

CONFERENCE SUMMARY



New Perspectives on Consumer Behavior in Credit and Payments Markets

October 1–2, 2015

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CONFERENCE SUMMARY

New Perspectives on Consumer Behavior in Credit and Payments Markets

October 1–2, 2015

Mitchell Berlin*

On October 1–2, 2015, the Payment Cards Center and the Research Department of the Federal Reserve Bank of Philadelphia hosted their eighth biennial conference focused on new research in consumer credit and payments. The seven papers presented during New Perspectives on Consumer Behavior in Credit and Payments Markets used new data and techniques to explore a number of longstanding questions pertaining to the design, and sometimes renegotiation, of financial contracts; the linkages between consumer credit and the real economy; the effects of government policy during the Great Recession; and the effect of timely disclosures about the cost of student loans on borrowing decisions.

Keywords: asymmetric information, auto loans, business cycles, credit cards, educational finance, financial contracts, financial markets and the macro economy, government policy and regulation, monetary policy and the supply of credit, mortgages, personal loans, student loans, unemployment duration and job search

JEL Codes: D12, D82, E32, E44, E5, G18, I22, J64

* Mitchell Berlin is a vice president and economist at the Federal Reserve Bank of Philadelphia. Berlin organized this conference with Manuel Adelino, Duke University, and Ronel Elul, Robert M. Hunt, and Vyacheslav Mikhed, Federal Reserve Bank of Philadelphia. The views expressed in this summary do not necessarily reflect the views of the Federal Reserve Bank of Philadelphia or the Federal Reserve System. No statements here should be treated as legal advice. This paper is available free of charge at www.philadelphiafed.org/consumer-credit-and-payments/payment-cards-center/publications.

At the Federal Reserve Bank of Philadelphia's last research conference on consumer credit and payments (October 1–2, 2015), researchers presented the results of seven studies on a variety of topics. These topics included the design of consumer loan contracts, the effect of consumer credit on real economic activity, the effects of government programs on household behavior during the Great Recession, and the efficacy of programs to make student loan borrowers more knowledgeable.

The program began with a welcome from Patrick T. Harker, president and chief executive officer of the Federal Reserve Bank of Philadelphia, who noted the longstanding commitment of the Bank to conduct research on payments and consumer finance. This research is carried out in many areas of the Bank, notably the Bank's Research Department; the Supervision, Regulation, and Credit Department; the Community Development Studies & Education Department; and the Payment Cards Center.

Adverse Selection on Maturity Choice: Evidence from On-Line Consumer Credit

In the first paper of the conference, Andrew Hertzberg of Columbia University reported the results of a study (with Andres Liberman, New York University, and Daniel Paravisini, London School of Economics) on the effects of loan maturity on the behavior of consumer loan borrowers. Specifically, the authors used data from Lending Club, the largest online platform for consumer loans, to see whether consumers with private information about their risk of payment default would choose between taking out short-term or long-term loans depending on their knowledge of their likelihood of default. Examples of such private information include a borrower's own evaluation of his or her likelihood of being fired or divorcing — both factors that increase financial distress but which would not be easily observed by the lender. In a theoretical model in which borrowers have such private information, the authors first showed that higher-risk borrowers would choose longer-maturity loans, while lower-risk borrowers would choose shorter-maturity loans, so called self-selection on maturity.

The authors then tested the prediction of their model by examining the effects of a policy change by Lending Club, which offers a menu of loan contract choices to each customer based on his or her risk of default, as measured by credit score and other information available to Lending Club. Crucially, this information does not include the borrower's private information. Before 2013, Lending Club limited customers who sought to borrow less than \$16,000 to loans with a 36-month maturity, although 60-month loans were available for larger loan amounts. In March 2013, Lending Club relaxed this restriction and permitted borrowers to take out a 60-month loan for amounts as low as \$12,000, and, in July 2013, this figure was lowered to \$10,000. These were the only changes that Lending Club made to its menu of contracts, and the authors noted that Lending Club did not actively change its marketing program in conjunction with the changes to its menu of loan contracts.

The authors' theoretical model predicts that customers with a higher likelihood of default based on their private information would be more likely to choose the 60-month loan when those loans became available. The authors' empirical test worked as follows. First, the authors estimated the number of customers borrowing at different maturities following Lending Club's policy change. They estimated that the new borrowing options led approximately 17 percent of the borrowers to choose the longer-maturity loan when they would have chosen the shorter-maturity loan given the prior menu of choices. Then the authors performed regressions that compared subsequent performance — defaults and credit score — of those customers who took out smaller denomination 36-month loans following the menu change with the performance of those customers who borrowed comparable amounts at the 60-month maturity.

Consistent with the theory, the authors found that, subsequent to the change in policy, short-term borrowers were significantly less likely to default, both economically and statistically speaking. Specifically, they estimated that the default rate for customers who took out 36-month loans when the long-term loans became available declined by 0.8 percentage point, and their aver-

age FICO scores increased by 2.5 points. Focusing on the 17 percent of the borrowers who selected into the longer-term loan, the estimates imply that these borrowers would have had a default rate 6.8 percentage points higher than the average default rate for short-term borrowers in the sample.

Loan Contracting in the Presence of Usury Limits: Evidence from Auto Lending

Aaron Schroeder from the Consumer Financial Protection Bureau (CFPB) presented the findings of his study (with Brian Melzer, Northwestern University) that explored the effects of state usury laws on the structure of auto loan contracts. In particular, the authors studied the prevalence and effects of dealer financing. The key feature of dealer financing is that the dealer both sells and finances the purchase of the car. Accordingly, a dealer who cannot raise the loan rate for a high-risk customer because of state usury laws has another contractual dimension to adjust: the price of the car. Thus, the dealer can take a loss on the loan while making a profit on the entire transaction. Dealers who do not provide financing cannot employ the strategy of charging a higher sale price because the lender providing financing would still lose money on the loan. The authors concluded that dealer financing was more prevalent in states where usury laws were binding and that such dealers did not reduce the supply of subprime auto loans. Instead, they charged a higher sale price for the vehicle to higher-risk customers, thereby raising the loan-to-value (LTV) ratio.

The authors used a number of data sets that covered a sample period between January 2012 and August 2013. Experian's AutoCount data included information about loan contract terms, including the borrower's credit score, the interest rate, monthly payments, loan amount, vehicle value, and the LTV ratio.¹ In addition, the authors had anonymized credit records from the CFPB's Consumer Credit Panel.

¹ These data are aggregated so that each observation contains the average values for a number of loans.

To begin, the authors showed that loan rates in states without usury limits were systematically higher than the ceilings in those states with usury laws, evidence that usury limits were binding. Then the authors provided evidence that usury limits did not appear to reduce the supply of credit to higher-risk borrowers. Instead, they found that the share of loans made to high-risk customers was essentially the same both for states with and without usury laws.

This finding presented a puzzle: If auto lenders constrained by usury ceilings were unable to charge high-risk customers higher rates to compensate for the higher risk of default, how were they able to adjust? The authors addressed one part of the puzzle by providing evidence that dealer financing was more prevalent in states with usury ceilings, particularly for subprime borrowers. For example, for customers with low credit scores (in the 600–660 range), the probability of a transaction being dealer-financed was 11.9 percentage points higher in states with usury ceilings.

The authors then examined how contractual terms for dealer-financed loans were affected by binding usury limits, using cross-state variation to provide identification.² Unsurprisingly, they found that loan rates were nearly 8 percentage points lower when usury limits were binding. Consistent with their argument that dealers adjusted the price of the car when ceilings bind, they found that LTV ratios were significantly higher. They also found that binding usury ceilings were associated with shorter-maturity loans, evidence that dealers used maturity to mitigate the credit risk of making high LTV ratio loans to risky borrowers.

How Credit Constraints Impact Job Finding Rates, Sorting and Aggregate Output

Kyle Herkenhoff of the University of Minnesota reported the results of his research (with Ethan Cohen-Cole, Econ One Research, and

² In examining the effects of binding usury limits on contract terms, the authors used a two-step procedure in their regressions because whether the limit is binding or not is endogenous.

Gordon Phillips, University of Southern California) on the effects of the availability of credit on labor market outcomes, output, and productivity. The authors estimated the effects of credit card limits on unemployed workers' access to credit and their ability to search for a good job. Then the authors used these estimates to calibrate a model that could calculate the effects of expansionary monetary policy on job finding rates and output.

The authors used three main data sets in their analysis. The first was the Longitudinal Employer–Household Dynamics database, which allowed them to follow job matches between job seekers and employers, including information about new employees' wages. These data were merged with credit bureau data from TransUnion. The latter provided information on unemployed job seekers' access to credit. The third data set was the Longitudinal Business Database, which identified when a business laid off 25 or more employees, the authors' measure of a mass layoff. They used this measure to minimize concerns that the employees were laid off because of some unobservable characteristic of the worker. The authors limited their attention to 11 states for which they had full data.

The authors used a household's unused credit card lines as a measure of the degree to which the household was financially constrained. They found that the unused balances had a statistically significant effect on households' duration of unemployment and wages upon getting a job.³ For example, they found that a \$1,000 increase in unused credit limit increased the duration of non-employment by roughly four days, on average, in one specification, and nearly two weeks in another. Intuitively, larger financial resources permitted an unemployed worker to search longer for a better, higher-paying job.

Then the authors designed a model that could reproduce their empirical findings. In this model, risk-averse households are either financially constrained or unconstrained. Some firms are also

financially constrained and, thus, unable to freely purchase the capital goods they need to hire workers and use them most productively. When a financially constrained worker loses her job, she is forced to be less patient in her search for a more productive, high-wage job at a financially unconstrained firm. A lessening of financial constraints permits households to search longer and to seek more productive employment. The model was calibrated to match the empirical estimates for duration of unemployment and wage replacement.

The model was then used to measure the effects of a reduction in the risk-free interest rate, the main tool of expansionary monetary policy. In their quantitative exercise, the authors showed that the decline in the risk-free rate increased the rate of capital formation — increasing firms' demand for labor — but reduced the return to household liquid savings, thereby reducing the amount of time spent searching by workers from households with savings. Both these effects increased employment. These effects offset — indeed, they outweighed — the increased time spent searching by indebted households. Indebted households search more patiently because the lower risk-free interest rate reduced the costs of servicing their debt. The model also predicted that a decline in the risk-free rate reduced the ability of more skilled workers to find jobs where their skills were most valuable; that is, sorting was less efficient. The net effect on output and productivity depended on the precise model specification, with higher capital formation raising output and the less efficient sorting reducing output.

Household Credit and Employment in the Great Recession

John Mondragon of Northwestern University's Kellogg School of Management presented estimates of the effects of contractions in the supply of consumer credit on employment during the Great Recession. The broad conclusion of his empirical exercise is that declines in the supply of consumer credit explained up to 60 percent of the decline in employment in the 2007–2010 period.

Mondragon's strategy for identifying the supply shock exploited Wachovia Bank's failure in

³The authors used a two-stage regression approach in which the supply elasticity of the local housing stock served as an instrument for the household's unused credit.

2008, which was significantly driven by portfolio losses caused by the purchase of a large subprime lender in 2006.⁴ The key to Mondragon's research design is that Wachovia's share of mortgage originations varied across local markets. Accordingly, he used Wachovia's market share in a county as an instrument for a shock to the local supply of credit. A key assumption underlying this strategy is that other local bank competitors were unable or unwilling to replace Wachovia's share of the markets quickly, at least in the short run. Mondragon limited his investigation to counties in the South and the East of the United States because these were the regions where Wachovia's footprint was significant.

Mondragon used the Home Mortgage Disclosure Act data set to measure home mortgage applications and credit granted and the County Business Patterns data set to measure local employment. He first demonstrated that Wachovia's home mortgage originations declined significantly between 2007 and 2010, most notably for high loan-to-income loans and for low- and middle-income applicants. Then he estimated that increased local exposure of 1 percentage point to Wachovia decreased home mortgage originations by 2.5 percent from 2007 to 2010, a large and significant effect both economically and statistically. He discussed the mechanisms through which the decline in credit might affect employment and found that local exposure to Wachovia was associated with a decline in retail expenditures, house sales, and prices. However, Mondragon found little evidence of a decline in business lending associated with higher local exposure to Wachovia.

Turning to his main question, Mondragon found economically and statistically significant associations between higher exposure to Wachovia mortgage originations and construction employment as well as employment in nontradable goods, those sectors most likely to be affected by a contraction in local household credit. Then Mondragon used a two-step procedure to estimate the

elasticity of employment growth with respect to a decline in credit.⁵ He found that a 10 percent decline in household credit driven by a supply shock caused a 3 percent decline in county employment. The effects were greatest in low-income counties.

Mondragon then constructed an estimate of the effect of the national decline in the supply of consumer credit on employment, concluding that 30 percent to 60 percent of the decline in employment was due to the negative credit supply shock.

Do Banks Pass Through Credit Expansions? The Marginal Profitability of Consumer Lending During the Great Recession

Neale Mahoney of the University of Chicago's Booth School of Business presented the results of his study (with Sumit Agarwal, National University of Singapore; Souphala Chomsisengphet, Office of the Comptroller of the Currency; and Johannes Stroebel, New York University). The authors attempted to measure the effect of expansionary monetary policy during the Great Recession both on customers' propensity to borrow out of increases in credit availability and banks' propensity to lend. The authors' main focus was on the differences between borrowers with high and low credit scores. They found that although borrowers with low credit scores spent significantly more when their credit limits increased — and those with higher credit scores were much less responsive — banks were significantly less willing to increase credit limits for higher-risk customers, thereby blunting the expansionary effects of credit easing by the Federal Reserve.

The authors' empirical strategy was based on the recognition that banks' policies concerning credit limits for their credit card customers typically involve discontinuities. For example, a bank might allow a \$5,000 credit limit for customers with a credit score between 521 and 550 but might grant a \$6,000 credit limit to customers with credit scores between 551 and 580. Although the credit limit changes discontinuously at the 550 credit score,

⁴ Wachovia's eventual failure took the form of a distressed sale to Wells Fargo in 2008.

⁵ The procedure involved using Wachovia's share of a local market as an instrument for household credit.

the authors showed that other contract terms, for example, loan rates and late charges, were the same, and the number of originations did not change discontinuously at such breaks. Furthermore, the risk characteristics of a customer with a 648 credit score, for example, were essentially identical to those of a customer with a 652 credit score. The authors argued that higher borrowings for a customer just above the limit were due to the higher limit rather than some unobserved difference among the customers. This increase in borrowing is what the authors called the marginal propensity to borrow (MPB).

The authors used the same discontinuities to estimate the banks' marginal profitability of increasing loan limits to customers with different credit scores, taking into account the borrowers' MPB and charge-offs. In conjunction with a theoretical model of lending, the authors estimated the banks' marginal probability of lending (MPL) in response to a decline in their cost of funds due to expansionary monetary policy.

To estimate the MPB and MPL, the authors employed the Credit Card Metrics data set assembled by the U.S. Office of the Comptroller of the Currency. The data set includes monthly account-level information about credit card utilization, contract characteristics, account fees and charges, customer performance, and customer characteristics (most notably, their FICO score). In addition, the data set contains information about the banks' credit card portfolios, including operational costs and fraud expenses. The sample period extended from January 2008 to January 2016. These data were merged with quarterly credit file data, which include information about an individual's total credit limits across all cards, credit card utilization, and repayment behavior.

The authors found that the MPB was positive for all FICO scores, although the increase in borrowing was larger for borrowers with lower credit scores. A \$1 increase in a borrower's credit limit increased borrowings by 59 cents after 12 months for borrowers with the lowest credit scores (a FICO score less than 660). For these borrowers, the increase was not due to a reshuffling of debt across credit cards. Borrowers with the high-

est credit scores (a FICO score more than 740) increased their borrowings by 22 cents for each \$1 increase in their borrowing limit, but nearly all of this increase could be explained by shifting borrowings from other credit cards.

The authors then determined the MPL by estimating the marginal revenues and marginal costs of higher credit limits for borrowers with different FICO scores. While higher credit limits increased fee income from all customers, they also increased charge-offs, especially for borrowers with low FICO scores. The authors estimated that, over a 48-month period, a 1 percentage point decrease in the cost of funds raised credit limits by \$239 for the lowest FICO score customers and by \$1,211 for the highest FICO score borrowers.

The key point of these estimates is that there was a strong negative correlation between the MPB and the MPL; that is, those customers who increased borrowing significantly in response to a rise in their borrowing limit were precisely those customers who received the smallest credit limit increases when their banks' cost of funds decreased. This blunted the effects of expansionary monetary policy.

The Effect of Negative Equity on Mortgage Default: Evidence from HAMP's Principal Reduction Alternative

Therese C. Scharlemann of the Office of Financial Research at the U.S. Department of the Treasury presented the findings of her research (with Stephen H. Shore, Georgia State University) on the effects of one government program to reduce defaults by homeowners with negative equity by forgiving principal. Specifically, the authors examined the effect of the Principal Reduction Alternative (PRA) of the Home Affordable Modification Program (HAMP). Broadly, the authors found that principal reduction was effective in reducing the rate of homeowner delinquencies.

The goal of the program was to decrease homeowners' debt-to-income (DTI) ratios to 31 percent, thereby reducing their monthly payments.⁶

⁶ The DTI ratio is the ratio of a household's mortgage payments and other fixed housing expenses to its monthly income.

The authors' approach exploited details of the program that created "kinks" in the amount of principal reduction for homeowners with different loan-to-value (LTV) ratios. For example, servicers were required to impose a target LTV ratio (usually 115 percent); that is, a homeowner's LTV ratio could be reduced to no lower than 115 percent through principal reduction. Some homeowners could achieve DTI ratios of 31 percent solely through principal reductions, without driving their LTV ratios all the way to 115 percent. Other homeowners could not reduce their DTI ratios to 31 percent, even with a reduction in their LTV ratios to 115 percent. For this second group of homeowners, further reductions in their DTI ratios were achieved by interest rate reductions or maturity increases rather than through further principal reductions. Accordingly, the program had a kink at the LTV ratio of 115 percent; that is, the relationship between a homeowner's initial LTV ratio and the amount of principal reduction the homeowner received under the PRA changed discontinuously once principal reductions reached the target LTV ratio of 115 percent. Arguing that homeowners with relatively small differences in their initial LTV ratios, initial DTI ratios, and other characteristics were very similar in most respects, the authors used the kink to identify the effect of principal reductions on default due to different levels of principal reduction to otherwise similar households.

The authors used an administrative data set that included details of the modifications and information about performance by homeowners. This data set also included data required by the HAMP administrators (e.g., estimates of the loan payments before and after modifications, home value, homeowner income, and geographic information). The authors estimated that the cumulative default rate for PRA program participants in 2011, 2012, and 2013 was 16.4 percent, approximately 3 percent lower than it would have been without principal reduction. Their results showed that principal forgiveness is a relatively powerful way to reduce delinquency, compared with rate reductions and term extensions, but the authors also noted that principal reduction was a relatively costly alternative for lenders.

Does Salient Financial Information Affect Academic Performance and Borrowing Among College Students?

In the final paper of the conference, Maximilian D. Schmeiser of the Board of Governors of the Federal Reserve System reported the results of his research (with Christiana Stoddard and Carly Urban, both from Montana State University) on the effects of an information intervention on students with significant student debt. Broadly speaking, the authors found that the intervention was successful along a number of dimensions, including lowering debt, raising grade point averages (GPAs), and shifting students toward scientific and technical majors.

The sample period for the study was 2002–2014. The authors' data set included information on the students' high school performance, demographics, debt levels, degrees pursued, and whether the student attended Montana State University (MSU) or the University of Montana (UM). At MSU, students with debt above a target threshold received a letter notifying them of their debt level and offering them free one-on-one counseling. Similar students at UM received no such letter.

Before conducting the main analysis, the authors showed that higher student debt levels were associated with worse academic outcomes along a number of dimensions. Specifically, their tests showed that a higher loan-to-tuition ratio was associated with lower GPAs; fewer credits per semester; and a lower likelihood of majoring in the areas of science, technology, engineering, or math (STEM), which are, in general, higher-paying fields.

The authors' main analysis used a difference-in-differences strategy in which they compared those students who received the letter at MSU in Fall 2012 or Fall 2013 with (i) those students at UM who did not but who would have received the letter at MSU and (ii) those students at MSU who would have received the letter in the years before the program was introduced.

The authors' results were striking. The intervention increased students' GPAs by .06 point in the subsequent semester and increased their course load by .2 credit. Furthermore, the number of students who declared a STEM major was 3.7 per-

centage points higher for those receiving the letter. Restricting the sample to freshmen, who presumably had more flexibility in their choice of majors, the authors found that there was an 11 percentage point increase in the number of students declaring STEM majors. Students who received the intervention also reduced their student loan borrowings in the subsequent semester by \$1,450. Finally, the authors found that students were more likely to be enrolled in the subsequent semester and the next year, with the probability of returning to school the next year 4.8 percentage points higher for freshmen who received the intervention.

Conclusion

The papers selected for this conference exploited newly available data sets and novel techniques to improve our understanding of consumer credit markets and the linkages between them and the economy more generally. Several of these studies revealed the linkages between consumer credit shocks, employment, and the functioning of the labor market. Others examined the consequences of regulatory interventions — price caps in one instance and mortgage principal forgiveness in another. Another study highlighted the importance of recognizing heterogeneity in consumers' financial positions and the implications for monetary policy. The final paper of the conference demonstrated that young people (college students) do respond to timely information about their likely indebtedness and labor market prospects.

Appendix A: Conference Agenda

Thursday, October 1

- 5:30 p.m. **Welcome Remarks**
Robert M. Hunt, Vice President and Director, Payment Cards Center, Federal Reserve Bank of Philadelphia

Friday, October 2

- 8:45 a.m. **Opening Remarks**
Patrick T. Harker, President and CEO, Federal Reserve Bank of Philadelphia

9:00 a.m. **Panel 1: Contract Design**

Adverse Selection on Maturity Choice: Evidence from On-Line Consumer Credit

Presenter: Andrew Hertzberg, Columbia University

(Coauthors: Andres Liberman, New York University, and Daniel Paravisini, London School of Economics)

Discussant: Anthony DeFusco, Northwestern University

Loan Contracting in the Presence of Usury Limits: Evidence from Auto Lending

Presenter: Aaron Schroeder, Consumer Financial Protection Bureau

(Coauthor: Brian Melzer, Northwestern University)

Discussant: Karen M. Pence, Board of Governors of the Federal Reserve System

11:00 a.m. **Panel 2: Credit and the Real Economy**

How Credit Constraints Impact Job Finding Rates, Sorting and Aggregate Output

Presenter: Kyle Herkenhoff, University of Minnesota

(Coauthors: Ethan Cohen-Cole, Econ One Research, and Gordon Phillips, University of Southern California)

Discussant: Lukasz A. Drozd, Federal Reserve Bank of Philadelphia

Household Credit and Employment in the Great Recession

Presenter: John Mondragon, Northwestern University

Discussant: Kristoph Kleiner, Indiana University

1:45 p.m. **Panel 3: Government Policy in the Great Recession**

Do Banks Pass Through Credit Expansions? The Marginal Profitability of Consumer Lending During the Great Recession

Presenter: Neale Mahoney, University of Chicago

(Coauthors: Sumit Agarwal, National University of Singapore; Souphala Chomsisengphet, Office of the Comptroller of the Currency; and Johannes Stroebel, New York University)

Discussant: Gregory Nini, Drexel University

The Effect of Negative Equity on Mortgage Default: Evidence from HAMP's Principal Reduction Alternative

Presenter: Therese C. Scharlemann, U.S. Department of the Treasury

(Coauthor: Stephen H. Shore, Georgia State University)

Discussant: Tomasz Piskorski, Columbia University

3:30 p.m. **Panel 4: Information Interventions**

Does Salient Financial Information Affect Academic Performance and Borrowing Among College Students?

Presenter: Maximilian D. Schmeiser, Board of Governors of the Federal Reserve System

(Coauthors: Christiana Stoddard and Carly Urban, Montana State University)

Discussant: Basit Zafar, Princeton University and Federal Reserve Bank of New York

Appendix B: Presenter and Discussant Biographies*

Anthony DeFusco recently joined the Kellogg School of Management at Northwestern University as an assistant professor of finance. He is an applied microeconomist with research interests in real estate and urban economics, household finance, and public finance. His recent work focuses on the residential mortgage market, with a particular emphasis on understanding the drivers of household demand for mortgage debt, including collateral constraints and interest rates.

DeFusco has a Ph.D. in applied economics from the Wharton School of the University of Pennsylvania and a B.A. in economics and mathematics from Temple University.

Lukasz A. Drozd is a senior economist at the Federal Reserve Bank of Philadelphia. He joined the Research Department in July 2015. In 2007, he worked at the University of Wisconsin–Madison, and, in 2009, he joined the Finance Department of the Wharton School of the University of Pennsylvania. His research focuses on consumer finance with a particular focus on bankruptcy, regulation, and unsecured credit markets. In his work, he studies the growth and expansion of the credit card market, its implications for personal bankruptcy filings, and the role of technological progress and regulation in driving these recent changes. His other active area of research interest is international economics, within which he focuses on understanding the sources of deviations from the law of one price and international transmission of business cycles.

Drozd has a Ph.D. in economics from the University of Minnesota and an M.S. in quantitative methods and information systems from the Warsaw School of Economics.

Kyle Herkenhoff is an assistant professor at the University of Minnesota and a visiting scholar at the Federal Reserve Bank of Minneapolis. He has coauthored several papers with Lee E. Ohanian that assess the impact of mortgage market interventions on employment recoveries. Herkenhoff's dissertation research, which was awarded the University of California, Los Angeles' Welton Graduate Prize in Macroeconomics and the Institute for Humane Studies' Humane Studies Fellowship, looks at the rise of unsecured credit access among the unemployed during the mid-1980s and its role in jobless recoveries.

Herkenhoff's latest research, which is coauthored with Ethan Cohen-Cole and Gordon Phillips, combines new sorting theory and newly merged administrative credit records and employment histories to measure the impact of credit on the labor market. This research has been recognized with several grants from organizations including the National Bureau of Economic Research and the Washington Center for Equitable Growth.

Herkenhoff has a Ph.D. and an M.A. in economics and a B.A. in business economics from the University of California, Los Angeles.

Andrew Hertzberg is an assistant professor at Columbia University. Previously, he was on the faculty of the Finance Department at the Kellogg School of Management at Northwestern University. In his research on financial intermediation, he has studied impediments to the communication of borrower information within banks and has measured the degree of strategic complementarity between corporate lenders. He also has studied the way household savings and investment decisions are impacted by the interaction between household members and the way loan terms can be used to screen borrowers on unobservable creditworthiness.

*The presenter and discussant biographies were current as of the conference dates (October 1–2, 2015).

Hertzberg has a Ph.D. in economics from the Massachusetts Institute of Technology.

Kristoph Kleiner is an assistant professor of finance at the Kelley School of Business, Indiana University. His research focuses on how a financial crisis becomes an economic recession, and he builds on work in applied macroeconomics, consumer and small business finance, and real estate finance.

Kleiner has a Ph.D. in economics from Duke University and a B.S. and an M.S. in mathematics from North Carolina State University. As a Ph.D. student, he completed dissertation internships with the Federal Reserve Bank of New York and the Federal Reserve Board of Governors.

Neale Mahoney is an assistant professor of economics and Neubauer Family Faculty Fellow at the University of Chicago Booth School of Business and a Faculty Research Fellow at the National Bureau of Economic Research. Mahoney is an applied microeconomist with interests in health insurance and consumer credit markets. His research has been published in the *American Economic Review* and the *Quarterly Journal of Economics*; he also has received coverage in the *New York Times* and the *Wall Street Journal*. He was awarded a National Tax Association Outstanding Doctoral Dissertation Award (first runner-up) and the Samuel C. Lamport Prize for the best undergraduate thesis in economics at Brown University. Before joining Chicago Booth, Mahoney was a Robert Wood Johnson Fellow in Health Policy Research at Harvard University. He also worked as an associate at McKinsey & Company and on health-care reform for the Obama administration.

Mahoney has a Ph.D. and an M.A. in economics from Stanford University and a B.S. in applied mathematics–economics from Brown University.

John Mondragon is an assistant professor of finance and Donald P. Jacobs Scholar at Northwestern University. He joined the Kellogg School of Management in July 2015. His research focuses on household finance and empirical macroeconomics. His recent work has focused on the extent to which the 2007–2008 financial crisis reduced the supply of credit to households and how much this contributed to the decline in employment during the Great Recession. He also studies the interaction between household leverage, default, and the severity of deleveraging shocks.

Mondragon has a Ph.D. in economics from the University of California, Berkeley.

Gregory Nini is an assistant professor at LeBow College of Business at Drexel University. Previously, Nini was an assistant professor in the Finance Department of the Wharton School of the University of Pennsylvania. Upon completing his Ph.D., he served as an economist at the Federal Reserve Board of Governors. Nini works in the areas of corporate finance, financial institutions, and risk management. He is interested in the role that corporate creditors play in shaping firms' decisions and is currently working to understand how securitization has changed the intermediation process.

Nini has a Ph.D. in managerial science and applied economics from the Wharton School.

Karen M. Pence is an adviser in the Research and Statistics Division of the Federal Reserve Board of Governors. Her expertise is in the areas of consumer credit, mortgage, housing, and securitization markets. Her research has been published in the *Review of Economics and Statistics*, the *Journal of Monetary Economics*, the *Journal of Economic Perspectives*, and the *Journal of Urban Economics*. She serves on the Board of Overseers of the Panel Study of Income Dynamics.

Pence has a Ph.D. in economics from the University of Wisconsin and a B.A. from Swarthmore College.

Tomasz Piskorski is the Edward S. Gordon Associate Professor of Real Estate at Columbia Business School and the Paul Milstein Center for Real Estate. His research interests include real estate finance, household finance, asset securitization, security design and contracting, and market structure and regulation.

Piskorski has a Ph.D. in economics from New York University Stern School of Business and an M.S. in mathematics from New York University's Courant Institute of Mathematical Sciences.

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