

MAY 24-25, 2018

Technology-Enabled

DISRUPTION

IMPLICATIONS FOR
BUSINESS, LABOR MARKETS
AND MONETARY POLICY



Federal Reserve
Bank of Dallas



FEDERAL
RESERVE
BANK
of ATLANTA

Technology-enabled disruption means workers are increasingly being replaced by technology. It also means that existing business models are being supplanted by new models, often technology-enabled, for more efficiently selling or distributing goods and services. In addition, consumers are increasingly able to use technology to shop for goods and services at lower prices with greater convenience—having the impact of reducing the pricing power of businesses. This reduced pricing power has, in turn, caused them to further intensify their focus on creating greater operational efficiencies. These trends appear to be accelerating.

It is likely that disruption is a factor in economic outcomes becoming more and more skewed by the educational attainment levels of workers. Increasingly, workers with lower levels of educational attainment are seeing their jobs restructured or eliminated. Unless they have sufficient math and literacy skills, or are retrained, these workers may see their productivity and incomes decline as a result of disruption. This may help explain the muted levels of wage gains and overall labor productivity growth we see in the U.S. as well as other advanced economies.

The impact of technology-enabled disruption on the workforce is likely not susceptible to monetary policy—it requires structural reforms. The reforms could include improving early childhood literacy and overall college readiness in order to increase the percentage of students who graduate college in six years or less—now estimated at 59 percent in the U.S. They would also include stepped-up efforts to increase middle-skills training in cities across the U.S. in order to improve employment, close the skills gap (not enough workers to fill skilled jobs) and raise worker productivity.

Disruption may also help explain why companies, facing one or more disruptive competitors, have been more cautious about making capacity-expansion decisions as well as investing in major capital projects.

To deal with disruptive changes and lack of pricing power, many companies are seeking to achieve greater scale economies in order to maintain or improve profit margins. This may help explain the record level of merger-and-acquisition activity globally over the past few years.

The purpose of the conference is to:

- Provide a better understanding of technology-enabled disruption and explore its implications for the broader economy, in particular inflation, productivity, labor markets, business dynamics and the workforce.
- Promote further research on technology-enabled disruption, which affects more and more areas of economic life.

Thursday, May 24

8:30 a.m.

Registration Opens

Continental Breakfast

9:30 a.m.

Welcome

Speaker: Mark A. Wynne (Federal Reserve Bank of Dallas)

9:35 a.m.

Opening Remarks

Speakers: Raphael Bostic (Federal Reserve Bank of Atlanta), Robert S. Kaplan (Federal Reserve Bank of Dallas)

Topic: Introduce the purpose, structure and content of the conference.

10:00 a.m.

Session I: The Disruption Challenge Facing Business

Moderator: Robert S. Kaplan

Speakers: Tom Fanning (Southern Co.), John Stephens (AT&T Inc.), Troy Taylor (Coca-Cola Beverages Florida), Myron E. "Mike" Ullman (J.C. Penney Co., retired)

Topics: What do you mean by technology-enabled disruption? How is your business being affected? What are the implications of technology-enabled disruption for your business? How is your business responding?

11:30 a.m.

Working Lunch

Session II: Defining Disruption—The View from Academia

Moderator: Daniel G. Sullivan (Federal Reserve Bank of Chicago)

Speakers: Jan W. Rivkin (Harvard University), Willy Shih (Harvard University)

Topics: What do you mean by technology-enabled disruption? How do you see business being affected? What are the implications of technology-enabled disruption for business? How do you see business responding?

1:00 p.m.

Session III: Broader Labor Market Implications of Technology-Enabled Disruption

Moderator: Mary C. Daly (Federal Reserve Bank of San Francisco)

Speakers: Patrick Harker (Federal Reserve Bank of Philadelphia), William Kerr (Harvard University), Sam Schuhofer-Wohl (Federal Reserve Bank of Chicago)

Topics: How is disruption affecting labor markets? Do we have the right educational infrastructure in place to facilitate the movement of workers from disrupted to emerging sectors?

2:30 p.m.

Break

2:45 p.m.

Session IV: Roundtable on the Implications of Technology-Enabled Disruption for Workforce Development

Moderator: Pia Orrenius (Federal Reserve Bank of Dallas)

Speakers: Joe May (Dallas County Community College District), William Serrata (El Paso Community College), Michael J. Sorrell (Paul Quinn College)

Topics: How is the education sector being disrupted? How is disruption affecting labor markets? How do you do workforce development in your

community? Do we have the right educational infrastructure in place to facilitate the movement of workers from disrupted to emerging sectors?

4:15 p.m.

Break

4:30 p.m.

Session V: Disruption, Entrepreneurship and Small-Business Dynamism

Moderator: Mine K. Yücel (Federal Reserve Bank of Dallas)

Speakers: John C. Haltiwanger (University of Maryland), Deepak Hegde (New York University), Antoinette Schoar (Massachusetts Institute of Technology), James Conrad "Rad" Weaver (McCombs Partners)

Topics: How is information technology changing business models? How do we reconcile declining rates of business formation and entrepreneurship with accelerating disruption? What is the relationship between disruption and entrepreneurship? Can disruption only occur through new firm formation, or can incumbents be disruptors as well?

6:00 p.m.

Reception

6:30 p.m.

Dinner

7:00 p.m.

Dinner Keynote

Introduction: Thomas I. Barkin (Federal Reserve Bank of Richmond)

Speaker: Martin Feldstein (Harvard University)

Topic: What are the challenges for monetary policy?

8:00 p.m.

Adjourn for the Day

Friday, May 25

7:30 a.m.

Registration and Breakfast

8:30 a.m.

Session VI: The Workforce Ecosystem: Local and Regional Solutions

Introduction: Mark A. Wynne

Speaker: Alfreda B. Norman (Federal Reserve Bank of Dallas)

Topics: How has disruption affected the ecosystem? What are local leaders doing to support a strong workforce and improve economic growth? How are stakeholders leveraging resources and reframing policies?

9:00 a.m.

Session VII: Disruption and the Broader Economy

Moderator: Michael Dotsey (Federal Reserve Bank of Philadelphia)

Speakers: Michael J. Boskin (Stanford University), Mark Duggan (Stanford University), Ganesh Padmanabhan (CognitiveScale), Chad Syverson (University of Chicago)

Topics: How does disruption happen? What are the challenges for regulatory policy? Has the statistical infrastructure kept up with the evolution of the digital economy? How does disruption relate to low productivity growth? How does disruption relate to low inflation?

10:30 a.m.

Break

10:45 a.m.

Session VIII: Policymaker Panel

Moderator: David E. Altig (Federal Reserve Bank of Atlanta)

Speakers: Raphael Bostic, Charles Evans (Federal Reserve Bank of Chicago), Robert S. Kaplan

Topics: If disruption is affecting the macroeconomy, where are we seeing it? Does technology-enabled disruption pose challenges for monetary policy over and above the puzzles of low inflation and low productivity growth? Are different monetary policy frameworks more appropriate for a world that is more susceptible to disruption?

12:15 p.m.

Lunch

12:45 p.m.

Session IX: Where Next?

Moderator: Joseph S. Tracy (Federal Reserve Bank of Dallas)

Speakers: David E. Altig, Marc P. Giannoni (Federal Reserve Bank of Dallas), Daniel G. Sullivan

Topics: What have we learned? Where do we go from here?

1:30 p.m.

Closing Remarks

Robert S. Kaplan

David E. Altig

Executive Vice President and Director of Research Federal Reserve Bank of Atlanta

Altig is executive vice president and director of research at the Federal Reserve Bank of Atlanta. In addition to advising the Atlanta Fed president on monetary policy and related matters, Altig oversees the Bank's regional executives and Research Department. He leads the Bank's macroblog, which provides commentary on economic topics, including monetary policy, macroeconomic developments and the Southeast economy.

Altig also serves as an adjunct professor of economics in the Booth School of Business at the University of Chicago. In 2016, he was elected to a three-year term as a director of the National Association for Business Economics. He is a member of the board of the Global Interdependence Center and the advisory board of Atlanta-based Neighborhood Nexus.

Altig previously served as vice president and associate director of research at the Federal Reserve Bank of Cleveland. Before joining the Cleveland Fed, Altig was a faculty member at Indiana University. He has lectured at other universities, including Ohio State, Brown, Case Western Reserve, Cleveland State, Duke, John Carroll, Kent State, Iowa and Wisconsin as well as in the Chinese executive MBA program sponsored by the University of Minnesota and Lingnan College of Sun Yat-Sen University.

Altig graduated from the University of Iowa with a bachelor's degree in business administration. He earned his master's and doctoral degrees in economics from Brown University.

Thomas I. Barkin

President and CEO Federal Reserve Bank of Richmond

Barkin is president and CEO of the Federal Reserve Bank of Richmond. He joined the Richmond Fed in January 2018.

In this role, he is responsible for the Bank's monetary policy, bank supervision and regulation, and payment services as well as oversight of the Federal Reserve System's information technology organization. Barkin serves as a voting member in 2018 on the Federal Reserve's chief monetary policy body, the Federal Open Market Committee.

Prior to joining the Richmond Fed, Barkin was a senior partner and chief risk officer at McKinsey and Co., a worldwide management consulting firm, and previously served as the organization's CFO. Barkin oversaw McKinsey's offices in the southern United States, led multiple functional areas and provided strategic counsel to a diverse portfolio of clients. He also served on the board of directors for the Federal Reserve Bank of Atlanta from 2009 to 2014 and was the board's chairman from 2013 to 2014.

Barkin has served on the executive committee of Metro Atlanta's Chamber of Commerce, the Atlanta Committee for Progress, the Commerce Club and the Emory University Board of Trustees. He has held leadership roles with other civic and community organizations.

Barkin is a native of Tampa, Florida, and attended Harvard University, where he earned his undergraduate, MBA and law degrees.

Michael J. Boskin

Professor of Economics and Senior Fellow Hoover Institution, Stanford University

Boskin is a senior fellow at the Hoover Institution and Tully M. Friedman Professor of Economics at Stanford University. He is also research associate at the National Bureau of Economic Research.

Boskin served as chairman of the President's Council of Economic Advisers from 1989 to 1993. He chaired the blue-ribbon Commission on the Consumer Price Index, whose report has transformed the way government statistical agencies around the world measure inflation, gross domestic product and productivity. An adviser to governments and businesses globally, Boskin serves on several corporate and philanthropic boards, including Exxon Mobil Corp., Oracle Corp. and Vodafone PLC.

Boskin frequently speaks on the economic outlook and evolving trends significant to business, national and international economic policy and the intersection of economics and geopolitics. He is the author of more than 100 books and articles and has received numerous professional awards and citations, including the 1998 Adam Smith Prize for outstanding contributions to economics.

Boskin received his BA and the Chancellor's Award as outstanding undergraduate in 1967 from the University of California, Berkeley, where he also received his MA and PhD, all in economics. In addition to Stanford, he has taught at the University of California and Harvard and Yale universities.

Raphael Bostic

President and CEO Federal Reserve Bank of Atlanta

Bostic took office in 2017 as the 15th president and CEO of the Federal Reserve Bank of Atlanta. He is responsible for all the Bank's activities, including monetary policy, bank supervision and regulation, and payment services. In addition, he serves on the Federal Reserve's chief monetary policy body, the Federal Open Market Committee.

From 2012 to 2017, Bostic was the Judith and John Bedrosian Chair in Governance and the Public Enterprise at the Sol Price School of Public Policy at the University of Southern California. Earlier, he served as a professor in the School of Policy, Planning and Development. His research has spanned many fields, including homeownership, housing finance, neighborhood change and the role of institutions in shaping policy effectiveness. He was director of USC's master of real estate development degree program and founding director of the Casden Real Estate Economics Forecast.

From 2009 to 2012, Bostic was the assistant secretary for policy development and research at the U.S. Department of Housing and Urban Development (HUD). Bostic also worked as an economist at the Federal Reserve Board of Governors from 1995 to 2001, earning a special achievement award for his work on the Community Reinvestment Act. He served as special assistant to HUD's assistant secretary of policy development and research in 1999 and was a professional lecturer at American University in 1998.

Bostic graduated from Harvard University with a combined major in economics and psychology. He earned his doctorate in economics from Stanford University.

Mary C. Daly

Executive Vice President and Director of Research Federal Reserve Bank of San Francisco

Daly is executive vice president and director of economic research at the Federal Reserve Bank of San Francisco. In this role, she oversees key research functions and supports the development of monetary policy by guiding and providing relevant economic and financial analyses.

Daly began her career as an economist at the Bank in 1996 after completing a National Institute of Aging Postdoctoral Fellowship at Northwestern University. Her research focuses on topics including labor economics, economic inequality, wage and unemployment dynamics, and disability and retirement policy. She has collaborated with scholars in a multitude of fields and from around the globe to bring economic analysis into the development of effective and sustainable public policies. She has published numerous articles in leading research journals and authored and edited several books.

Daly currently serves on the U.S. Congressional Budget Office Panel of Economic Advisors and is a research fellow at the University of Southern California Schaeffer Center for Health Policy and Economics and at the Institute for the Study of Labor (IZA) in Bonn, Germany. She also serves on the editorial boards for the *Journal of Comparative Policy Analysis* and the journal *Industrial Relations*. Daly has been a member of the Institute of Medicine Expert Panel, the Technical Panel of the Social Security Advisory Board, and the National Academy of Social Insurance Committee on the Privatization of the Social Security Retirement Program.

Prior to completing her PhD in economics at Syracuse University, she earned an MS in economics from the University of Illinois at Urbana–Champaign and a BA from the University of Missouri–Kansas City.

Michael Dotsey

Executive Vice President, Director of Research and Director of the Consumer Finance Institute Federal Reserve Bank of Philadelphia

Dotsey is executive vice president and director of research at the Federal Reserve Bank of Philadelphia, and also director of the Bank's Consumer Finance Institute, whose mission is to produce leading-edge research on how credit markets and payment systems affect the economy.

Dotsey has published extensively in the fields of macroeconomics and monetary economics. He currently serves as an associate editor of the *International Journal of Central Banking*. He began his career at the Federal Reserve Bank of Richmond. He has taught at Duke University, the University of Rochester, the Rochester Institute of Technology and the State University of New York at Oswego.

Dotsey earned a BA and MBA from the University of Chicago and an MA and PhD from the University of Rochester.

Mark Duggan

Director and Senior Fellow, Stanford Institute for Economic Policy Research Professor of Economics, Stanford University

Duggan is the Trione Director of the Stanford Institute for Economic Policy Research and the Wayne and Jodi Cooperman Professor of Economics at Stanford University. He is also a research associate at the National Bureau of Economic Research and serves on the editorial board of the *American Economic Journal: Economic Policy*.

Duggan previously served as Rowan Family Foundation Professor at the University of Pennsylvania's Wharton School and was also the faculty director of the Penn Wharton Public Policy Initiative and the chair of Wharton's Business Economics and Public Policy Department. Duggan served in 2009–10 as the senior economist for health care policy at the White House Council of Economic Advisers. He also was a fellow of the Alfred P. Sloan Foundation and a visiting fellow at the Brookings Institution.

Duggan's research focuses on the health care sector and also on the effects of government expenditure programs such as Social Security, Medicare and Medicaid on the behavior of individuals and firms. Some of his more recent research involves exploring the effect of federal disability programs on the labor market and of the Affordable Care Act on the labor market and health care costs. His research has been published in academic journals including the *American Economic Review*, *Journal of Political Economy* and *Quarterly Journal of Economics* and has been featured in many media outlets.

Duggan was the 2010 recipient of the ASHEcon Medal from the American Society of Health Economists for his contributions to the field of health economics. He and co-author Fiona Scott Morton received the National Institute for Health Care Management's 2011 Health Care Research Award for their work on Medicare Part D.

He received his BS and MS degrees in electrical engineering from the Massachusetts Institute of Technology and his PhD in economics from Harvard University.

Charles Evans

President and CEO Federal Reserve Bank of Chicago

Evans has been president and CEO of the Federal Reserve Bank of Chicago since September 2007. In that capacity, he serves on the Federal Open Market Committee, the Federal Reserve System's monetary policy making body.

Previously, Evans served as director of research and senior vice president, supervising the Bank's research on monetary policy, banking, financial markets and regional economic conditions. His personal research has focused on measuring the effects of monetary policy on U.S. economic activity, inflation and financial market prices and has been published in peer-reviewed journals.

Evans is active in the civic community. He is a trustee at Rush University Medical Center, a director of the Chicago Council on Global Affairs, a governing board member of Econ Illinois, a member of the Economic Club of Chicago board of directors and a member of the civic committee of the Commercial Club of Chicago and the Civic Consulting Alliance board.

Evans has taught at the University of Chicago, University of Michigan and University of South Carolina. He received a bachelor's degree in economics from the University of Virginia and a doctorate in economics from Carnegie-Mellon University in Pittsburgh.

Tom Fanning

Chairman, President and CEO Southern Co.

Fanning is chairman, president and CEO of the energy firm Southern Co. He became president of the company in August 2010 and assumed the additional responsibilities of chairman and CEO in December 2010.

Fanning has worked for Southern Co. for more than 35 years and has held 15 different positions in eight business units, including numerous officer positions with a variety of subsidiaries in the areas of finance, strategy, international business development and technology. Most recently, Fanning served as chief operating officer. He also led the company's efforts on business strategy and served as a director of Southern Nuclear, Southern Co.'s nuclear plant operating company. Fanning previously was Southern Co.'s CFO. Prior to taking that position, he was president and CEO of Gulf Power.

Fanning serves on the board of directors of the Federal Reserve Bank of Atlanta, where he is the immediate past chairman, and serves as chair of the Conference of Chairs of the Federal Reserve Banks. He also is the immediate past chairman of the Edison Electric Institute and serves on boards for Georgia Tech, the Institute of Nuclear Power Operations and the World Association of Nuclear Operators' Atlanta Centre, among others. Fanning is co-chair of the Electricity Subsector Coordinating Council, which serves as the principal liaison between the federal government and the electric power sector to protect the electric grid. He also is a member of the American Energy Innovation Council, which works to build support for public and private investments in innovation.

Fanning earned bachelor's and master's degrees in industrial management and also was awarded an honorary Doctor of Philosophy degree from Georgia Tech. His executive education includes programs at the International Institute for Management Development in Lausanne, Switzerland, Harvard Business School and the University of Virginia's Darden School of Business.

Martin Feldstein

Professor of Economics Harvard University

Feldstein is the George F. Baker Professor of Economics at Harvard University and president emeritus of the National Bureau of Economic Research (NBER). He served as president and CEO of the NBER, a private, nonprofit research organization, in both 1977–82 and 1984–2008 and continues as a research associate.

From 1982 through 1984, Feldstein was chairman of the Council of Economic Advisers and President Reagan's chief economic adviser. He served as president of the American Economic Association in 2004. He was appointed by President Bush to the President's Foreign Intelligence Advisory Board in 2006 and by President Obama to the President's Economic Recovery Advisory Board in 2009.

Feldstein is a member of the American Philosophical Society, a corresponding fellow of the British Academy, a fellow of the Econometric Society and a fellow of the National Association for Business Economics. He is a trustee of the Council on Foreign Relations and a member of the Trilateral Commission, the Group of 30, the American Academy of Arts and Sciences and the Council of Academic Advisors of the American Enterprise Institute. In 1977, he received the John Bates Clark Medal of the American Economic Association for his contributions to economic science.

Feldstein has been a director of several public corporations. He is also an economic adviser to businesses and government organizations in the United States and abroad. He is the author of more than 300 research articles in economics and a regular contributor to the *Wall Street Journal* and other publications.

Feldstein is a graduate of Harvard College and Oxford University.

Marc P. Giannoni

Senior Vice President and Director of Research Federal Reserve Bank of Dallas

Giannoni is senior vice president and director of research at the Dallas Fed. He joined the Bank in September 2017.

Giannoni previously was research economist and assistant vice president in the macroeconomic and monetary studies function of the Federal Reserve Bank of New York. He is a native of Switzerland and began his career as an economist with the Swiss National Bank in Zurich in 1992.

He joined the New York Fed as an economist in 2000 before leaving to begin an academic career at the Columbia University Graduate School of Business. Giannoni rejoined the New York Fed in 2011 while continuing as an adjunct professor of finance and economics at Columbia.

He holds BA and MA degrees in economics from the University of Geneva in Switzerland and MA and PhD degrees in economics from Princeton University.

John C. Haltiwanger

Professor of Economics University of Maryland

Haltiwanger is a Distinguished University Professor in the Department of Economics at the University of Maryland. He is also the first recipient of the Dudley and Louisa Dillard Professorship in 2013.

After serving on the faculty of the University of California at Los Angeles and Johns Hopkins University, he joined the Maryland faculty in 1987. In the late 1990s, he served as chief economist of the Census Bureau. He is a research associate of the National Bureau of Economic Research, a senior research fellow at the Center for Economic Studies at the Census Bureau and a fellow of the Society of Labor Economics and the Econometric Society.

Haltiwanger has played a major role in developing and studying U.S. longitudinal firm-level data. Using these data, he has developed new statistical measures and analyzed the determinants of firm-level job creation, job destruction and economic performance. The methods he has helped develop to measure and study firm dynamics have been increasingly used by many statistical agencies around the world. He received the Julius Shiskin Award for economic statistics in 2013 and the Roger Herriott Award for innovation in federal statistics in 2014. He has published more than 100 academic articles and numerous books, including *Job Creation and Destruction* (with Steven Davis and Scott Schuh, MIT Press).

Haltiwanger received his PhD from the Johns Hopkins University in 1981.

Patrick Harker

President and CEO Federal Reserve Bank of Philadelphia

Harker took office in July 2015 as the 11th president and CEO of the Federal Reserve Bank of Philadelphia. In this role, Harker participates on the Federal Open Market Committee, which formulates the nation's monetary policy.

Harker previously served as president of the University of Delaware. He was also a professor of business administration at the university and a professor of civil and environmental engineering. Before joining the university in 2007, Harker was dean and Reliance Professor of Management and Private Enterprise at the Wharton School of the University of Pennsylvania. He was named Wharton dean in 2000 after serving as interim and deputy dean. 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 served as 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 a Class B director of the Philadelphia Fed from 2012 to 2015.

Harker has a PhD in civil and urban engineering, an MA in economics and an MSE and a BSE in civil engineering, all from the University of Pennsylvania.

Deepak Hegde

Associate Professor of Management and Organizations New York University

Hegde, associate professor at New York University, focuses his research on entrepreneurship, innovation and intellectual property rights. He studies how entrepreneurs and inventors in science- and technology-based industries overcome the challenges associated with commercializing their ideas. His work has been widely published in academic journals. He is a recipient of the Kauffman Faculty Fellowship for entrepreneurship research and the Thomas Alva Edison Fellowship awarded by the U.S. Patent and Trademark Office.

Hegde teaches MBA courses on competitive strategy and corporate strategy, coordinates a PhD course on innovation and hosts the Creativity and Innovation Research Initiative at the university's Stern School of Business. He was named one of the world's best 40 under 40 business school professors by *Poets & Quants*.

Prior to joining Stern's Management and Organizations Department in 2010, Hegde worked at Bosch, a technology-based German company, and Abt Associates, a research and consulting firm for the U.S. government and business sectors.

He earned a BE in industrial engineering with distinction from the Mysore University, an MS in public policy from the Georgia Institute of Technology and a PhD in business administration from the University of California, Berkeley.

Robert S. Kaplan

President and CEO Federal Reserve Bank of Dallas

Kaplan has served as president and CEO of the Federal Reserve Bank of Dallas since September 2015. He represents the Eleventh Federal Reserve District on the Federal Open Market Committee in the formulation of U.S. monetary policy and oversees the 1,200 employees of the Dallas Fed.

Kaplan was previously the Martin Marshall Professor of Management Practice and a senior associate dean at Harvard Business School. Prior to joining Harvard in 2006, Kaplan was vice chairman of Goldman Sachs Group Inc. He is the author of several books on leadership and management.

Kaplan serves as co-chairman of Project A.L.S. and co-chairman of the Draper Richards Kaplan Foundation, a global venture philanthropy firm that invests in developing nonprofit enterprises dedicated to addressing social issues. He is also a board member of Harvard Medical School.

Kaplan holds a bachelor's degree in business administration from the University of Kansas and an MBA from Harvard Business School.

William Kerr

Professor of Business Administration Harvard University

Kerr is the Dimitri V. D'Arbeloff–MBA Class of 1955 Professor of Business Administration at Harvard Business School. He is co-director of Harvard's Managing the Future of Work initiative and the faculty chair of the Launching New Ventures program for executive education.

Kerr focuses on how companies and economies explore new opportunities and generate growth. He considers the leadership and resources necessary to identify, launch and sustain dynamic and enduring organizations, and his recent work on Launching New Ventures emphasized global opportunities.

Kerr works with companies worldwide on the development of new ventures and transformations for profitable growth. He also advises governments about investments in the innovative capacities of their nations. He is a recipient of the Ewing Marion Kauffman Prize Medal for Distinguished Research in Entrepreneurship.

Kerr received a BS from the University of Virginia and a PhD from the Massachusetts Institute of Technology.

Joe May

Chancellor Dallas County Community College District

May assumed his duties as the seventh chancellor of the Dallas County Community College District in late February 2014. He is known both nationally and internationally for his advocacy of the role of community colleges in solving today's most challenging social issues.

May helped start and then became founding president of Rebuilding America's Middle Class (RAMC), a national consortium of community colleges. As a community leader and educator, he has worked closely with public school districts and sponsored charter schools, career academies and early college programs. May has helped jump-start new economic investment and job creation through organizations like RAMC and COMBASE, a consortium of community and technical colleges. He serves on the COMBASE board of directors as president.

May previously served as president of the Louisiana Community and Technical College System, system president for the Colorado Community College System and president of Pueblo (Colo.) Community College. He started his higher education career in 1978 as an adjunct faculty member at Cedar Valley College in the Dallas County Community College District. May has delivered consulting services to new community college initiatives in Japan, the United Kingdom, Russia and Saudi Arabia. He also served in leadership roles at Sul Ross State University, Navarro College and Vernon College.

May earned his doctorate in education from Texas A&M–Commerce. He also holds Master of Education and Bachelor of Science degrees from Stephen F. Austin State University.

Alfreda B. Norman

Senior Vice President Federal Reserve Bank of Dallas

Norman oversees the Dallas Fed's communications and public outreach programs. She has responsibility for corporate communications, publications/web services, community development, economic education and financial institution relationship management.

Since joining the Bank in 2004, she has also served as an officer and vice president of the Community Development Department, promoting financial stability for low- and moderate-income communities and individuals.

Before her arrival at the Dallas Fed, Norman was one of the first neighborhood development officers at Bank of America in Texas. She has extensive experience working with the public and private sectors and held management positions at the city of Dallas' Office of Cultural Affairs and The Container Store corporate headquarters.

She is affiliated with many community and civic organizations. She is a board trustee at the Communities Foundation of Texas, Southwestern Medical Foundation, The Meadows School of the Arts at Southern Methodist University and Big Thought. She is a member of the Dallas Assembly, the North Texas Asset Funders Network and the Dallas Regional Chamber's Executive Women's Roundtable.

Norman earned a bachelor's degree from SMU and is a graduate of the University of Virginia's Graduate School of Retail Banking.

Pia Orrenius

Vice President and Senior Economist Federal Reserve Bank of Dallas

As a vice president and senior economist at the Dallas Fed, Orrenius is a labor economist working on regional economic growth and demographic change. She manages the regional and microeconomics group in the Research Department and serves as executive editor of the quarterly publication *Southwest Economy*.

Orrenius was co-editor of *Ten Gallon Economy: Sizing up Economic Growth in Texas* (Palgrave MacMillan, 2015). Her academic research also focuses on the labor market impacts of immigration, unauthorized immigration and U.S. immigration policy. She is co-author of the book *Beside the Golden Door: U.S. Immigration Reform in a New Era of Globalization* (AEI Press, 2010).

Orrenius is a research fellow at the Tower Center for Political Studies at Southern Methodist University and the IZA Institute of Labor in Bonn, Germany, as well as adjunct scholar at the American Enterprise Institute. Orrenius is also adjunct professor at Baylor University (Dallas campus), where she teaches in the executive MBA program.

Orrenius was senior economist on the Council of Economic Advisers in the Executive Office of the President in 2004–05, where she advised the Bush administration on labor, health and immigration issues. She holds a PhD in economics from the University of California, Los Angeles and bachelor's degrees in economics and Spanish from the University of Illinois at Urbana–Champaign.

Ganesh Padmanabhan

Vice President of Market Development CognitiveScale

Padmanabhan is vice president of market development at CognitiveScale, responsible for revenue growth at the augmented intelligence software provider through marketing and business development and strategic partnerships. He has brought new and disruptive technologies to market for firms ranging from startups to Fortune 50 companies.

Previously, Padmanabhan was general manager of converged solutions at Dell and an entrepreneur-in-residence at Capital Factory in Austin. In a career with tech powerhouses like Dell and Intel, he was instrumental in launching the first Cloud software product and building one of industry's first converged/hyperconverged infrastructure portfolios.

Padmanabhan holds a bachelor's degree in mechanical engineering and an MBA from the McCombs School of Business at the University of Texas at Austin.

Jan W. Rivkin

Professor of Business Administration and Senior Associate Dean for Research Harvard University

Rivkin is the C. Roland Christensen Professor of Business Administration, senior associate dean for research and chair of the strategy unit at Harvard Business School. His research, course development and teaching examine the interactions across functional and product boundaries within a firm. His work analyzes, first, how such interactions constrain managerial behavior and, second, how managers use cognitive devices and organizational design to cope with decisions whose ramifications span boundaries.

Rivkin's scholarly work has appeared in journals such as *Management Science*, *Organization Science*, *Strategic Management Journal* and the *Academy of Management Journal*. He also co-chairs the business school's project on the competitiveness of the United States. In that role, he has worked with a faculty team to explore steps that leaders—especially business leaders—can take to improve the ability of firms in the U.S. to win in the global marketplace and support American living standards.

Rivkin received his PhD in business economics from Harvard. Earlier, he studied chemical engineering and public policy at Princeton University and obtained an MSc in economics from the London School of Economics on a Marshall Scholarship.

Antoinette Schoar

Professor of Entrepreneurial Finance Massachusetts Institute of Technology

Schoar is the Michael M. Koerner (1949) Professor of Entrepreneurial Finance at the MIT Sloan School of Management. She is an associate editor of the *Journal of Finance* and co-chair of the NBER Entrepreneurship group.

Her research interests span from entrepreneurship and financing of small businesses in emerging markets to household finance and intermediation in retail financial markets. She received several awards including the Brattle Prize for best paper in the *Journal of Finance* and the Kauffman Prize Medal for Distinguished Research in Entrepreneurship in 2009. She has published numerous papers in the *Journal of Finance*, *Journal of Financial Economics*, *Quarterly Journal of Economics* and others. Her work has been featured in *The Economist*, *Financial Times*, the *New York Times* and the *Wall Street Journal*.

She also is the co-founder of ideas42, a nonprofit organization that uses insights from behavioral economics and psychology to address social problems.

Schoar holds an undergraduate degree from the University of Cologne, Germany, and a PhD in economics from the University of Chicago.

Sam Schulhofer-Wohl

Senior Economist and Research Advisor Federal Reserve Bank of Chicago

Schulhofer-Wohl is a senior economist and research advisor at the Federal Reserve Bank of Chicago.

Schulhofer-Wohl's research uses microdata to inform our understanding of the macroeconomy. He studies topics including migration, risk sharing, labor markets and inflation. His work has been published in the *Journal of Political Economy*, *Quantitative Economics*, *Demography*, *Review of Economic Dynamics* and *Journal of Development Economics*, among other journals.

Before joining the Chicago Fed in September 2016, Schulhofer-Wohl was senior vice president and director of research at the Federal Reserve Bank of Minneapolis. He also has been an assistant professor of economics and public affairs at Princeton University and a visiting faculty member at the University of Minnesota and Macalester College. He has a background in journalism and has worked at daily newspapers including the *Freeport Journal Standard* (Illinois), *Birmingham Post-Herald* (Alabama) and *Milwaukee Journal Sentinel*.

Schulhofer-Wohl earned a BA in physics from Swarthmore College and an MA and a PhD in economics from the University of Chicago.

William Serrata

President El Paso Community College

Serrata was named president of the El Paso County Community College District in 2012. Under Serrata's leadership, in fall 2014, El Paso Community College was named one of 10 nationwide finalists for the Aspen Institute prize for community college excellence, which recognizes a college's impact on student success.

Serrata previously served as the vice president for student affairs and enrollment management at South Texas College in McAllen for over seven years.

He has presented at numerous national conferences as well as state conferences on subjects including strategic enrollment management, student development and the role of student affairs in facilitating student success. Serrata is a recipient of the National Institute for Staff and Organizational Development Excellence Award.

Serrata currently serves as a member of the board of directors of the Workforce Solutions Upper Rio Grande, the Greater El Paso Chamber of Commerce, the United Way of El Paso and Sierra Providence Hospital and is on the executive committee of the Hispanic Chamber of Commerce.

Serrata holds a bachelor's degree from Texas A&M University, a master's degree from the University of Texas at Brownsville and a PhD in educational human resource development from Texas A&M University.

Willy Shih

Professor of Management Practice Harvard University

Shih is the Robert and Jane Cizik Professor of Management Practice in Business Administration at Harvard Business School. He is part of the technology and operations management unit and teaches in the MBA and executive education programs.

Shih's expertise is in manufacturing and product development, and he has written or co-authored numerous cases and teaching materials in such industries as semiconductors, IT and consumer electronics. His paper, "Restoring American Competitiveness," co-authored with Gary Pisano, won the 2009 McKinsey Award. His recent book, *Producing Prosperity—Why America Needs a Manufacturing Renaissance*, co-authored with Gary Pisano, has called attention to the link between manufacturing and innovation. He is also the author of the innovation simulation "Back Bay Battery."

Prior to joining Harvard in 2007, Shih spent 28 years in industry at IBM, Digital Equipment, Silicon Graphics, Eastman Kodak and Thomson SA.

He has two SB degrees from the Massachusetts Institute of Technology and a PhD from the University of California, Berkeley.

Michael J. Sorrell

President Paul Quinn College

Sorrell is the 34th president of Paul Quinn College. Under his leadership, Paul Quinn won two historically black colleges and universities (HBCU) honors—2011 HBCU of the Year and 2012 HBCU Student Government Association of the Year—and was named a finalist for the President's Higher Education Community Service Award.

Sorrell is the only two-time recipient of the HBCU Male President of the Year Award (2016 and 2012) in history. He received the Excellence in Education Distinguished Alumni Award from St. Ignatius College Prep in Chicago, the A. Kenneth Pye Award for Excellence in Education from Duke University's School of Law and the TRACS Leadership Award.

He was recently named the third most influential HBCU President in America, and *Washington Monthly* magazine identified him as one of America's 10 Most Innovative College Presidents.

Sorrell earned a BA in government from Oberlin College. He received his JD and MA in public policy from Duke University and his EdD from the University of Pennsylvania.

John Stephens

Chief Financial Officer AT&T Inc.

Stephens is CFO and senior executive vice president at AT&T. He is responsible for financial planning, corporate development, accounting, tax, auditing, treasury, investor relations, corporate real estate and shared services. He previously served as controller and senior vice president of AT&T. He also served as CFO for the diversified business unit at AT&T and was responsible for all corporate tax and shared services. Prior to serving as controller, he served as vice president—taxes.

Stephens has served as director of Telefonos de Mexico, S.A.B. de C.V. He has been chairman of the United Way of Dallas and serves on an advisory board to the Mays Business School at Texas A&M University. He also serves on the board of Catholic Charities of Dallas.

Stephens earned a BS/BA degree in accounting from Rockhurst College in Kansas City and a JD degree from Saint Louis University School of Law.

Daniel G. Sullivan

Executive Vice President and Director of Research Federal Reserve Bank of Chicago

Sullivan is director of research and an executive vice president at the Federal Reserve Bank of Chicago. He oversees the Bank's research in monetary policy, banking and financial markets, microeconomics and regional economics. In addition, he has supervisory responsibility for the Bank's community development and policy studies division and the Public Affairs Department. Sullivan also attends meetings of the Federal Open Market Committee, the group responsible for formulating national monetary policy.

Prior to joining the Chicago Fed, Sullivan was an assistant professor of economics at Northwestern University and also taught at Princeton University. In addition, he is an adjunct faculty member at the University of Chicago's Harris School of Public Policy. His research is in the area of labor economics, especially issues related to displaced workers and alternative work arrangements. He has published articles in leading academic journals including *American Economic Review*, *Econometrica*, the *Journal of Political Economy* and the *Quarterly Journal of Economics*.

Sullivan received a BA in mathematics and statistics from the University of Chicago and a PhD in economics from Princeton University.

Chad Syverson

Professor of Economics University of Chicago

Syverson is Eli B. and Harriet B. Williams Professor of Economics in the Booth School of Business at the University of Chicago. His research spans several topics, with a particular focus on the interactions of firm structure, market structure and productivity. His research has been published in top journals and has earned multiple National Science Foundation awards. He also co-authored (with Austan Goolsbee and Steve Levitt) an intermediate-level text, *Microeconomics*.

Syverson serves as an editor of the *RAND Journal of Economics* and is on the editorial board of several other journals. He is a research associate of the National Bureau of Economic Research and has recently served on National Academies committees and as the chair of the Chicago Census Research Data Center board. He joined the Chicago Booth faculty in 2008. Prior to his appointment at the university, Syverson was a mechanical engineer co-op for Loral Defense Systems and Unisys Corp.

He earned two bachelor's degrees from the University of North Dakota, one in economics and one in mechanical engineering. He received his PhD in economics from the University of Maryland.

Troy Taylor

Chairman and CEO Coca-Cola Beverages Florida

Taylor is chairman and CEO at Coca-Cola Beverages Florida, the third-largest privately held and sixth-largest independent Coca-Cola bottler in the United States.

Taylor previously served as an advisor to the Coca-Cola Co. and a consultant to one of its largest independent bottlers in the world. Prior to this, Taylor held senior-level positions at J.P. Morgan, Accenture and BBVA Compass. He is a member of the Coca-Cola Bottlers' Association board of directors, the Tampa Bay Partnership Council of Governors, Johns Hopkins All Children's Hospital board of trustees and the Florida Council of 100.

Taylor holds a BBA in finance and business law from Marshall University.

Joseph S. Tracy

Executive Vice President and Senior Advisor to the President Federal Reserve Bank of Dallas

Tracy is executive vice president and senior advisor to the president at the Dallas Fed. He joined the Bank in September 2017.

Tracy was previously executive vice president and senior advisor to the president at the Federal Reserve Bank of New York. He also served as the Bank's director of research. He joined the New York Fed in 1996 after teaching at Yale and Columbia universities.

Tracy is a native of Missouri and holds a BA from the University of Missouri and PhD in economics from the University of Chicago.

Myron E. “Mike” Ullman

Chairman and CEO (retired) J.C. Penney Co.

Ullman served as executive chairman of J.C. Penney Co. from Aug. 1, 2015, until Aug. 1, 2016. He has been an independent director of Taubman Centers Inc. since April 2016.

Ullman has held executive positions with major domestic retailers over more than two decades and has extensive experience, both domestically and internationally, in corporations, government and academia. Ullman also served as CEO, director and chairman of J.C. Penney as well as CEO of stores, catalog and internet. Earlier, he served as a director general and group managing director of LVMH Moët Hennessy Louis Vuitton and chairman and CEO of DFS Group Ltd.

After leading the restructure and turnaround of the DFS Group, he served as president of the Selective Retail Group at LVMH, guiding the global expansion of the Sephora beauty specialty store chain. He was vice chairman and executive vice president and then CEO and chairman of R.H. Macy & Company Inc. and executive VP for Sanger Harris. In addition, he served as the group managing director and chief operating officer at Wharf Holdings Ltd. He was selected by President Reagan as a White House fellow, serving as executive assistant to U.S. Trade Representative William Brock in 1981–82.

Ullman served as deputy chairman and chairman of the Federal Reserve Bank of Dallas from December 2012 to January 2015. He is on the board of directors at Starbucks Corp. and Teavana Holdings Inc. Ullman is currently chairman of Mercy Ships International and a director of For Inspiration and Recognition of Science and Technology (FIRST). He has served on numerous boards for community and not-for-profit organizations and industry associations.

Ullman holds a BS in industrial management from the University of Cincinnati and received an honorary doctorate from the same school in 2006.

James Conrad “Rad” Weaver

CEO McCombs Partners

Weaver is CEO of McCombs Partners in San Antonio and oversees the implementation of the company’s investment strategies, including management of direct investments in private operating businesses.

He joined the Federal Reserve Bank of Dallas’ San Antonio Branch board in 2014 and serves on the boards of the San Antonio Chamber of Commerce and the McCombs School of Business at the University of Texas at Austin.

Weaver is also a member of the Texas Business Leadership Council and the Advance Team for the MD Anderson Cancer Therapy and Research Center.

He holds a bachelor’s degree in business administration from UT Austin.

Mark A. Wynne

Vice President, Associate Director of Research and Director of the Globalization and Monetary Policy Institute Federal Reserve Bank of Dallas

Wynne is vice president, associate director of research and director of the Globalization and Monetary Policy Institute at the Dallas Fed. In the latter role, Wynne is responsible for developing and leading the Bank's research program on globalization and understanding its implications for the conduct of U.S. monetary policy.

Since joining the Dallas Fed in 1989, he has had a variety of responsibilities, including briefing the Bank's president on national and international economic conditions prior to meetings of the Federal Open Market Committee, providing updates on key economic issues to the Bank's board of directors and conducting research on the effects of fiscal policy, understanding business cycles, inflation measurement and the workings of monetary unions, among other topics. His research has appeared in many of the leading peer-reviewed academic journals and Federal Reserve publications. He was co-editor (with Michael Bordo) of the Cambridge University Press volume *The Federal Reserve's Role in the Global Economy: A Historical Perspective*, published in 2016.

Wynne has taught at University College Dublin, the University of Rochester, the University of Texas at Dallas and Southern Methodist University and has served as a faculty member for the American Bankers Association Stonier Graduate School of Banking. Most of his professional career has been at the Dallas Fed, but Wynne also spent time at the European Monetary Institute and European Central Bank during the formative years of European Economic and Monetary Union (EMU), where he worked on issues related to the strategy of monetary policy under EMU.

Wynne earned first-class-honors BA and MA degrees from the National University of Ireland–University College Dublin, and holds MA and PhD degrees in economics from the University of Rochester.

Mine K. Yücel

Senior Vice President and Senior Research Advisor Federal Reserve Bank of Dallas

Yücel is senior vice president and senior research advisor at the Dallas Fed. She joined the Bank in 1989 and previously served as director of research, head of the micro/regional/energy group and director of publications. She is an expert on regional and energy issues and has published numerous articles on energy and regional growth.

Yücel is president of the National Association for Business Economics. She serves on the board of the Global Interdependence Center and the University of Texas at Dallas Energy Board. She was president of the International Association of Energy Economics (IAEE) in 2011 and president of the United States Association of Energy Economics (USAEE) in 2005. She has served on the executive boards of these two organizations as well as Executive Women of Dallas, Dallas Area Business Economists, the Dallas chapter of Women in Technology International Inc. and the Dallas Regional Chamber's Board of Economists.

She received the USAEE Senior Fellow Award in 2007, the *Energy Journal* Best Paper Award in 2009 and the Outstanding Contributions to the IAEE Award in 2015.

Before joining the Bank, Yücel was an assistant professor of economics at Louisiana State University. She has a BS and an MS in mathematics from Bogazici University in Istanbul, Turkey, and a PhD in economics from Rice University in Houston.

NOTES

This image shows a single page from a notebook or ledger. It features approximately 20 evenly spaced horizontal grey lines across its entire width. The margins are uniform on all sides, and there are no vertical lines, text, or other markings present on the page.

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