Workshop on Risks, Trends, and Innovations in Credit Card Lending and Other Revolving Credit

December 6-7, 2017

Consumer Finance Institute

SURF
Supervisory Research and Policy Forum

The Federal Reserve Bank of Philadelphia, the Consumer Finance Institute (CFI), and the Supervisory Research and Policy Forum (SURF) welcome you to the Workshop on Risks, Trends, and Innovations in Credit Card Lending and Other Revolving Credit.

Emerging risks in revolving credit, industry challenges, the present and future of regulation, and advances in models and processes, such as machine learning and artificial intelligence, are only a few of the many timely topics that will be addressed at this workshop. Through presentations, case studies, and panel discussions, we hope to provide regulators, industry experts, and academic contributors with an opportunity to share research and exchange their views on the state and direction of the industry more broadly.

Organizing Committee

Jose J. Canals-Cerda — Federal Reserve Bank of Philadelphia

Robert Hunt — Federal Reserve Bank of Philadelphia

Iris Gonzalez — Federal Reserve Bank of Philadelphia

Ihssane Leckey — Federal Reserve Bank of Philadelphia

Agenda

Day 1: Wednesday, December 6

8:00 a.m.–8:45 a.m.   **Continental Breakfast and Registration**

8:45 a.m.–9:00 a.m.   **Introduction**
Paul Calem, Federal Reserve Bank of Philadelphia

9:00 a.m.–9:30 a.m.   **State of the Credit Cards Industry**
Stephen Lake, Federal Deposit Insurance Corporation

9:30 a.m.–10:30 a.m.   **Valuation of Credit Cards Portfolios**
Vivienne Cheng and Kapo Yuen,
Federal Reserve Bank of New York

Onesime Epouhe, Federal Reserve Bank of Philadelphia
Session Chair: Geng Li, The Board of Governors of the
Federal Reserve System

10:30 a.m.–10:45 a.m.   **Break**

10:45 a.m.–12:00 noon   **Analyzing Exposure at Default in Revolving Portfolios — Regulatory and Risk Perspectives**
Raymond Brastow, Federal Reserve Bank of Richmond

Liming Brotcke, Federal Reserve Bank of Chicago

Gene Huang, Federal Reserve Bank of Philadelphia
Session Chair: Eduard Pelz, Federal Reserve Bank
of Chicago

12:00 noon–1:00 p.m.   **Lunch**

1:00 p.m.–2:00 p.m.   **Analysis of Fraud and Other Sources of Credit Cards Losses**
Stephen Lake and Brian Capsavage,
Federal Deposit Insurance Corporation

Paul Calem and Silvio Rendon, Federal Reserve Bank
of Philadelphia

Session Chair: Shuwei Ma, Federal Reserve Bank of
New York

2:00 p.m.–2:45 p.m.	**Panel Discussion: Large Banking Organizations Challenges and Opportunities**
	James L. Adams, Federal Reserve Bank of Philadelphia
	Piu Banerjee, Federal Reserve Bank of New York
	Christine Townsend, Federal Deposit Insurance Corporation
	Panel Chair: Raymond Brastow, Federal Reserve Bank of Richmond
2:45 p.m.–3:15 p.m.	**Break**
3:15 p.m.–4:30 p.m.	**Empirical Applications in Banking and Surveillance.**
	Jing Chen, Federal Deposit Insurance Corporation
	Arden Hall, Jason Keegan, and Yuh-jeng Lee, Federal Reserve Bank of Philadelphia
	Session Chair: Andy Kish, Federal Reserve Bank of Philadelphia, presenting with Vivienne Cheng, Federal Reserve Bank of New York
4:30 p.m.–5:30 p.m.	**Roundtable: Emerging Issues in Credit Cards Supervision**
	Richard Murphy, Federal Reserve Bank of Richmond
	Matthew Engelhart, Office of the Comptroller of the Currency
	Daniel Grantham, The Board of Governors of the Federal Reserve System
	Stephen Lake, Federal Deposit Insurance Corporation
	Panel Chair: Kenneth Benton, Federal Reserve Bank of Philadelphia
5:30 p.m.–5:35 p.m.	**Closing Remarks**
5:35 p.m.–7:00 p.m.	**Reception, Eastburn Court (First Floor) Introduction to the Consumer Finance Institute**
	Robert Hunt, Federal Reserve Bank of Philadelphia

Agenda

Day 2: Thursday, December 7

7:45 a.m.–8:15 a.m.	**Breakfast and Registration**
8:15 a.m.–8:30 a.m.	**Introduction**

Patrick T. Harker, President and Chief Executive Officer, Federal Reserve Bank of Philadelphia

8:30 a.m.–9:00 a.m.   Credit Cards Performance Trends

Cristian de Ritis and Evan Andrews, Moody's Analytics

9:00 a.m.–10:00 a.m.   Regulation of Cards Credit

The Effect of Debt Collection Laws on Access to Credit
Ryan Sandler, Consumer Financial Protection Bureau

Private Information and Price Regulation in the U.S. Credit Card Market
Session Chair: Scott Nelson, Consumer Financial Protection Bureau

10:00 a.m.–10:15 a.m.   Break

10:15 a.m.–11:15 a.m.   Access to Credit

Personal Loans and Credit Cards
Claude Lawrence, Mintel

Monthly Payment Targeting and the Demand for Maturity
Session Chair: Taylor D. Nadauld, Brigham Young University

11:15 a.m.–12:00 noon   Panel Discussion: Advances in Methods and Data

Panel Chair: Kapo Yuen, Federal Reserve Bank of New York

Ethan Dornhelm, FICO Scores and Predictive Analytics

Akhtarur Siddique, Office of the Comptroller of the Currency

Seph Mard, DataRobot

Alexey Smurov, Capital One

Mike Trapanese, VantageScore Solutions

12:00 noon–1:00 p.m.	**Lunch, Eastburn Court (First Floor)**

1:00 p.m.–2:00 p.m. **Impact of Technological Innovation**

Insights on Latest Innovations in Credit Scoring
Ethan Dornhelm, FICO Scores and Predictive Analytics

*Fintech Adoption Across Generations:
Financial Fitness in the Information Age*
Session Chair: Michaela Pagel, Columbia University

2:00 p.m.–3:00 p.m. **Roundtable: Credit Card Lending — Challenges and Opportunities**

Cristian de Ritis, Moody's Analytics

Robert Hunt, Federal Reserve Bank of Philadelphia

Moshe Orenbuch, Credit Suisse

Paul Calem, Federal Reserve Bank of Philadelphia

Panel Chair: Richard Murphy, Federal Reserve Bank of Richmond

3:00 p.m.–3:15 p.m. **Break**

3:15 p.m.–4:45 p.m. **Behavioral Economic Applications to Revolving Credit**

*Credit Card Utilization and Consumption over the
Life Cycle and Business Cycle*
Scott Fulford, Consumer Financial Protection Bureau

The Power of Predictability
Judith Ricks, Consumer Financial Protection Bureau

Revolving Credit: Shrouded by Construction
Session Chair: Mary Zaki, University of Maryland

4:45 p.m.–5:30 p.m. **Empirical Methods and Machine Learning Applications**

*Exposure at Default Models With and Without the
Credit Conversion Factor*
Edward Tong, Bank of America

*Machine Learning Automation for Model Development
and Validation*
Session Chair: Seph Mard, DataRobot

5:30 p.m.–5:35 p.m. **Closing Remarks**

Biographies

James L. Adams

Supervising Examiner
Supervision, Regulation, and Credit
Federal Reserve Bank of Philadelphia

James L. Adams is a supervising examiner with the Federal Reserve Bank of Philadelphia's Supervision, Regulation, and Credit (SRC) Department. He has been with the Philadelphia Fed for 28 years, 24 of which have been within SRC as a field examiner. Adams has held a number of positions in his career, most recently as the lead examiner for a large banking organization. Before that, Adams was responsible for assessing TD Bank US Holding Company's enterprise risk and operational risk management programs.

Adams is a graduate of the ABA Stonier Graduate School of Banking and continues as a capstone advisor for the program. He has also been an instructor for the Federal Reserve System's examiner training program, teaching financial analysis and risk management classes. He has a bachelor's degree in finance with a minor in economics from the Fox Business School at Temple University.

Evan Andrews

Senior Economist
Moody's Analytics

Evan Andrews is a senior economist at Moody's Analytics and a member of the credit analytics group, which develops consumer credit models for stress testing, business strategy, and accounting purposes.

Andrews has a Ph.D. in social science and an M.A. in economics from Syracuse University and a B.A. from Cornell University.

Kenneth Benton

Senior Consumer Regulations Specialist
Federal Reserve Bank of Philadelphia

Kenneth Benton is a senior consumer regulations specialist in the Consumer Compliance/Community Reinvestment Act examination unit at the Federal Reserve Bank of Philadelphia. Benton, who has worked at the Philadelphia Fed for 12 years, edits *Consumer Compliance Outlook*, a Federal Reserve publication focusing on consumer compliance laws and regulations affecting financial institutions. He also participates extensively in outreach and provides training and assistance to examiners on regulatory issues involving federal consumer protection laws.

Benton has a J.D. from Tulane Law School and a B.A. from Indiana University.

Raymond Brastow

Senior Financial Economist
Federal Reserve Bank of Richmond

Raymond Brastow is a senior financial economist at the Federal Reserve Bank of Richmond. Since joining the Richmond Fed in 2004, he has had several roles in bank supervision, most recently as a reviewer of bank loss models for credit cards and other retail products. Brastow's current research is focused on financial institution risks and issues related to residential real estate. He taught economics at several universities and is currently an emeritus professor of economics at Longwood University in Virginia.

Liming Brotcke

Quantitative Manager
Model Risk Oversight
Federal Reserve Bank of Chicago

Liming Brotcke is a quantitative manager of the Model Risk Oversight team at the Federal Reserve Bank of Chicago. She manages a team of model risk management specialists who conduct in-depth quantitative and qualitative review of models used for comprehensive capital analysis and review stress testing as well as business decision management by large bank holding companies across the Federal Reserve System. Brotcke has extensive modeling experience in the retail business and working knowledge of other modeling areas including wholesale, securities, market and liquidity, derivatives, and operations. Before joining the Chicago Fed, she worked at Citigroup and Discover Financial Services in model development and portfolio management.

Brotcke has a Ph.D. in economics from the University of Illinois at Chicago.

Biographies

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.

Calem has a Ph.D. in economics from Brown University and a B.A. in mathematics from Duke University.

Brian Capsavage

Senior Complex Financial Institution Analyst
Federal Deposit Insurance Corporation

Brian Capsavage is a senior complex financial institution analyst for the Federal Deposit Insurance Corporation's Division of Risk Management Supervision, Complex Financial Institutions, Institutional Monitoring. His responsibilities include reviewing firm-level risk for the systemically important financial institutions by performing in-depth analysis of specific markets, products, and practices for auto, credit card, and residential mortgage lending. He has more than four years of regulatory experience monitoring retail credit risks over a group of largest U.S.-based financial institutions. His previous retail credit work experience includes managing the conforming fixed pipeline at Countrywide/Bank of America from 2006 through 2010 and as a senior corporate marketing officer portfolio trader at Fannie Mae from 2000 through 2006.

Capsavage has an M.B.A. from the University of the Pacific.

Jing Chen

Quantitative Risk Specialist
Federal Deposit Insurance Corporation

Jing Chen, who joined the Federal Deposit Insurance Corporation (FDIC) in 2011, is a quantitative risk specialist for its Division of Risk Management Supervision, Complex Financial Institutions, Risk Analytics Branch, Quantitative Model Analysis Section. In this role, Chen is a credit risk modeling expert and works on onsite and off-site review of models and model risk management for wholesale credit and retail credit, capital adequacy, comprehensive capital analysis and review, and stress testing. Chen has also held multiday training sessions for FDIC and Federal Reserve System examiners in the areas of retail and wholesale credit risk modeling.

Before joining the FDIC, Chen was a principal economist/manager at Fannie Mae for nearly five years and was the key developer of major credit risk models for loss forecasting and guarantee fee pricing. He was also the owner and developer of Fannie Mae's Acquisition Credit Index model, a key model used for underwriting, acquisition, and pricing. Chen was in charge of models to predict the industry mortgage origination volume, product composition, and potential company market shares while he was at Bank of America. Before that, he was a senior economist at JPMorgan Chase in its mortgage risk modeling team. He is also an expert in statistical analysis software programming.

Chen has a doctorate in resource and development economics from the University of California, Davis, and a master's degree in agricultural economics from Ohio State University.

Cristian de Ritis

Senior Director
Moody's Analytics

Cristian de Ritis is a senior director at Moody's Analytics, where he conducts economic analysis and develops econometric models for a variety of clients. His regular analysis and commentary on consumer credit, housing, and the broader economy appear on the firm's Economy.com website. He is regularly quoted in publications such as the *Wall Street Journal* for his views on the economy and consumer credit markets. De Ritis also gives frequent presentations on the state of the economy and credit markets to a variety of audiences.

Before joining Moody's Analytics, de Ritis worked for Fannie Mae and taught at Johns Hopkins University. He is also named on two U.S. patents related to credit modeling techniques. He has a Ph.D. in economics from Johns Hopkins University.

Biographies

Ethan Dornhelm

Vice President
FICO Scores and Predictive Analytics

Ethan Dornhelm is vice president at FICO Scores and Predictive Analytics. He leads the research and analytic development of FICO scores worldwide. Dornhelm is responsible for maintaining the predictive power of the core product line as well as research and development of new scoring products, alternative data, and enhanced modeling techniques. Most recently, his team launched the newest FICO Score 9, FICO Score XD, and the FICO Safe Driving Score as well as developing the analytic features available to millions of consumers via FICO's B2C solutions — myFICO.com and FICO Score Open Access.

Dornhelm has spent much of his 17 years at FICO supporting the technical redevelopment, maintenance, and analytic support of FICO Scores in North America. He was one of the original analysts overseeing the development of the company's consumer credit education portal.

Before FICO, Dornhelm was a director in the risk management group at American Express and focused on underwriting strategies in the consumer card business, evaluating and using new data sources for consumers with limited credit history.

Dornhelm has a B.S. in management science/operations research from the University of California, San Diego.

Onesime Epouhe

Principal Financial Economist
Supervision, Regulation, and Credit
Federal Reserve Bank of Philadelphia

Onesime Epouhe is a principal financial economist in the Supervision, Regulation, and Credit Department at the Federal Reserve Bank of Philadelphia. In this role, he has conducted research and participated in several supervisory policy and implementation projects. His areas of expertise include retail credit risk, credit card loss modeling and home equity loss modeling. Epouhe has been a significant contributor in the design and implementation of models employed by the Federal Reserve System during the capital stress tests conducted at the largest U.S. financial institutions. He currently leads the U.S. retail credit card comprehensive capital analysis and review Supervisory Modeling Team. Before joining the Philadelphia Fed, Epouhe worked for Discover Financial Services in Illinois.

Epouhe has a Ph.D. from the University of Illinois at Urbana–Champaign.

Scott Fulford

Economist
Consumer Financial Protection Bureau

Scott Fulford is an economist at the Consumer Financial Protection Bureau (CFPB), where he works on credit cards, remittances, and consumer financial surveys. Before joining the CFPB, he was an assistant professor of economics and international studies at Boston College. He has a Ph.D. from Princeton University.

Daniel Grantham

Lead Retail Credit Analyst
The Board of Governors of the Federal Reserve System

Daniel Grantham is a lead retail credit analyst in the Board of Governors of the Federal Reserve System's Risk Function. He monitors emerging credit risk across supervisory portfolios. Before joining the Federal Reserve, he was an analyst at the Consumer Financial Protection Bureau, where he helped devise the TILA/RESPA mortgage servicing rules. At the start of his career, he was an analyst at the Office of the Comptroller of the Currency, where he spearheaded the agency's credit card benchmarks for stress testing. Grantham has a master of public policy from the College of William and Mary and a bachelor's degree in economics from Mary Washington University.

Arden Hall

Special Advisor
Supervision, Regulation, and Credit Department
Federal Reserve Bank of Philadelphia

Arden Hall is a special advisor in the Supervision, Regulation, and Credit Department at the Federal Reserve Bank of Philadelphia. He was previously a senior vice president in the consumer credit group at Wells Fargo. He has also worked at Fair Isaac Corporation, Bank of America, and the Federal Home Loan Bank of San Francisco. Hall's career has focused primarily on measurement and management of credit risk and market risk, particularly for mortgages and mortgage-backed securities. Since joining the Philadelphia Fed in 2010, his focus has been on Basel II examinations, models for use in comprehensive capital analysis and review stress tests, and development of the model validation function for stress testing models.

Hall has a Ph.D. in economics and an M.A. in statistics from the University of California, Berkeley.

Biographies

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 chief executive officer of the Federal Reserve Bank of Philadelphia. In 2017, he became 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. Before 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.

Harker 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.

Gene Huang

Principal Quantitative Specialist
Supervision, Regulation, and Credit Department
Federal Reserve Bank of Philadelphia

Gene Huang is a principal quantitative specialist in the Retail Supervision and Research Group in the Supervision, Regulation, and Credit Department of the Federal Reserve Bank of Philadelphia. The group specializes in consumer credit risk management and provides banking supervision support to the System through research, quantitative analysis, bank exams, and model development. Before joining the Bank, he had worked in the banking industry for about 16 years.

Huang has an M.S. in financial engineering from Temple University's Fox School of Business; an M.S. in biostatistics from the University of California, Los Angeles; and an M.B.A. in finance from Fu Jen Catholic University. He also has a B.S. in mathematics from National Taiwan University.

Robert Hunt

Senior Vice President
Director of the Payment Cards Center
Associate Director of the Consumer Finance Institute
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. Before joining the Payment Cards Center, 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. Prior to 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.

Jason Keegan

Financial Economist
Supervision, Regulation, and Credit Department
Federal Reserve Bank of Philadelphia

Jason Keegan is a financial economist in the Supervision, Regulation, and Credit Department at the Federal Reserve Bank of Philadelphia. Some of his job responsibilities include serving as the deputy lead and head of quality control for the retail supervisory modeling teams as part of the comprehensive capital analysis and review and Dodd–Frank Wall Street Reform and Consumer Protection Act stress testing exercises. Keegan also leads the implementation of the automobile stress testing models. Previously, he was an authorized officer at UBS Financial, where he was business manager for the chief administrative officer of Wealth Management Americas.

Keegan has a Ph.D. and an M.A. in economics from Temple University and a B.S. in finance from Pennsylvania State University.

Biographies

Andy Kish

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

Andy Kish, who has worked at the Federal Reserve Bank of Philadelphia for 13 years, is the assistant vice president of the financial monitoring group in the Supervision, Regulation, and Credit Department. The financial monitoring group is responsible for delivering high-quality, actionable management information system reports and analysis related to current and emerging risks in financial institutions. The team also participates in comprehensive capital analysis and review, evaluating firms' stress testing capabilities with respect to retail credit.

Kish has a Ph.D. in economics from Temple University and a B.A. from the University of Pennsylvania.

Stephen Lake

Senior Complex Financial Institution Analyst
Federal Deposit Insurance Corporation

Stephen Lake is a senior complex financial institution analyst for the Federal Deposit Insurance Corporation's Division of Risk Management Supervision, Complex Financial Institutions, Risk Analytics Branch, Financial Products and Practices Section. He has more than 32 years of regulatory experience assessing the risk of an array of financial products and services in regulated and nonregulated entities and developing appropriate supervisory policy as a senior specialty examiner, retail credit, and financial analyst. His career focus has been in retail credit, and he has drafted several regulatory guidance papers detailing prudent practices. His responsibilities include reviewing horizontal risk for the systemically important financial institutions by performing in-depth analysis of specific markets, products, and practices pertaining to auto, credit card, and residential mortgage lending.

Lake has a B.S. in business administration from the University of Maryland, College Park, with a major in accounting and a minor in finance. He also is a commissioned Bank Safety & Soundness Examiner.

Claude Lawrence

Director of Lending and Payments Insights
Mintel

Claude Lawrence leads payments and lending insights at Mintel, a market research firm. His specific focuses are on secured and unsecured loans, credit cards, and consumer banking. Lawrence has presented at conferences on consumer finance and routinely discusses strategy and opportunities with financial institutions. Before joining Mintel, Lawrence had experience as a regulatory economist and an international development professional. Lawrence has an M.A. in economics from the University of Illinois and a B.S. in economics from DePaul University.

Yuh-jeng Lee

Senior Financial Economist
Supervision, Regulation, and Credit Department
Federal Reserve Bank of Philadelphia

Yuh-jeng Lee is a senior financial economist with the Federal Reserve Bank of Philadelphia. His work in the financial industry focuses on risk mismanagement. He has developed and managed analytic projects as well as model development and validation teams in Basel, allowance for loan and lease losses, and comprehensive capital analysis and review, working on a variety of consumer portfolios with special focus on credit cards, auto lending, educational lending, and home equity. He has a Ph.D. from University of Illinois at Urbana–Champaign.

Geng Li

Economist and Chief of the Consumer Finance Section
The Board of Governors of the Federal Reserve System

Geng Li is an economist and chief of the Consumer Finance Section at the Board of Governors of the Federal Reserve System. Li's research focuses on household economics, macroeconomics, labor market, and financial economics. His work has been published at the *Review of Economics and Statistics*, *Review of Financial Studies*, and *Journal of Economic Dynamics and Control*, among others. At the Board, Li and the Consumer Finance Section contribute to the monetary policymaking, surveillance of financial stability, and consumer credit-related data releases.

Li has a Ph.D. from the University of Michigan, an M.A. from the University of New Mexico, and a B.A. from Nankai University.

Biographies

Shuwei Ma

Senior Examiner
Federal Reserve Bank of New York

Shuwei Ma is a senior examiner in consumer credit risk management at the Federal Reserve Bank of New York. Before joining the Federal Reserve System, Ma held several senior positions in the capital market in the United States and overseas, including posts at Saudi Home Loans, Luminent Mortgage Capital, and Radian Guaranty Inc. Ma's expertise and research include securitization and consumer lending.

Ma has an M.B.A. from the University of Vermont and an M.S. in statistics from Villanova University. He also is a C.F.A. charterholder.

Seph Mard

Head of Model Validation
DataRobot

As the head of model validation at DataRobot, Seph Mard is responsible for leading the design and implementation of DataRobot's model risk management and model validation products. He started his career as a behavioral economist with a focus on modeling microeconomic choices under uncertainty and risk but transitioned into the financial services industry. Mard has more than 10 years of experience working across different banking and risk management teams and organizations. Before joining DataRobot, Mard led a model validation team at Ally Bank, which is one of the nation's top 20 largest banks in total assets.

Mard has master's degree in mathematical risk management and business economics from Georgia State University.

Richard Murphy

Senior Bank Examiner
Federal Reserve Bank of Richmond

Richard Murphy is a senior bank examiner with the Federal Reserve Bank of Richmond. Before Murphy joined the Richmond Fed in 2012, he was an executive vice president at the Bank of Hawaii. His responsibilities included retail credit and collection activities for the consumer and small business portfolios from 2006–2012. He also has 25 years of experience in various risk management roles at large banks and was the manager of retail credit review for 14 years at NationsBank/Bank of America. He is currently responsible for monitoring retail credit risk at a large retail firm and has led two System-wide committees responsible for monitoring retail credit and strategy trends for large institution supervision coordinating committee and large banking organization firms.

Murphy was a speaker at the 2016 Consumer Banking Association conference and other retail credit risk-related conferences in 2017. He actively participated in Risk Management Association consumer risk round tables from 1996–2012.

Taylor D. Nadauld

Goldman Sachs Distinguished Faculty Fellow and Associate Professor of Finance
Marriott School of Business at Brigham Young University

Taylor D. Nadauld is the Goldman Sachs distinguished faculty fellow and associate professor of finance at the Marriott School of Business at Brigham Young University. His research focuses on the role of securitization in financial markets, student loans, and household debt decisions. His research has been published in the *Journal of Financial Economics*, *The Review of Financial Studies*, *Management Science*, and *Real Estate Economics*. His latest paper, recently accepted for publication by the *The Review of Financial Studies*, focuses on the relation between federal student aid and college tuition prices. The paper was presented to the Congressional House Ways and Means Subcommittee in October 2015. Nadauld's student loan research began in 2014 while he was on leave as a visiting scholar at the Federal Reserve Bank of New York. In 2013, he was recognized as an outstanding referee by the Society for Financial Studies for his work as a referee for *The Review of Financial Studies*. He was named the finance professor of the year by the BYU Finance Society in the years 2009, 2010, and 2011. Nadauld worked as a research analyst in the U.S. economics research group at Goldman Sachs in New York. He is also a founding partner of Visible Equity, LLC.

Nadauld has a doctorate in financial economics from Ohio State University and an undergraduate degree in economics from Brigham Young University.

Biographies

Scott Nelson

Economist
Consumer Financial Protection Bureau

Scott Nelson is an economist at the Consumer Financial Protection Bureau and a Ph.D. candidate in the economics program at MIT. His job market paper studies the effects and distributional consequences of dynamic price regulation in the 2009 Credit Card Accountability and Responsibility Disclosure Act. Nelson has studied household balance sheet responses to tax refund shocks, regulation of credit report data in the labor market, and the formation of consumers' financial expectations. Nelson has worked as a research fellow with the City of Boston's Office of Financial Empowerment, as an assistant economist at the Federal Reserve Bank of New York, and as a research assistant at Innovations for Poverty Action, where he was a member of the U.S. Household Finance Initiative.

Moshe Orenbuch

Managing Director
Credit Suisse

Moshe Orenbuch is a managing director of Credit Suisse, based in New York, covering specialty finance companies including credit card and payments companies, auto finance, student lending, commercial finance, and aircraft leasing companies. He previously covered multinational banks.

Orenbuch joined Credit Suisse First Boston in October 2000 when the firm merged with Donaldson, Lufkin & Jenrette (DLJ). He covered specialty finance at DLJ from 1999–2000. Before that, Orenbuch was a senior research analyst at Sanford C. Bernstein, where he covered credit card issuers and regional banks. He previously worked as an auditor and management consultant at Deloitte Haskins & Sells. In each year starting in 1993, Orenbuch has been a ranked analyst on Institutional Investor's All-America Research Team.

Orenbuch has a B.S. in accounting from Yeshiva University.

Michaela Pagel

Assistant Professor
Columbia Business School

Michaela Pagel, an assistant professor at Columbia Business School, works on topics related to behavioral economics, household finance, and macroeconomics. Her dissertation focused on the consumption and investment implications of nonstandard preferences. More specifically, she analyzed how decision-making is affected by people's beliefs about their consumption. Her current work analyzes transaction-level data on income, spending, balances, credit limits, and logins stemming from a financial aggregation app. She is also working with bank account data linked to individual investors' security trades and portfolios. Pagel has a Ph.D. in economics from the University of California, Berkeley.

Eduard Pelz

Knowledge Leader
Member of Executive Leadership
Supervision and Regulation
Federal Reserve Bank of Chicago

Eduard Pelz is a knowledge leader and member of executive leadership in Supervision and Regulation (S&R) at the Federal Reserve Bank of Chicago. Pelz is currently a member of the Wholesale Credit Risk Center in the Risk Specialist Division (RSD), where he focuses on large institution supervision coordinating committee supervision, credit risk modeling, and analysis. Pelz is a primary advisor to senior management on wholesale credit-related matters.

Pelz joined RSD in 2003 but has also engaged in the direct supervision of bank holding companies as part of the large, specialized, and regional institutions division. While working in S&R, Pelz has focused on credit risk modeling, securitization, economic capital, capital planning, stress testing, and issues related to the implementation of the Advanced Approaches capital framework (i.e., the Basel II Capital Accord). Pelz participated in the Federal Reserve's initial round of simultaneous supervisory stress tests in 2009 during the Supervisory Capital Assessment Program, subsequent comprehensive capital analysis and reviews, and the capital plan reviews. Pelz transferred to the Board of Governors of the Federal Reserve System, where he focused on the enhancement of capital adequacy supervision. After his transfer, Pelz co-led the wholesale supervisory modeling team during Dodd–Frank Act stress tests in 2016.

Biographies

Silvio Rendon

Senior Financial Economist
Federal Reserve Bank of Philadelphia

Silvio Rendon is a senior financial economist in the Risk Identification Group at the Federal Reserve Bank of Philadelphia. In his role, he led the implementation of the home equity stress testing model in the retail supervisory modeling team and worked in the retail risk evaluation team and the wholesale horizontal capital review as part of the comprehensive capital analysis review and Dodd–Frank Act stress testing exercises. He also provided quantitative support of bank examinations with a focus on loss estimation and projection. Before joining the Federal Reserve System, he was an assistant professor in the Department of Economics at Stony Brook University. He has published articles in several journals, including the *Journal of Business and Economic Statistics*, the *Review of Economic Dynamics*, and the *International Economic Review.*

Rendon has a doctorate in economics from New York University and a bachelor's degree in economics from Universidad Catolica de Lima, Peru.

Judith Ricks

Economist
Office of Research
Consumer Financial Protection Bureau

Judith Ricks is an economist in the Office of Research at the Consumer Financial Protection Bureau. Her research focuses on mortgage market regulations and access to mortgage credit. In addition, she works on questions related to household finance, particularly among retirement age households. Ricks has a Ph.D. from the Maxwell School at Syracuse University.

Ryan Sandler

Economist
Office of Research
Consumer Financial Protection Bureau

Ryan Sandler is an economist in the Office of Research at the Consumer Financial Protection Bureau. Before joining the Office of Research, he was a staff economist at the Federal Trade Commission in the Bureau of Economics, working on consumer protection issues. He has a Ph.D. and M.A. in economics from the University of California, Davis, and a B.A. in economics from Willamette University.

Akhtarur Siddique

Deputy Director
Enterprise Risk Analysis Division
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Akhtar Siddique is deputy director of the Enterprise Risk Analysis Division at the Office of the Comptroller of the Currency (OCC). In this role, he helps manage a staff of Ph.D. financial economists who work on bank supervision, research, and policy along with his own work in the same areas. His current research interests include big data methods and new methodological work in financial econometrics. Previously, he taught at the McDonough School of Business at Georgetown University. His research has spanned financial econometrics, financial institutions, capital adequacy, stress testing, asset pricing, corporate finance, and numerical methods/optimization. He has authored papers published in peer-reviewed journals including the *Journal of Finance, Review of Financial Studies, Management Science, Journal of Accounting Research,* and *Naval Research Logistics*. He has also been cited in the *New York Times, Forbes,* and *USA Today* and has edited (and written several chapters of) a book on stress testing published by Risk Books, *Stress Testing: Approaches Methods and Applications*, parts of which are used as readings for certification programs in risk management. He continues to conduct research and teaches finance as a research professor at University College Dublin.

Siddique has a Ph.D. in finance from Duke University.

Alexey Smurov

Senior Director and Head of Capital Model Validation
Capital One

Alexey Smurov is senior director and head of capital model validation at Capital One. His group is responsible for model risk management related to regulatory and economic capital across the full spectrum of risk types. Smurov has more than 15 years of experience in the financial services industry. He has spent the past six years at Capital One as a model risk manager in the areas of credit, counterparty, operational, and market risk.

Smurov also has worked as a chartered financial analyst, financial risk manager, energy risk professional, and has professional risk manager designations. He has a Ph.D. in economics from the University of Georgia.

Biographies

Edward Tong

Vice President
Model Risk Management
Bank of America

Edward Tong is vice president in model risk management at Bank of America in New York. He leads independent model validations on retail and wholesale credit risk models for Basel regulatory capital and comprehensive capital analysis and reviews stress testing. He previously developed credit risk models at HSBC in New York, Royal Bank of Scotland in London, and Suncorp Bank in Australia. Before that, he was a statistician in public health-care research. His research has been published in several journals including the *International Journal of Forecasting* and *European Journal of Operational Research*.

Tong has a Ph.D. in management science from the University of Southampton, UK, and an M.S. in statistics from University of Queensland, Australia.

Christine Townsend

Senior Examiner
Large Financial Institutions
Federal Deposit Insurance Corporation

Christine Townsend joined the Federal Deposit Insurance Corporation (FDIC) in 2003 and is a senior large financial institution examiner for the FDIC's Division of Risk Management Supervision, New York Region, in the Wilmington, DE, Field Office. She is currently the examiner-in-charge for a six-person team assigned to a large credit card issuing institution. Townsend has spent the past five years assessing credit risk and Bank Secrecy Act programs at large, complex institutions as well as niche banking groups specializing in higher-risk products. Before joining the FDIC, she was an assistant staff judge advocate in the U.S. Air Force and a legal support coordinator for the U.S. Attorney's Office, District of New Mexico.

Townsend has a J.D. from the Marshall-Wythe School of Law, College of William and Mary, and B.S. in accounting from Towson State University.

Mike Trapanese

Senior Vice President
VantageScore Solutions

Mike Trapanese is a senior vice president at VantageScore Solutions, where he is responsible for strategic planning and alliances.

Before joining VantageScore, Trapanese oversaw strategy and corporate development at the Federal Home Loan Bank of New York. In that capacity, he was instrumental in developing strategies, programs, investments, and policies to position the bank within the evolving housing finance supply chain. He began his career as a management consultant, where he worked with some of the largest financial services firms in the world on their most pressing strategic challenges.

Trapanese has an M.B.A. from the Wharton School at the University of Pennsylvania, where he was a fellow in the Program for Executives; he also has a B.A. from Boston College.

Kapo Yuen

Risk Analyst, Risk Group
Federal Reserve Bank of New York

Kapo Yuen is a risk analyst in the Risk Group of the Federal Reserve Bank of New York. Before that, he was in the Supervision Group for 10 years, in which he led a team of quantitative analysts and modelers to support the supervision of systemically important financial institutions. His responsibilities included evaluating the appropriateness of the firms' quantitative models such as Dodd–Frank Act stress testing, credit origination, and economic capital models.

Since the group's inception, Yuen participated in many of the Federal Reserve's comprehensive capital analysis and review exercises. His work on "Determining the Severity of Macroeconomic Stress Scenarios" is available at the Federal Reserve Board website. While in Supervision, he was the New York Fed representative to the Risk Measurement Group of the Basel Committee of Banking Supervision (BCBS), led many quantitative impact studies, and was one of the authors of two of BCBS's articles, one on stress testing practices, and one on the costs of central counterparty clearing. Before joining the New York Fed in 2006, Yuen had worked in several large financial institutions in United States and overseas. He has more than 25 years of financial industry experience, covering retail, wholesale, and payment system risk modeling; developing and validating models for credit origination; and risk management.

Mary Zaki

Assistant Professor
Department of Agricultural and Resource Economics
University of Maryland

Mary Zaki is an assistant professor in the Department of Agricultural and Resource Economics of the University of Maryland. Her research focuses on household finance and food consumption issues, especially among low-income populations. She is studying household spending patterns between paycheck receipts, the effects of high-cost credit on food consumption among military families, the influence of food acquisition costs on SNAP month spending, historical consumer credit costs, food access programs in food deserts, and the effect of school breakfast program expansions on health outcomes and test scores.

Zaki has a Ph.D. and an M.S. in economics from Northwestern University and a B.S. and B.A. in economics from the University of Pennsylvania.

Consumer Finance Institute

The Consumer Finance Institute brings together the Philadelphia Fed's wide-ranging expertise on the nature and functioning of consumer finance and payments markets while enhancing opportunities for collaboration with outside scholars, market participants, government regulators, and consumer groups. The Institute includes Philadelphia Fed economists, researchers from other centers within the Bank, analysts, and visiting scholars.

Our mission is to produce leading-edge, policyrelevant research, and events that explore how credit markets and payment systems affect consumers and the economy. The Institute sponsors opportunities for scholars, the financial industry, and the public sector to collaborate and share insights on fostering healthy household finances, a stable financial system, and a resilient economy.

SURF
Supervisory Research and Policy Forum

The Supervisory Research and Policy Forum The Supervisory Research and Policy Forum (SURF) is an initiative of the Supervision, Regulation, and Credit Department at the Federal Reserve Bank of Philadelphia. It is designed to facilitate interactive discussion, networking, and information sharing among economists and policy experts working in areas related to supervision of retail credit at the federal regulatory agencies, academia, and industry.

SURF is a hub for economists and experts on banking supervision to share research and policy analysis. Through its publications and workshops, SURF strives to foster innovation and collaboration in research, promote discussion on supervisory policy, and promote networking and discussion toward the common goal of enhancing the supervision of retail credit risk.

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