

# Research Update

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## Beautiful City: Leisure Amenities and Urban Growth

Modern urban economic theory and policymakers are coming to see the provision of consumer-leisure amenities as a way to attract population, especially the highly skilled and their employers. However, past studies have arguably only provided indirect evidence of the importance of leisure amenities for urban development. In this paper, we propose and validate the number of tourist trips and the number of crowdsourced picturesque locations as measures of consumer revealed preferences for local lifestyle amenities. Urban population growth in the 1990–2010 period was about 10 percentage points (about one standard deviation) higher in a metro area that was perceived as twice more picturesque. This measure ties with low taxes as the most important predictor of urban population growth. “Beautiful cities” disproportionally attracted highly educated individuals and experienced faster housing price appreciation, especially in supply-inelastic markets. In contrast to the generally declining trend of the American central city, neighborhoods that were close to central recreational districts have experienced economic growth, albeit at the cost of minority displacement.  
Supersedes Working Paper 08-22.

Working Paper 19-16. Gerald A. Carlino, Federal Reserve Bank of Philadelphia; Albert Saiz, Massachusetts Institute of Technology.

## Building Credit History with Heterogeneously Informed Lenders

This paper examines a novel mechanism of credit-history building as a way of aggregating information across multiple lenders. We build a dynamic model with multiple competing lenders, who have heterogeneous private information about a consumer’s creditworthiness, and extend credit over multiple stages. Acquiring a loan at an early stage serves as a positive signal—it allows the borrower to convey to other lenders the existence of a positively informed lender (advancing that early loan)—thereby convincing other lenders to extend further credit in future stages. This signaling may be costly to the least risky borrowers for two reasons. First, taking on an early loan may involve cross-subsidization from the least risky borrowers to more risky borrowers. Second, the least risky borrowers may take inefficiently large loans relative to the symmetric-information benchmark. We demonstrate that, despite these two possible costs, the least risky borrowers often prefer these equilibria to those without information aggregation. Our analysis offers an interesting and novel insight into debt dilution. Contrary to the conventional wisdom, repayment of the early loan is more likely when a borrower subsequently takes on a larger rather than a smaller additional loan. This result hinges on a selection effect: Larger subsequent loans are only given to the least risky borrowers.

Working Paper 19-17. Natalia Kovrijnykh, Arizona State University; Igor Livshits, Federal Reserve Bank of Philadelphia; Ariel Zetlin-Jones, Carnegie Mellon University.

## The Firm Size and Leverage Relationship and Its Implications for Entry and Concentration in a Low Interest Rate World

Larger firms (by sales or employment) have higher leverage. This pattern is explained using a model in which firms produce multiple varieties and borrow with the option to default against their future cash flow. A variety can die with a constant probability, implying that bigger firms (those with more varieties) have lower coefficient of variation of sales and higher leverage. A lower risk-free rate benefits bigger firms more as they are able to lever more and existing firms buy more of the new varieties arriving into the economy. This leads to lower startup rates and greater concentration of sales.

Working Paper 19-18. Satyajit Chatterjee, Federal Reserve Bank of Philadelphia; Burcu Eyigungor, Federal Reserve Bank of Philadelphia.

## Mortgage Loss Severities: What Keeps Them So High?

Mortgage loss-given-default (LGD) increased significantly when house prices plummeted and delinquencies rose during the financial crisis, but it has remained over 40 percent in recent years despite a strong housing recovery. Our results indicate that the sustained high LGDs postcrisis are due to a combination of an overhang of crisis-era foreclosures and prolonged foreclosure timelines, which have offset higher sales recoveries. Simulations show that cutting foreclosure timelines by one year would cause LGD to decrease by 5–8 percentage points, depending on the trade-off between lower liquidation expenses and lower sales recoveries. Using difference-in-differences tests, we also find that recent consumer protection programs have extended foreclosure timelines and increased loss severities in spite of their benefits of increasing loan modifications and enhancing consumer protections. Supersedes Working Paper 17-08.

Working Paper 19-19. Xudong An, Federal Reserve Bank of Philadelphia; Larry Cordell, Federal Reserve Bank of Philadelphia.

## Capitalization as a Two-Part Tariff: The Role of Zoning

This paper shows that the capitalization of local amenities is effectively priced into land via a two-part pricing formula: a “ticket” price paid regardless of the amount of housing service consumed and a “slope” price paid per unit of services. We first show theoretically how tickets arise as an extensive margin price when there are binding constraints on the number of households admitted to a neighborhood. We use a large national dataset of housing transactions, property characteristics, and neighborhood attributes to measure the extent to which local amenities are capitalized in ticket prices vis-à-vis slopes. We find that in most U.S. cities, the majority of neighborhood variation in pricing occurs via tickets, although the importance of tickets rises sharply in the stringency of land development regulations, as predicted by theory. We discuss implications of two-part pricing for efficiency and equity in neighborhood sorting equilibria and for empirical estimates of willingness to pay for nonmarketed amenities, which generally assume proportional pricing only.

Working Paper 19-20. H. Spencer Banzhaf, Georgia State University; Kyle Mangum, Federal Reserve Bank of Philadelphia.

## Demographic Aging, Industrial Policy, and Chinese Economic Growth

We examine the role of demographics and changing industrial policies in accounting for the rapid rise in household savings and in per capita output growth in China since the mid-1970s. The demographic changes come from reductions in the fertility rate and increases in the life expectancy, while the industrial policies take many forms. These policies cause important structural changes; first benefiting private labor-intensive firms by incentivizing them to increase their share of employment, and later on benefiting capital-intensive firms resulting in an increasing share of capital devoted to heavy industries. We conduct our analysis in a general equilibrium economy that also features endogenous human capital investment. We calibrate the model to match key economic variables of the Chinese economy and show that demographic changes and industrial policies both contributed to increases in savings and output growth but with differing intensities and at different horizons. We further demonstrate the importance of endogenous human capital investment in accounting for the economic growth in China.

Working Paper 19-21. Michael Dotsey, Federal Reserve Bank of Philadelphia; Wenli Li, Federal Reserve Bank of Philadelphia; Fang Yang, Louisiana State University.

## Commuting, Labor, and Housing Market Effects of Mass Transportation: Welfare and Identification

Using a panel of tract-level bilateral commuting flows, I estimate the causal effect of Los Angeles Metro Rail on commuting between connected locations. Unique data, in conjunction with a spatial general equilibrium model, isolate commuting benefits from other channels. A novel strategy interacts local innovations with intraurban geography to identify all model parameters (local housing and labor elasticities). Metro Rail connections increase commuting between locations containing (adjacent to) stations by 15 percent (10 percent), relative to control routes selected using proposed and historical rail networks. Other margins are not affected. Elasticity estimates suggest relatively inelastic mobility and housing supply. Metro Rail increases welfare \$146 million annually by 2000, less than both operational subsidies and the annual cost of capital. More recent data show some additional commuting growth.

Working Paper 18-14 Revised. Christopher Severen, Federal Reserve Bank of Philadelphia.

## 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 cyclical flow 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 cyclical flow of labor market flows and stocks.

Working Paper 19-03 Revised. Isabel Cairó, Board of Governors of the Federal Reserve System; Shigeru Fujita, Federal Reserve Bank of Philadelphia; Camilo Morales-Jiménez, Board of Governors of the Federal Reserve System.

## Consumer Lending Efficiency: Commercial Banks Versus a Fintech Lender

We compare the performance of unsecured personal installment loans made by traditional bank lenders with that of LendingClub, using a stochastic frontier estimation technique to decompose the observed nonperforming loans into three components. The first is the best-practice minimum ratio that a lender could achieve if it were fully efficient at credit-risk evaluation and loan management. The second is a ratio that reflects the difference between the observed ratio (adjusted for noise) and the minimum ratio that gauges the lender's relative proficiency at credit analysis and loan monitoring. The third is statistical noise. In 2013 and 2016, the largest bank lenders experienced the highest ratio of nonperformance, the highest inherent credit risk, and the highest lending efficiency, indicating that their high ratio of nonperformance is driven by inherent credit risk, rather than by lending inefficiency. LendingClub's performance was similar to small bank lenders as of 2013. As of 2016, LendingClub's performance resembled the largest bank lenders—the highest ratio of nonperforming loans, inherent credit risk, and lending efficiency—although its loan volume was smaller. Our findings are consistent with a previous study that suggests LendingClub became more effective in risk identification and pricing starting in 2015. Caveat: We note that this conclusion may not be applicable to fintech lenders in general, and the results may not hold under different economic conditions such as a downturn.

Working Paper 19-22. Joseph P. Hughes, Rutgers University; Julapa Jagtiani, Federal Reserve Bank of Philadelphia; Choon-Geol Moon, Hanyang University.

## **A Generalized Factor Model with Local Factors**

I extend the theory on factor models by incorporating local factors into the model. Local factors only affect an unknown subset of the observed variables. This implies a continuum of eigenvalues of the covariance matrix, as is commonly observed in applications. I derive which factors are pervasive enough to be economically important and which factors are pervasive enough to be estimable using the common principal component estimator. I then introduce a new class of estimators to determine the number of those relevant factors. Unlike existing estimators, my estimators use not only the eigenvalues of the covariance matrix, but also its eigenvectors. I find strong evidence of local factors in a large panel of U.S. macroeconomic indicators.

Working Paper 19-23. Simon Freyaldenhoven, Federal Reserve Bank of Philadelphia.

## **Institution, Major, and Firm-Specific Premia: Evidence from Administrative Data**

We examine how a student's major and the institution attended contribute to the labor market outcomes of young graduates. Administrative panel data that combine student transcripts with matched employer-employee records allow us to provide the first decomposition of premia into individual and firm-specific components. We find that both major and institutional premia are more strongly related to the firm-specific component of wages than the individual-specific component of wages. On average, a student's major is a more important predictor of future wages than the selectivity of the institution attended, but major premia (and their relative ranking) can differ substantially across institutions, suggesting the importance of program-level data for prospective students and their parents.

Working Paper 19-24. Ben Ost, University of Illinois–Chicago; Weixiang Pan, Georgia State University; Douglas Webber, Temple University.