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

**“Free” Internet Content: Web 1.0, Web 2.0, and the Sources of Economic Growth**

The Internet has evolved from Web 1.0, with static web pages and limited interactivity, to Web 2.0, with dynamic content that relies on user engagement. This change increased production costs significantly, but the price charged for Internet content has generally remained the same: zero. Because no transaction records the “purchase” of this content, its value is not reflected in measured growth and productivity. To capture the contribution of the “free” Internet, we model the provision of “free” content as a barter transaction between the content users and the content creators, and we value this transaction at production cost. When we incorporate this implicit transaction into U.S. gross domestic product (GDP), productivity, and household accounts, we find that including “free” content raises estimates of growth, but not nearly enough to reverse the recent slowdown.


**How Important Are Local Community Banks to Small-Business Lending? Evidence from Mergers and Acquisitions**

The authors investigate the shrinking community-banking sector and the impact on local small-business lending (SBL) in the context of mergers and acquisitions. From all mergers that involved community banks, they examine the varying impact on SBL depending on the local presence of the acquirers’ and the targets’ operations prior to acquisitions. Our results indicate that, relative to counties where the acquirer had operations before the merger, local SBL declined significantly more in counties where only the target had operations before the merger. This result holds even after controlling for the general local SBL market or local economic trends. These findings are consistent with an argument that SBL funding has been directed (after the mergers) toward the acquirers’ counties. The authors find even stronger evidence during and after the financial crisis. Overall, the authors find evidence that local community banks have continued to play an important role in providing funding to local small businesses. The absence of local community banks that became a target of a merger or acquisition by nonlocal acquirers has, on average, led to local SBL credit gaps that were not filled by the rest of the banking sector.

Inflation and Real Activity with Firm-Level Productivity Shocks

In the last fifteen 15 years there has been an explosion of empirical work examining price-setting behavior at the micro level. The work has in turn challenged existing macro models that attempt to explain monetary nonneutrality, because these models are generally at odds with much of the microprice data. A second generation of models, with fixed costs of price adjustment and idiosyncratic shocks, is more consistent with this microdata. Nonetheless, ambiguity remains about the extent of nonneutrality that can be attributed to costly price adjustment. Using a model that matches many features of the microdata, our paper takes a step toward eliminating that ambiguity, at the same time highlighting the challenges that remain.


Market-making with Search and Information Frictions

We develop a dynamic model of trading through market-makers that incorporates two canonical sources of illiquidity: trading (or search) frictions, which imply that market-makers have some amount of market power; and information frictions, which imply that market-makers face some degree of adverse selection. We use this model to study the effects of various technological innovations and regulatory initiatives that have reduced trading frictions in over-the-counter markets. Our main result is that reducing trading frictions can lead to less liquidity, as measured by bid-ask spreads. The key insight is that more frequent trading—or more competition among dealers—makes traders’ behavior less dependent on asset quality. As a result, dealers learn about asset quality more slowly and set wider bid-ask spreads to compensate for this increase in uncertainty.


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

We extend the conventional neoclassical production and growth framework, with its emphasis on total factor productivity as the primary macroeconomic mechanism of innovation, to allow for technical change that affects consumer welfare directly. Our model is based on Lancaster’s “New Approach to Consumer Theory,” in which there is a separate consumption technology that transforms 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 an output-saving technical change, in contrast to the resource-saving technical change of the TFP residual. The output-saving formulation is a natural way to think about the free information goods available over the Internet, which bypass GDP and go directly to the consumer. It also leads to the concept of expanded GDP (EGDP), the sum of conventional supply-side GDP and a willingness-to-pay metric of the value of output-saving innovation to consumers. This alternative concept of GDP is linked to output-saving technical change and incorporates the value of those technology goods that have eluded the traditional concept. It thus provides a potentially more accurate representation of the economic progress occurring during the digital revolution. One implication of our model is that living standards, as measured by EGDP, can rise at a faster rate than real GDP growth, which may shed light on the question of how the latter can decline in an era of rapid innovation.

**Relative Price Dispersion: Evidence and Theory**

Relative price dispersion is defined as persistent differences in the price that retailers set for the same good relative to the price they set for their other goods. Using a large-scale dataset on prices in the U.S. retail market, we document that relative price dispersion accounts for about 30 percent of the variance of prices for the same good, in the same market, during the same week. Using a search-theoretic model of the retail market, we show that relative price dispersion can be rationalized as the equilibrium consequence of a pricing strategy used by sellers to discriminate between high-valuation buyers who need to make all of their purchases in one store, and low-valuation buyers who are able to purchase different items in different stores.


**Peers’ Income and Financial Distress: Evidence from Lottery Winners and Neighboring Bankruptcies**

We examine whether relative income differences among peers can generate financial distress. Using lottery winnings as plausibly exogenous variations in the relative income of peers, we find that the dollar magnitude of a lottery win of one neighbor increases subsequent borrowing and bankruptcies among other neighbors. We also examine which factors may mitigate lenders’ bankruptcy risk in these neighborhoods. We show that bankruptcy filers obtain more secured but not unsecured debt, and lenders provide additional credit to low-risk but not high-risk debtors. In addition, we find evidence consistent with local lenders taking advantage of soft information to mitigate credit risk.


**Financial Contracting with Enforcement Externalities**

We study the negative feedback loop between the aggregate default rate and the efficacy of enforcement in a model of debt-financed entrepreneurial activity. The novel feature of our model is that enforcement capacity is accumulated ex ante and thus subject to depletion ex post. We characterize the effect of shocks that deplete enforcement resources on the aggregate default rate and credit supply. In the model, default decisions by entrepreneurs are strategic complements, leading to multiple equilibria. We propose a global game selection to overcome equilibrium indeterminacy and show how shocks that deplete enforcement capacity can lead to a spike in the aggregate default rate and trigger credit rationing.


**The Economics of Debt Collection: Enforcement of Consumer Credit Contracts**

Creditors often outsource the task of obtaining repayment from defaulting borrowers to third-party debt collectors. We argue that by hiring third-party debt collectors, creditors can avoid competing in terms of their debt collection practices. This explanation fits several empirical facts about third-party debt collection and is consistent with the evidence that third-party debt collectors use harsher debt collection practices than the original creditors. Our model shows that the impact of third-party debt collectors on consumer welfare depends on the riskiness of the pool of borrowers and provides insights into which policy interventions may improve the functioning of the debt collection market.

Dynamic Pricing of Credit Cards and the Effects of Regulation

We construct a two-period model of revolving credit with asymmetric information and adverse selection. In the second period, lenders exploit an informational advantage with respect to their own customers. Those rents stimulate competition for customers in the first period. The informational advantage the current lender enjoys relative to its competitors determines interest rates, credit supply, and switching behavior. We evaluate the consequences of limiting the repricing of existing balances as implemented by recent legislation. Such restrictions increase deadweight losses and reduce ex ante consumer surplus. The model suggests novel approaches to identify empirically the effects of this law.


The Effects of Competition in Consumer Credit Markets

Using changes in financial regulation that create exogenous entry in some consumer credit markets, we find that increased competition induces banks to become more specialized and efficient, while deposit rates increase and borrowing costs for riskier collateral decline. However, shadow banks change their credit policy when faced with more competition and aggressively expand credit to riskier borrowers at the extensive margin, resulting in higher default rates. These results show how the form of intermediation can shape economic fluctuations. They also suggest that increased competition can lead to large changes in credit policy at institutions outside the traditional supervisory umbrella, possibly creating a less stable financial system.


Inference in Bayesian Proxy-SVARs

Motivated by the increasing use of external instruments to identify structural vector autoregressions (SVARs), we develop algorithms for exact finite sample inference in this class of time time-series models, commonly known as proxy-SVARs. Our algorithms make independent draws from the normal-generalized-normal family of conjugate posterior distributions over the structural parameterization of a proxy-SVAR. Importantly, our techniques can handle the case of set identification and hence they can be used to relax the additional exclusion restrictions unrelated to the external instruments often imposed to facilitate inference when more than one instrument is used to identify more than one equation as in Mertens and Montiel-Olea (2018).


Redefault Risk in the Aftermath of the Mortgage Crisis: Why Did Modifications Improve More Than Self-Cures?

This paper examines changes in the redefault rate of mortgages that were selected for modification during 2008–2011, compared with that of similarly situated self-cured mortgages. We find a large decline in the redefault rate of both modified and self-cured mortgages over this period, but the improvement was greatest for modifications. Our analysis has identified several important factors contributing to the greater improvement for modified loans, including an increasing share of principal-reduction modifications, which appear to be more effective than other types of modification and increasingly generous modification terms (larger payment reductions). The favorable impacts of principal and payment reductions on household finances were enhanced by improving economic conditions, resulting in more effective modifications. Even after accounting for these factors, we still observe a larger decline in the redefault rate for modifications compared with similarly situated self-cured loans. This residual effect may reflect servicer “learning-by-doing”; that is, servicers gained knowledge as modification activity ramped up, resulting in more successful modification programs for later cohorts.

Leaving Households Behind: Institutional Investors and the U.S. Housing Recovery

Ten years after the mortgage crisis, the U.S. housing market has rebounded significantly with house prices now near the peak achieved during the boom. Homeownership rates, on the other hand, have continued to decline. We reconcile the two phenomena by documenting the rising presence of institutional investors in this market. Our analysis makes use of housing transaction data. By exploiting heterogeneity in zip codes’ exposure to the First Look program instituted by Fannie Mae and Freddie Mac that affected investors’ access to foreclosed properties, we establish the causal relationship between the increasing presence of institutions in the housing market and the subsequent recovery in house prices and decline in homeownership rates between 2007 and 2014. We further demonstrate that institutional investors contributed to the improvement in the local labor market by reducing overall unemployment rate and by increasing total employment, construction employment in particular. Local housing rents also rose.


Effects of the Community Reinvestment Act (CRA) on Small-Business Lending

This study provides new evidence on the effectiveness of the Community Reinvestment Act (CRA) on small-business lending by focusing on a sample of neighborhoods with changed CRA eligibility status across the country because of an exogenous policy shock in 2013. The results of difference-in-differences analysis provide consistent evidence that the CRA promotes small-business lending, especially in terms of number of loan originations, in lower-income neighborhoods. The generally positive effects of the CRA are sensitive to the types of CRA treatment. Losing CRA eligibility status has a relatively larger effect on small-business lending activities, while the effects of newly gaining CRA eligibility are less pronounced. The results are fairly robust when alternative sample periods and control groups are used.


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: Some 30% of appraisals in our sample are exactly at the home price (with less than 10% of them below it). We lay out a basic theoretical framework to explain how appraisers’ incentives within the institutional framework that governs mortgage lending lead to information loss in appraisals (that is, appraisals set equal to the contract price). Consistent with the theory, we observe a higher frequency of appraisal equal to contract price and a higher incidence of mortgage default at loan-to-value boundaries (notches) above which mortgage insurance rates increase. Appraisals appear to be less informative for default risk measurement compared with automated valuation models.


Financial Consequences of Identity Theft: Evidence from Consumer Credit Bureau Records

This paper examines how a negative shock to the security of personal finances due to severe identity theft changes consumer credit behavior. Using a unique data set of consumer credit records and alerts indicating identity theft and the exogenous timing of victimization, we show that the immediate effects of fraud on credit files are typically negative, small, and transitory. After those immediate effects fade, identity theft victims experience persistent, positive changes in credit characteristics, including improved Risk Scores. Consumers also exhibit caution with credit by having fewer open revolving accounts while maintaining total balances and credit limits. Our results are consistent with consumer inattention to credit reports prior to identity theft and reduced trust in credit card markets after identity theft.

Elasticities of Labor Supply and Labor Force Participation Flows

Using a representative-household search and matching model with endogenous labor force participation, we study the interactions between extensive-margin labor supply elasticities and the cyclicality of labor force participation flows. Our model successfully replicates salient business-cycle features of all transition rates between three labor market states, the unemployment rate, and the labor force participation rate, while using values of elasticities consistent with micro evidence. Our results underscore the importance of the procyclical opportunity cost of employment, together with wage rigidity, in understanding the cyclicality of labor market flows and stocks.


Bank Size and Household Financial Sentiment: Surprising Evidence from the University of Michigan Surveys of Consumers

We analyze comparative advantages/disadvantages of small and large banks in improving household sentiment regarding financial conditions. We match sentiment data from the University of Michigan Surveys of Consumers with local banking market data from 2000 to 2014. Surprisingly, the evidence suggests that large rather than small banks have significant comparative advantages in boosting household sentiment. Findings are robust to instrumental variables and other econometric methods. Additional analyses are consistent with both scale economies and the superior safety of large banks as channels behind the main findings. These channels appear to more than offset stronger relationships with and greater trust in small banks.