

# Research Update

These papers by Philadelphia Fed economists, analysts, and visiting scholars represent preliminary research that is being circulated for discussion purposes.

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## Where Do Students Go When For-Profit Colleges Lose Federal Aid?

Recent federal investigations and new regulations have resulted in restrictions on for-profit institutions' access to federal student aid. The authors examine the enrollment effects of similar restrictions imposed on over 1,200 for-profit colleges in the 1990s. Using variation in regulations linked to student loan default rates, the authors estimate the impact of the loss of federal aid on the enrollment of Pell Grant recipients in sanctioned institutions and their local competitors. Enrollment in a sanctioned for-profit college declines by 53 percent in the five years following a sanction. For-profit sanctions result in negative spillovers on unsanctioned competitor for-profit colleges in the same county, which experience modest enrollment declines. These enrollment losses in the for-profit sector are offset by gains in enrollment in local community colleges, suggesting that the loss of federal student aid for poor-performing for-profit colleges does not reduce overall college-going but instead shifts students across higher education sectors. Finally, the authors provide suggestive evidence that students induced to enroll in community colleges following a for-profit competitor's sanction are less likely to default on their federal loans.

Working Paper 17-12. Stephanie R. Cellini, George Washington University; Rajeev Darolia, University of Missouri–Columbia and Federal Reserve Bank of Philadelphia Payment Cards Center Visiting Scholar; Lesley J. Turner, University of Maryland.

## Fiscal Surprises at the FOMC

This paper provides a detailed examination of a new set of fiscal forecasts for the U.S. assembled by Croushore and van Norden (2017) from FOMC briefing books. The data are of particular interest because (1) they afford a look at fiscal forecasts over six complete business cycles and several fiscal policy regimes, covering both peacetime and several wars, (2) the forecasts were precisely those presented to monetary policymakers, (3) they include frequently updated estimates of both actual and cyclically adjusted deficits, (4) unlike most other U.S. fiscal forecasts, they were neither partisan nor constrained by unrealistic assumptions about future fiscal policy, and (5) forecasts for other variables (GDP growth, inflation) from the same forecasters are known to compare favorably with most other available forecasts.

The authors detail the performance of forecast federal expenditures, revenues, surpluses, and structural surpluses in terms of accuracy, bias, and efficiency. They find that (1) fiscal forecast errors can be economically large, even at relatively short forecast horizons, (2) while the accuracy of unemployment rate forecast errors improved after 1990, that of most fiscal variables deteriorated considerably, (3) there is limited evidence of forecast bias, and most of this evidence is confined to the period before 1993, (4) the forecasts appear to be efficient with respect to both the fed funds rate and CBO projections, and (5) cyclically adjusted deficit forecasts appear to be over-optimistic around both business cycle peaks and troughs.

Working Paper 17-13. Dean Croushore, University of Richmond and Federal Reserve Bank of Philadelphia Visiting Scholar; Simon van Norden, HEC Montréal, CIRANO, and Federal Reserve Bank of Philadelphia Visiting Scholar.

## Reorganization or Liquidation: Bankruptcy Choice and Firm Dynamics

In this paper, the authors ask how bankruptcy law affects the financial decisions of corporations and its implications for firm dynamics. According to current U.S. law, firms have two bankruptcy options: Chapter 7 liquidation and Chapter 11 reorganization. Using Compustat data, the authors first document capital structure and investment decisions of non-bankrupt, Chapter 11, and Chapter 7 firms. Using those data moments, they then estimate parameters of a firm dynamics model with endogenous entry and exit to include both bankruptcy options in a general equilibrium environment. Finally, the authors evaluate a bankruptcy policy change recommended by the American Bankruptcy Institute that amounts to a “fresh start” for bankrupt firms. The authors find that changes to the law can have sizable consequences for borrowing costs and capital structure, which via selection affects productivity (allocative efficiency rises by 2.58%) and welfare (rises by 0.54%).

Working Paper 17-14. Dean Corbae, University of Wisconsin–Madison and NBER; Pablo D’Erasmus, Federal Reserve Bank of Philadelphia Research Department.

## Don’t Know What You Got Till It’s Gone: The Effects of the Community Reinvestment Act (CRA) on Mortgage Lending in the Philadelphia Market

The Community Reinvestment Act (CRA), enacted in 1977, has served as an important tool to foster access to financial services for lower-income communities across the country. This study provides new evidence on the effectiveness of CRA on mortgage lending by focusing on a large number of neighborhoods that became eligible and ineligible for CRA credit in the Philadelphia market because of an exogenous policy shock in 2014. The CRA effects are more evident when a lower-income neighborhood loses its CRA coverage, which leads to a 10 percent or more decrease in purchase originations by CRA-regulated lenders. Lending institutions not subject to CRA can substitute approximately half, but not all, of the decreased lending by CRA lenders. The increased market share of nondepository institutions in previously CRA eligible neighborhoods, however, was accompanied by a greater involvement in riskier Federal Housing Administration lending. This study demonstrates how different lenders respond to the incentive of CRA credit and how the use of metropolitan division median family incomes can generate unintended consequences on CRA lending activities.

Working Paper 17-15. Lei Ding, Federal Reserve Bank of Philadelphia Community Development Studies & Education; Leonard I. Nakamura, Federal Reserve Bank of Philadelphia Research Department.

## Positive Trend Inflation and Determinacy in a Medium-Sized New Keynesian Model

This paper studies the challenge that increasing the inflation target poses to equilibrium determinacy in a medium-sized New Keynesian model without indexation fitted to the Great Moderation era. For moderate targets of the inflation rate, such as 2 or 4 percent, the probability of determinacy is near one conditional on the monetary policy rule of the estimated model. However, this probability drops significantly conditional on model-free estimates of the monetary policy rule based on real-time data. The difference is driven by the larger response of the federal funds rate to the output gap associated with the latter estimates.

Working Paper 17-16. Jonas E. Arias, Federal Reserve Bank of Philadelphia Research Department; Guido Ascari, University of Oxford, University of Pavia, and Bank of Finland; Nicola Branzoli, Bank of Italy; Efrem Castelnuovo, University of Melbourne and University of Padova.

## Fintech Lending: Financial Inclusion, Risk Pricing, and Alternative Information

Fintech has been playing an increasing role in shaping financial and banking landscapes. Banks have been concerned about the uneven playing field because fintech lenders are not subject to the same rigorous oversight. There have also been concerns about the use of alternative data sources by fintech lenders and the impact on financial inclusion. In this paper, the authors explore the advantages/disadvantages of loans made by a large fintech lender and similar loans that were originated through traditional banking channels. Specifically, they use account-level data from the Lending Club and Y-14M bank stress test data. The authors find that Lending Club's consumer lending activities have penetrated areas that could benefit from additional credit supply, such as areas that lose bank branches and those in highly concentrated banking markets. The authors also find a high correlation with interest rate spreads, Lending Club rating grades, and loan performance. However, the rating grades have a decreasing correlation with FICO scores and debt-to-income ratios, indicating that alternative data is being used and performing well so far. Lending Club borrowers are, on average, more risky than traditional borrowers given the same FICO scores. The use of alternative information sources has allowed some borrowers who would be classified as subprime by traditional criteria to be slotted into "better" loan grades and therefore get lower priced credit. Also, for the same risk of default, consumers pay smaller spreads on loans from the Lending Club than from traditional lending channels.

Working Paper 17-17. Julapa Jagtiani, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit Department; Catharine Lemieux, Federal Reserve Bank of Chicago.

## The Agglomeration of American Research and Development Labs

The authors employ a unique data set to examine the spatial clustering of about 1,700 private research and development (R&D) labs in California and across the Northeast corridor of the United States. Using these data, which contain the R&D labs' complete addresses, the authors are able to more precisely locate innovative activity than with patent data, which only contain zip codes for inventors' residential addresses. The authors avoid the problems of scale and borders associated with using fixed spatial boundaries, such as zip codes, by developing a new point pattern procedure. Our multiscale core-cluster approach identifies the location and size of significant R&D clusters at various scales, such as a half mile, one mile, five miles, and more. Our analysis identifies four major clusters in the Northeast corridor (one each in Boston, New York–Northern New Jersey, Philadelphia–Wilmington, and Washington, D.C.) and three major clusters in California (one each in the Bay Area, Los Angeles, and San Diego).

Working Paper 17-18. Kristy Buzard, Syracuse University; Gerald A. Carlino, Federal Reserve Bank of Philadelphia Research Department; Robert M. Hunt, Federal Reserve Bank of Philadelphia Payment Cards Center; Jake K. Carr, Ohio State University; Tony E. Smith, University of Pennsylvania.

## Not in My Backyard? Not So Fast. The Effect of Marijuana Legalization on Neighborhood Crime

This paper studies the effects of marijuana legalization on neighborhood crime using unique geospatial data from Denver, Colorado. We construct a highly local panel data set that includes changes in the location of marijuana dispensaries and changes in neighborhood crime. To account for endogenous retail dispensary locations, we use a novel identification strategy that exploits exogenous changes in demand across different locations. The change in geographic demand arises from the increased importance of access to external markets caused by a change in state and local policy. The results imply that retail dispensaries lead to reduced crime in the neighborhoods where they are located. Reductions in crime are highly localized, with no evidence of benefits for adjacent neighborhoods. The spatial extent of these effects are consistent with a policing or security response, and analysis of detailed crime categories provides indirect evidence that the reduction in crime arises from a disruption of illicit markets.

Working Paper 17-19. Jeffrey Brinkman, Federal Reserve Bank of Philadelphia Research Department; David Mok-Lamme.

## Banking Panics and Output Dynamics

This paper develops a dynamic general equilibrium model with an essential role for an illiquid banking system to investigate output dynamics in the event of a banking crisis. In particular, it considers the ex-post efficient policy response to a banking crisis as part of the dynamic equilibrium analysis. It is shown that the trajectory of real output following a panic episode crucially depends on the cost of converting long-term assets into liquid funds. For small values of the liquidation cost, the recession associated with a banking panic is protracted as a result of the premature liquidation of a large fraction of productive banking assets to respond to a panic. For intermediate values, the recession is more severe but short-lived. For relatively large values, the contemporaneous decline in real output in the event of a panic is substantial but followed by a vigorous rebound in real activity above the long-run level.

Working Paper 17-20. Daniel Sanches, Federal Reserve Bank of Philadelphia Research Department.

## Household Credit and Local Economic Uncertainty

This paper investigates the impact of uncertainty on consumer credit outcomes. The authors develop a local measure of economic uncertainty capturing county-level labor market shocks. They then exploit microeconomic data on mortgages and credit-card balances together with the cross-sectional variation provided by their uncertainty measure to show strong borrower-specific heterogeneity in response to changes in uncertainty. Among high risk borrowers or areas with more high risk borrowers, increased uncertainty is associated with housing market illiquidity and a reduction in leverage. For low risk borrowers, these effects are absent and the cost of mortgage credit declines, suggesting that lenders reallocate credit towards safer borrowers when uncertainty spikes. A similar pattern is observed in the unsecured credit market. Taken together, local uncertainty might independently affect aggregate economic activity through consumer credit markets and could engender greater inequality in consumption and housing wealth accumulation across households.

Working Paper 17-21. Marco Di Maggio, Harvard Business School and NBER; Amir Kermani, University of California, Berkeley, and NBER; Rodney Ramcharan, University of Southern California; Edison G. Yu, Federal Reserve Bank of Philadelphia Research Department.

## Concentration of Control Rights in Leveraged Loan Syndicates

Corporate loan contracts frequently concentrate control rights with a subset of lenders. In a large fraction of leveraged loans, which typically include a revolving line of credit and a term loan, the revolving lenders have the exclusive right and ability to monitor and renegotiate the financial covenants in the governing credit agreements. Concentration is more common in loans that include nonbank institutional lenders and in loans originated subsequent to the financial crisis, when recognition of bargaining frictions increased. The authors conclude that concentrated control rights maintain the benefits of lender monitoring and minimize the costs of renegotiation associated with larger and more diverse lending syndicates.

Working Paper 17-22. Mitchell Berlin, Federal Reserve Bank of Philadelphia Research Department; Greg Nini, Drexel University; Edison G. Yu, Federal Reserve Bank of Philadelphia Research Department.

## Appraising Home Purchase Appraisals

Home appraisals are produced for millions of residential mortgage transactions each year, but appraised values are rarely below the purchase contract price. The authors argue that institutional features of home mortgage lending cause much of the information in appraisals to be lost: some 30 percent of recent appraisals are exactly at the home price (with less than 10 percent below it). The authors lay out a novel, basic theoretical framework to explain how lenders' and appraisers' incentives lead to information loss in appraisals (that is, appraisals set equal to the contract price). Such information loss is more common at loan-to-value boundaries where mortgage insurance rates increase and appears to be associated with a higher incidence of mortgage default, after controlling for pertinent borrower and loan-level characteristics. Appraisals do, in some cases, improve default risk measurement, but they are less informative than automated valuation models. An important benefit of appraisals reported below the contract price is that they help borrowers renegotiate prices with sellers.

Working Paper 17-23. Paul S. Calem, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit Department; Lauren Lambie-Hanson, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit Department; Leonard I. Nakamura, Federal Reserve Bank of Philadelphia Research Department.

## Accounting for Growth in the Age of the Internet: The Importance of Output-Saving Technical Change

The authors extend the conventional Solow growth accounting model to allow innovation to affect consumer welfare directly. Their model is based on Lancaster's New Approach to Consumer Theory, in which there is a separate "consumption technology" that transforms the produced goods, measured at production cost, into utility. This technology can shift over time, allowing consumers to make more efficient use of each dollar of income. This is "output-saving" technical change, in contrast to the Solow TFP "resource-saving" technical change. One implication of the authors' model is that living standards can rise at a greater rate than real GDP growth.

Working Paper 17-24. Charles Hulten, University of Maryland and NBER; Leonard I. Nakamura, Federal Reserve Bank of Philadelphia Research Department.

## Political Distribution Risk and Aggregate Fluctuations

The authors argue that political distribution risk is an important driver of aggregate fluctuations. To that end, they document significant changes in the capital share after large political events, such as political realignments, modifications in collective bargaining rules, or the end of dictatorships, in a sample of developed and emerging economies. These policy changes are associated with significant fluctuations in output and asset prices. Using a Bayesian proxy-VAR estimated with U.S. data, the authors show how distribution shocks cause movements in output, unemployment, and sectoral asset prices. To quantify the importance of these political shocks for the U.S. as a whole, the authors extend an otherwise standard neoclassical growth model. They model political shocks as exogenous changes in the bargaining power of workers in a labor market with search and matching. The authors calibrate the model to the U.S. corporate non-financial business sector and they back up the evolution of the bargaining power of workers over time using a new methodological approach, the partial filter. The authors show how the estimated shocks agree with the historical narrative evidence. They document that bargaining shocks account for 34% of aggregate fluctuations.

Working Paper 17–25. Thorsten Drautzburg, Federal Reserve Bank of Philadelphia Research Department; Jesus Fernandez-Villaverde, University of Pennsylvania and Federal Reserve Bank of Philadelphia Visiting Scholar; Pablo Guerron-Quintana, Boston College, ESPOL, and Federal Reserve Bank of Philadelphia Visiting Scholar.

## Do Phillips Curves Conditionally Help to Forecast Inflation?

This paper reexamines the forecasting ability of Phillips curves from both an unconditional and conditional perspective by applying the method developed by Giacomini and White (2006). The authors find that forecasts from their Phillips curve models tend to be unconditionally inferior to those from their univariate forecasting models. Significantly, the authors also find conditional inferiority, with some exceptions. When the authors do find improvement, it is asymmetric—Phillips curve forecasts tend to be more accurate when the economy is weak and less accurate when the economy is strong. Any improvement they find, however, vanished over the post-1984 period.

Working Paper 17–26. Michael Dotsey, Federal Reserve Bank of Philadelphia Research Department; Shigeru Fujita, Federal Reserve Bank of Philadelphia Research Department; Tom Stark, Federal Reserve Bank of Philadelphia Research Department.

## Credit Enforcement Cycles

Empirical evidence suggests that widespread financial distress, by disrupting enforcement of credit contracts, can be self-propagatory and adversely affect the supply of credit. The authors propose a unifying theory that models the interplay between enforcement, borrower default decisions, and the provision of credit. The central tenets of their framework are the presence of capacity constrained enforcement and borrower heterogeneity. The authors show that, despite heterogeneity, borrowers tend to coordinate their default choices, leading to fragility and to credit rationing. Their model provides a rationale for the comovement of enforcement, default rates and credit seen in the data.

Working Paper 17–27. Lukasz A. Drozd, Federal Reserve Bank of Philadelphia Research Department; Ricardo Serrano-Padial, Drexel University.

## Stress Tests and Information Disclosure

The authors study an optimal disclosure policy of a regulator that has information about banks (e.g., from conducting stress tests). In their model, disclosure can destroy risk-sharing opportunities for banks (the Hirshleifer effect). Yet, in some cases, some level of disclosure is necessary for risk sharing to occur. The authors provide conditions under which optimal disclosure takes a simple form (e.g., full disclosure, no disclosure, or a cutoff rule). They also show that, in some cases, optimal disclosure takes a more complicated form (e.g., multiple cutoffs or nonmonotone rules), which they characterize. The authors relate their results to the Bayesian persuasion literature.

Working Paper 17–28. Itay Goldstein, the Wharton School, University of Pennsylvania; Yaron Leitner, Federal Reserve Bank of Philadelphia Research Department

Supersedes Working Paper 15–10.