street Economics blog. He is the chair of the board of directors of the Keep A Breast Foundation and is on the board of directors of Ben Franklin Technology Partners. Narron has a master's degree in international business administration from the University of South Carolina and a bachelor's degree in finance and economics from Rockhurst University in Kansas City, MO.



## **Richard Neiman**

### **Head of Regulatory and Government Affairs LendingClub**

Richard Neiman is the head of regulatory and government affairs for LendingClub. He joined LendingClub in 2014 after three years as vice chairman of the Global Financial Services Regulatory Practice at PricewaterhouseCoopers LLP (PwC). Neiman was previously superintendent of banks for the state of New York from 2007 to 2011, responsible for the supervision of all state chartered and licensed financial institutions, including banks, nonbank lenders, money transmitters, and the majority of foreign bank branches in the U.S. During his term as superintendent, Neiman was appointed by the U.S. Congress to serve on the five-member Congressional Oversight Panel for the Troubled Asset Relief Program. Earlier in his career, he was executive vice president and general counsel for TD Waterhouse (now TD Ameritrade), and general counsel of the Global Equities Division at Citibank. Neiman began his career with the Office of the Comptroller of the Currency in Washington, D.C., where he initially was staff attorney and then special assistant to the chief counsel. Neiman also advises the Bipartisan Policy Center's Financial Regulatory Reform Initiative and cochairs its Regulatory Architecture Task Force. He is on the advisory council of the Institute for Financial Market Regulation and on the advisory board of Columbia Business School's Chinese Business Initiative. Neiman has a J.D. from Emory University's School of Law and a B.A. from the American University School of Government.



## **William Nelson**

### **Executive Managing Director The Clearing House**

William (Bill) Nelson is executive managing director, chief economist, and head of research at the Clearing House Association, and chief economist of the Clearing House Payments Company. Nelson contributes to and oversees research and analysis to support the advocacy of the association on behalf of owner banks. Before joining the Clearing House in 2016, Nelson was a deputy director of the Division of Monetary Affairs at the Federal Reserve Board, where his responsibilities included monetary policy analysis, discount window policy analysis, and financial institution supervision. Nelson attended Federal Open Market Committee (FOMC) meetings and regularly briefed the Board and FOMC. He was a member of the Large Institution Supervision Coordinating Committee and the steering committee of the Comprehensive Liquidity Analysis and Review. He has chaired and participated in several Bank for International Settlements working groups on the design of liquidity regulations and most recently chaired the Committee on the Global Financial System Markets Committee working group on regulatory change and monetary policy. Nelson has a Ph.D., an M.S., and an M.A. in economics from Yale University and a B.A. from the University of Virginia.



## **Robert Nichols**

### **President and Chief Executive Officer American Bankers Association**

Robert Nichols is the president and chief executive officer of the American Bankers Association (ABA), which represents banks of all sizes and charters and is the voice for the nation's \$17 trillion banking industry. Nichols joined the ABA in August 2015, following 10 years at the helm of the Financial Services Forum, a nonpartisan financial and economic policy organization. Before that, Nichols was assistant secretary of the Treasury for Public Affairs, a position requiring confirmation by the U.S. Senate. Nichols also was communications director for the Electronic Industries Alliance; communications director to U.S. Senator Slade Gorton and Press Secretary to the late Congresswoman Jennifer Dunn, a former member of the House leadership; and in the West Wing as an aide in the Office of the Chief of Staff in the George H.W. Bush administration. He is a recipient of the Alexander Hamilton Award, the highest honor of the U.S. Department of the Treasury. Nichols also is consistently ranked as one of Washington's top lobbyists by *The Hill* and was recently described as one of the "new generation of trade group CEOs" by *The Washington Post*. He is also vice chair of the board of directors of Food Allergy Research & Education. Nichols is a graduate of the George Washington University.

# Speakers' Biographies



## **Keith A. Noreika**

### **Acting Comptroller of the Currency Office of the Comptroller of the Currency**

Keith A. Noreika is the acting comptroller of the currency, the administrator of the federal banking system, and head of the Office of the Comptroller of the Currency (OCC).

The comptroller also is a director of the Federal Deposit Insurance Corporation (FDIC) and a member of the Financial Stability Oversight Council. Noreika became the acting comptroller of the currency on May 5, 2017. Before that, he was a partner in Simpson Thacher & Bartlett LLP and a member of the firm's financial institutions practice, focusing on banking regulation and related litigation. He advised a wide range of domestic and international financial institutions on regulatory issues relating to mergers and acquisitions, minority investments, capital issuances, structuring and compliance activities, and litigation matters, particularly in the area of federal preemption. Noreika's experience includes advising regional, multinational, and other banks on the structuring of their operations, including complying with the Volcker Rule and Consumer Financial Protection Bureau regulations, and Bank Secrecy Act and anti-money laundering rules. He has represented national banks before the U.S. Supreme Court, the U.S. Courts of Appeals, and the U.S. District Courts. He previously was partner at Covington & Burling LLP. Noreika has been an adjunct faculty member at the University of Pennsylvania Law School and the University of Virginia School of Law. He has a J.D. from Harvard Law School, where he was editor of the *Harvard Law Review*. He also has a B.S. from the Wharton School of the University of Pennsylvania.



## **Mukul Pandya**

### **Editor-in-Chief and Executive Director Knowledge@Wharton**

Mukul Pandya is editor-in-chief and executive director of Knowledge@Wharton, the web-based journal of research and business analysis published by the Wharton School of the University of Pennsylvania. A winner of four awards for

investigative journalism, he has more than 35 years of experience as a writer and editor. His articles have appeared in the *Wall Street Journal*, the *New York Times*, *The Economist*, *TIME*, the *Philadelphia Inquirer*, and many other publications. He coauthored *Knowledge@Wharton: On Building Corporate Value* and three other books. Pandya has an M.A. in economics from the University of Bombay.



## **Andreas Park**

**Associate Professor of Finance  
University of Toronto**

Andreas Park is an associate professor of finance at the University of Toronto, where he has been a faculty member since 2003; his appointment is with the Department of Management at the University of Toronto Mississauga, and he is cross-appointed at the Rotman School of Management and the Institute of Management and Innovation. His research covers empirical topics, such as the impact of maker-taker pricing, dark orders, and high-frequency trading, and theoretical topics, such as herd behavior in financial markets or the impact of market design when securities are on a blockchain. His work has been published in many journals, including *Econometrica*, the *Journal of Finance*, the *Journal of Financial Economics*, and the *Journal of Financial and Quantitative Analysis*. He has received and has been an affiliate on a number of research grants, including from the Economic and Social Research Council, the Social Sciences and Humanities Research Council, RCF, and the Global Risk Institute, and he is engaged in several fintech-related initiatives at the University of Toronto. Park was codirector of the Master of Financial Economics program at University of Toronto and was associate chair in the Department of Management, and he teaches courses on fintech, market microstructure, trading, investments, asset pricing, and corporate finance. He is currently serving a two-year term on the Ontario Security Commission's Market Structure Advisory Committee.



## **Christine A. Parlour**

**Sylvan C. Coleman Chair of Finance and Accounting  
University of California, Berkeley**

Christine A. Parlour is the Sylvan C. Coleman Chair of Finance and Accounting at the Haas School of Business at the University of California, Berkeley. Most of her work is in institutionally complex areas such as market microstructure and banking. Her current focus is on changes in the payments system and the effects on bank balance sheets. Her work has appeared in major journals in finance and economics. She has been on the Nasdaq Economic Advisory Board and is currently on the steering committee for the New Special Study of Securities Markets.

# Speakers' Biographies



## **Brad Pennington**

**Chief Risk Officer  
Prosper Marketplace**

Brad Pennington is the chief risk officer at Prosper Marketplace. In this role, he leads the team that develops proprietary models, builds automated credit strategies, and designs automated fraud and income verification strategies.

The team is a blend of consumer unsecured business experts, data scientists, and quantitative analysts. Pennington joined Prosper in 2012 and was instrumental in the development of its rating systems, automated strategies, and risk monitoring systems and brings more than 10 years of experience in risk management and applied analysis. Before Prosper, Pennington was a credit risk consultant with Moody's Analytics, where he worked with large global and U.S. clients focusing on economic capital, Basel compliance, and probability of default, loss given default, and exposure at default model development. He began his risk career designing the automated underwriting and pricing strategies at First Equity Card, a small business credit card specialty finance startup. Pennington has a B.S in economics from the Wharton School of the University of Pennsylvania, where he completed a self-directed course of study, obtaining minors in finance, statistics, mathematics, econometrics, and operations research.



## **Tomasz Piskorski**

**Edward S. Gordon Associate Professor of Real Estate  
Columbia University**

Tomasz Piskorski is the Edward S. Gordon Associate Professor of Real Estate at Columbia Business School (Columbia University) and the Paul Milstein Center for Real Estate and a research associate at the National Bureau of Economic

Research. His research has been published in academic journals in economics and finance as well as major media, including the *Wall Street Journal*, the *Financial Times*, *Business Week*, and *The Economist*. His research and market views have been presented at an array of academic, governmental, and financial institutions, including the U.S. Congress, the U.S. Treasury, the U.S. Department of Housing and Urban Development, the Federal Deposit Insurance Corporation, the Securities and Exchange Commission, the London Stock Exchange, Federal Reserve Banks, the National Association of Home Builders, the Cato Institute, the Brookings Institution, and the Woodrow Wilson Center. He was awarded funding from the National Science Foundation and Pew Charitable Trusts. He received the AQR Insight Distinguished Paper Award, which recognizes research that provides the most significant, new practical insights for tax-exempt institutional or taxable investor portfolios. He has a Ph.D. in economics from NYU Stern School of Business and an M.S. in mathematics from New York University's Courant Institute of Mathematical Sciences.



## Jillian Popadak

**Assistant Professor of Finance  
Duke University**

Jillian Popadak is an assistant professor of finance at Duke University's Fuqua School of Business. Popadak's research combines the disciplines of corporate finance, innovation, and law and economics. Previously, she worked at the Board of Governors of the Federal Reserve System, the World Trade Organization, and KPMG. She has a Ph.D. from the Wharton School of the University of Pennsylvania and a B.A. from Wellesley College.



## Robin A. Prager

**Senior Advisor  
Board of Governors of the Federal Reserve System**

Robin A. Prager is a senior advisor in the Division of Research and Statistics at the Board of Governors of the Federal Reserve System. She joined the Board staff in 1994 as an economist in the Financial Structure Section and was chief of the Financial Structure Section from 2000 to 2007. Throughout her tenure at the Board, Prager has been involved in conducting economic analysis of issues relating to the structure and performance of the financial services sector, with an emphasis on banking. Recently, she has devoted much of her attention to issues surrounding the availability of credit to small businesses and the role of community banks in the U.S. financial system. Before joining the Federal Reserve Board, Prager was on the faculty of the Owen Graduate School of Management at Vanderbilt University for several years. She has also been a visiting faculty member at Boston University's School of Management and MIT's Sloan School of Management, and she was a visiting senior policy scholar at Georgetown University's Center for Business and Public Policy. She is on the board of the Industrial Organization Society and on the editorial boards of the *Review of Industrial Organization* and *Journal of Regulatory Economics*. Prager has a Ph.D. in economics from the Massachusetts Institute of Technology and an A.B. in economics from Harvard University.



## P. Raghavendra Rau

**Sir Evelyn de Rothschild Professor of Finance  
University of Cambridge**

P. Raghavendra Rau is the Sir Evelyn de Rothschild Professor of Finance at the University of Cambridge Judge Business School. He has taught at a number of universities around the

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world, including the Institut d'Etudes Politiques de Paris (Sciences Po); Purdue University; University of California, Los Angeles; and the University of California, Berkeley. Rau was also principal at Barclays Global Investors in San Francisco from 2008 to 2009. He is a past president of the European Finance Association; an associate editor of the *Journal of Banking and Finance*, the *International Review of Finance*, and the *Quarterly Journal of Finance*; and a past editor of *Financial Management*. His research has frequently been covered by the popular press, including the *New York Times*, the *Financial Times*, the *Wall Street Journal*, and *The Economist*, among others. He won the Ig Nobel Prize in Management in 2015, a prize awarded for research that makes people laugh and then think.



## **Spencer Robinson**

**Head of Strategy  
Kabbage, Inc.**

As the head of strategy at Kabbage, Inc., Spencer Robinson uses his 15 years of product development experience to support small business growth. Robinson joined Kabbage in 2010 as one of the original designers and developers of the technology platform. Robinson's ability to understand and act upon the business's goals has enabled him to build various teams in the organization, ranging from technology to risk/analytics. That same ability is now leveraged in guiding efforts around the company's strategy. Before joining Kabbage, Robinson spent seven years as a consultant to Bear Stearns/JPMorgan Chase inside the global equities group. During that time, he oversaw the applications used internally for systems monitoring as well as the front-end trading system used by the institutional traders and sales traders inside the organizations. Before that, Robinson helped various Internet-based technology companies build custom solutions to generate business value. Robinson has a degree in computer science from the University of Notre Dame.



## **Asani Sarkar**

**Assistant Vice President  
Federal Reserve Bank of New York**

Asani Sarkar is an assistant vice president at the Federal Reserve Bank of New York. He received the Western Finance Association Pearson Award for 2011 for the best paper on financial institutions and markets for his paper, "Stigma in Financial Markets: Evidence from Liquidity Auctions and Discount Window Borrowing During the Crisis." Previously, Sarkar has also held positions at Princeton University, Columbia University, and the University of Illinois at

Urbana-Champaign. He is currently working on too-big-to-fail risk, Bitcoin, corporate bond markets, and the real effects of the Federal Reserve's liquidity provision programs during the crisis. Sarkar's papers have appeared in many journals, including the *Journal of Finance*, the *Journal of Financial Economics*, the *Review of Financial Studies*, the *Journal of Financial and Quantitative Analysis*, the *Journal of Business*, the *Journal of Empirical Finance*, and the *Journal of Financial Intermediation*. He has a Ph.D. from the University of Pennsylvania.



## **John Schindler**

**Associate Director  
Board of Governors of the Federal Reserve System**

John Schindler is an associate director in the Division of Financial Stability at the Board of Governors of the Federal Reserve System. His focus is financial innovation, and he currently chairs the Financial Stability Board's Financial

Innovation Network. From 2008 to 2009, he took a leave from the Board to be the chief international economist at the Treasury Department. Schindler has been a lecturer at Johns Hopkins University since 2005, and he has also spent time as a visiting professor at the Pontifical Catholic University of Chile and as a visiting scholar at the United Nations Economic Commission for Latin America and the Caribbean. He has published papers on a range of topics, including measuring financial conditions, crisis modeling, and China. He has a Ph.D. from the University of Pennsylvania.



## **André Schweizer**

**Research Assistant  
University of Bayreuth**

André Schweizer started as a research assistant at the Research Center of Finance and Information Management at the University of Bayreuth in October 2015. In his research, Schweizer focuses on the fields of strategic information

technology (IT) management, with a specific emphasis on IT innovation, banking, fintech, and blockchain technology. He completed his apprenticeship as an information technology electronics technician at Daimler in 2009. During his studies, he enhanced his work experience through international internships and projects at PricewaterhouseCoopers (risk assurance solutions), Bosch Lawn and Garden (turnaround project), and Capgemini (technology services). In addition, he was involved in a startup, challenging the status quo and developing sustainable alternatives for studying finance in Germany. He studied the management of information systems at the University of

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Regensburg, University of Technology in Sydney, and Peter the Great St. Petersburg Polytechnic University, receiving an M.S. with honors; he also has a B.S. in engineering (management and information technology) from the University of Applied Sciences Esslingen.



## **John Sedunov**

### **Assistant Professor of Finance Villanova University**

John Sedunov joined the Villanova School of Business as an assistant professor of finance in fall 2012. His research and teaching interests include systemic risk, banking, financial crises, and risk management. His work has been published in the *Journal of Banking and Finance*, the *Journal of Financial Stability*, the *Journal of Empirical Finance*, and the *Journal of Financial Research*. His current research projects include examining the effects of government relief programs on systemic risk, the effects of cross-border bank flows on international systemic risk, and the impact of large institutional investors on financial market stability. Sedunov also teaches courses on the risk management of financial institutions to undergraduates and alternative investments to graduate students. He has a Ph.D. in finance and an M.A. in business administration, both from the Ohio State University, and a B.S. in business administration from Carnegie Mellon University.



## **William G. Spaniel**

### **Senior Vice President and Lending Officer Federal Reserve Bank of Philadelphia**

William G. Spaniel is a senior vice president and lending officer at the Federal Reserve Bank of Philadelphia, overseeing the Bank's Supervision, Regulation, and Credit Department. Previously, Spaniel spent 25 years with the Board of Governors of the Federal Reserve System, where he advanced through staff and officer positions to associate director of the Division of Banking Supervision and Regulation (BSR). He joined the Board of Governors staff in 1990 as a supervisory financial analyst and advanced to assistant to the director for BSR before he was appointed assistant director in 2000. He was promoted to deputy associate director in 2003, to associate director in 2006, and to senior associate director in 2008. Before joining the Federal Reserve, Spaniel was a senior consultant for KPMG, specializing in credit administration, profit improvement, and regulatory compliance. He began his career as a compliance officer for a \$1 billion savings and loan. He has a B.A. in economics from the College of William and Mary.



## Samuel Taussig

**Head of Global Policy and Community Banking  
Kabbage, Inc.**

Samuel Taussig is head of global policy and community banking at Kabbage, Inc. and responsible for its interactions with state, federal, and foreign governments as well as community banks and development organizations. His interests include topics ranging from traditional financial regulatory reform to artificial intelligence, privacy, and corporate social responsibility. He entered the alternative credit space in Zambia, where he experienced how microcredit projects offered a sustainable path to entrepreneurship. Since 2007, Taussig has promoted alternative credit across Africa, South America, Asia, the Caribbean, and United States with a variety of nongovernmental organizations and the United Nations. Before joining Kabbage, Taussig worked in Indonesia supporting microeconomic development, big data, and bilateral diplomacy.



## Larry Wall

**Research Center Executive Director  
Center for Financial Innovation and Stability  
Federal Reserve Bank of Atlanta**

Larry Wall is the research center executive director of the Center for Financial Innovation and Stability (CenFIS) in the Research Department of the Federal Reserve Bank of Atlanta. He is part of the financial markets team. CenFIS was created to improve knowledge of financial innovation and financial stability and the connection between the two. Wall joined the financial structure team of the Bank's Research Department in 1982 and was promoted to executive director of CenFIS in 2013. In addition, Wall leads CenFIS's activities, including its newsletter, *Notes from the Vault*, and conferences. He also provides policy advice. A certified public accountant, Wall is on the editorial boards of the *Journal of Financial Research*, *Journal of Financial Services Research*, *Journal of Financial Stability*, *Journal of Money Credit and Banking*, and *Journal of Financial Regulation and Compliance*. He is also on the Academic Advisory Panel for the International Association of Deposit Insurers. He is a past president and chairman of the trustees of the Eastern Finance Association. Wall has a doctoral degree in business from the University of North Carolina at Chapel Hill and a bachelor's degree in business administration from the University of North Dakota.























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