

Third Quarter 2024

Economic Insights

Volume 9, Issue 3

Population, Prices,
and Amenities

Gender Gaps in
the Labor Market

Why Banks Finance
Their Nonbank
Competitors



Questions and Answers | Research Update | Data in Focus

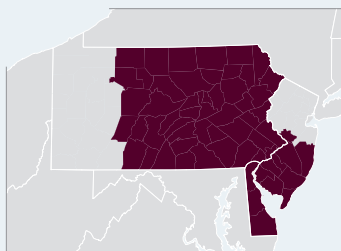
Economic Insights

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Q&A...

with Allison Shertzer, an economic advisor and economist here at the Philadelphia Fed.



Allison Shertzer

Allison Shertzer joined the Philadelphia Fed as an economic advisor and economist in 2023 after more than a decade teaching economics at the University of Pittsburgh. She is a principal investigator for the Historical Housing Prices (HHP) Project, which is hosted on the Philadelphia Fed website and featured in this issue's Data in Focus. Allison is passionate about delving into archives and visualizing the history of cities through map digitization. She has used this type of historical digitization to study redlining, segregation, and zoning.

1 Michael Coury, Toru Kitagawa, Allison Shertzer, and Matthew A. Turner, "The Value of Piped Water and Sewers: Evidence from 19th Century Chicago," Federal Reserve Bank of Philadelphia Working Paper (forthcoming).

2 Professor Golden is the recipient of the 2023 Nobel Memorial Prize in Economics "for having advanced our understanding of women's labour market outcomes" (<https://www.nobelprize.org/prizes/economic-sciences/2023/summary/>).

The Historical Housing Prices (HHP) Project was years in the making. What led you to launch this project? Were you recruited? Or did you come to it on your own?

I was collecting land prices from old issues of the *Chicago Tribune* to do work from an applied micro focus, specifically to study the impact of sewers on land values,¹ and Ronan Lyons, an associate professor in economics at Trinity College Dublin, was collecting rents and housing prices from similar newspapers for research with more of a macroeconomic focus. We met at an economic history conference in 2018 and decided to combine forces. We brought on Rowena Gray, an economic historian at the University of California, Merced, to join our team. We've been working together ever since. It's been such a good collaboration because we complement each other so well. Rowena is an expert on historical labor markets and on New York City specifically. Ronan has incredible intuition for housing prices. And I've been constructing large historical data sets my whole career. I think we're the right people to take a fresh look at U.S. housing markets over the long run.

What do you hope your HHP data visualization will accomplish in the social sciences?

The data visualization is an awesome tool for everyone interested in housing prices and affordability, not just economists and other social scientists. Our hope is that the HHP will make it much easier for anyone to produce visualizations that can inform policy or pieces in the popular press.

What led you to focus so much of your work on the creation of novel data sets?

That is what economic historians do. There's been a long tradition of building the data sets that are used in our own work and later by other economists, and this tradition is evolving with the new technological tools that have come online. Economic historians advance the study of economics by bringing data from the past into usable digital form.


How does the field of economic history position itself within the field of economics? Do other economists see economic historians primarily as economists, or as historians?

Forty years ago, there was a much bigger gap between economic history and the rest of economics. That gap has narrowed a lot. Economic historians are now using large data sets and cutting-edge empirical methods. The questions we're asking are still long run or historic in nature. But the methods we use have evolved along with the rest of economics.

Did the economic historians of 40 years ago have to fight their way into the field of economics?

My advisor's advisor, Claudia Golden, the Henry Lee Professor of Economics at Harvard University, has amazing stories of trying to convince people that the long-run trend in women's labor force participation is something worth studying. No one was really studying women in the labor force when she started working on the topic 45 years ago. But economic history is in a great position now with our second Nobel Prize² and a broad recognition that long-run work is important for understanding the current world. I don't think we have to fight so hard to convince the profession and society at large that understanding the past is critical for policymaking.

What kind of personality type thrives in your kind of work?

Being creative and not easily discouraged, because there are many setbacks with historical research. For example, I wanted to study Polish immigrants to the United States in the early 20th century. They're enumerated in the 1900 census, but for the 1910 census all Poles were enumerated as being from Austria-Hungary, the German Empire, or the Russian Empire. Poles were enumerated again in 1920. By then, Poland was an independent state. So how do you study Poles consistently over the early 20th century? I had to spend a few weeks figuring out how I would locate Polish immigrants in the United States in 1910. I think being creative and being able to pick yourself up after all these setbacks are important qualities for doing this kind of work. 



Population, Prices, and Amenities

To make housing more affordable, we need to understand what makes some places hot, others not.

Jeffrey Brinkman

Economic Advisor and Economist
FEDERAL RESERVE BANK OF PHILADELPHIA

The author thanks Heidi Artigue and Svyatoslav Karnasevych, who cowrote the working paper on which this article is partially based, and Samuel Jagolinzer, who helped process the data for this article.

The views expressed in this article are not necessarily those of the Federal Reserve.

Housing affordability has emerged as an important public concern, but housing rents have not increased the same in all locations. Rents have soared in large American cities such as New York and San Francisco, but smaller metropolitan statistical areas (MSAs)¹ have been able to grow with a more modest increase in rents.² The supply of new housing has failed to keep pace with demand in many large cities, causing some households to move to locations that provide a high quality of life but at a lower cost.

Typically, housing affordability is a function of supply and demand. When the demand for housing in a location is met with new housing, the local population grows. When it isn't, local rents rise. The more difficult it is to add housing to a high-demand location, the more likely it is that rents—rather than the population—will increase there.

Demand for housing in different places is driven by household demand for location characteristics—most notably, high-paying jobs and amenities. And different households have different preferences. Working-age adults may place more value

on access to high-paying jobs whereas retirees may place more value on local amenities.

In this article, I explore how rapidly evolving demographics and employment arrangements are changing the relative importance of amenities for households choosing where to live. Policymakers should consider the rising importance of amenities as they seek solutions to the affordability crisis in large coastal cities.

How Rents and Population Have Changed in Recent Decades

Historically, housing rents are significantly higher in large cities (Figure 1). In 1980, the 10 most populous MSAs had rents 26 percent higher than the national median. Between 1980 and 2019, rents rose more rapidly in these large metropolitan areas—by 71 percent after adjusting for inflation. In metropolitan areas ranked between the 11th and 200th most populous in 1980, the median inflation-adjusted rent increased by 55 percent, and in the remaining counties rents grew by only 45 percent.³ House prices are more volatile and subject to macroeconomic conditions, but they followed a similar pattern.

But while rents were rising fastest in the largest cities, population growth was largest in midsize cities. MSAs ranked between the 11th and 200th most populous in 1980 grew by 61 percent. The 10 largest metros in 1980 grew by only 35 percent, and MSAs ranked below the 200th and nonmetro rural counties grew by only 26 percent. As a result, the largest and smallest cities (as well as nonmetro rural counties) saw their respective shares of the total population decline after 1980 (Figure 2). These population trends reflect demand for different types of locations as well as housing supply constraints.

Population and price growth also varied by region. From 1980 to 2019, population growth was strongest in the West, which grew by 82 percent. This compares to 66 percent in the South, 16 percent in the Midwest, and 14 percent in the Northeast. During the same period, however, rents rose fastest in the Northeast and slowest in the Midwest. Meanwhile, in coastal regions, inflation-adjusted rents increased 68 percent and population increased 49 percent, but these increases varied based on the initial population. The largest coastal cities saw more growth in prices, whereas less-populated coastal counties saw more growth in population.

Drivers of Demand for Local Housing

One driver of demand for local housing is access to high-paying jobs. These jobs are provided by firms. Firms decide where to operate based on a location's advantages. A location may offer many advantages, including access to a port, natural resources, and a central location. But large cities offer an advantage that other locations can't offer: agglomeration economies—that is, efficiencies or innovation that arise from the colocation of firms, jobs, and other economic activity.⁴ The benefits of agglomeration arise from the sharing of production inputs, a deep local

labor pool, and interaction and knowledge diffusion between workers—all of which lead to increased productivity and innovation.

However, recent research suggests that as real incomes rise, amenities increasingly drive household location decisions, too. MSAs with more desirable amenities have grown faster in recent decades, with much of the growth predicted by natural amenities such as the local climate.⁵ But not all households are making the same location choices. Inner cities have reversed their 20th century decline and grown in both prices and population thanks to young, educated households seeking urban amenities such as nightlife and restaurants.⁶ Meanwhile, retirees, a rapidly growing demographic, are increasingly choosing to move to high-amenity locations away from expensive urban areas. Because their income is not tied to their location of residence, they are less sensitive to the availability of job opportunities found in large, productive cities.

In summary, the two underlying drivers of demand for a location are its production advantages and amenities. In locations that are more productive, firms are willing to pay higher wages, and in places that have more desirable amenities, households are willing to pay higher rents.

How Rents Respond to Increased Demand

A location needs housing to accommodate growing demand. However, not all locations can add housing at the same rate, and these differences determine whether demand is tempered by increased prices or accommodated through increased housing. In high-demand locations where housing can be added easily, population growth will follow. But in high-demand locations where housing is difficult to add, prices will rise instead. The ability to adjust the supply of housing is known as *supply elasticity* and varies greatly across locations for many reasons. These reasons include geographic constraints such as mountainous terrain and bodies of water, and legal constraints such as zoning and historic preservation laws.

One key determinate of housing supply elasticity is the size of a city. Generally, in less densely populated locations, land is plentiful and housing can be added relatively cheaply and easily. As cities grow in population, land becomes scarcer and construction costs and congestion increase. Therefore, large cities generally have a lower elasticity of housing supply, so increasing demand results in rents that are higher than in midsize cities or small towns. The relationship between housing supply elasticity and city size is predicted by theory and has been measured empirically by researchers.⁷

How Amenities Affect Housing Rents

Increasing incomes have led to increased demand for location amenities. As real incomes have grown, both overall and for certain segments of the population, households have been able to spend more of their income on nonessential items. One consequence is that households have become more willing to pay higher prices to live in "nice" locations, thus increasing demand for local amenities.

See *Population and Price Dynamics in the Philadelphia Region*.



FIGURE 1

Rents Rose Fastest in the Most Populous Metros, in Coastal Counties, and in the Northeast

Population-weighted median rent of counties in each group, 2019 dollars adjusted using the Consumer Price Index, % change



FIGURE 2

Population Grew Fastest in Midsize Cities, Some Coastal Counties, and the South

Population in millions, 1980 and 2019



Data Sources: 1980 U.S. Decennial Census and 2019 U.S. Census American Community Survey

cannot create a complete model of location choices using only wages and prices, this method does allow us to estimate a location's level of amenities.

Using this method, we estimated the level of amenities for each U.S. county as of 1980.¹⁰ Our estimates are strongly correlated with location characteristics expected to contribute to the level of amenities, including mountains, coastlines, a comfortable climate, and large universities.

We found that less-populated counties with a high amenity level experienced significantly higher population growth. In small cities and rural areas, a 1 standard deviation higher amenity level was associated with 8 percent higher population growth between 1980 and 2019.

However, in the 10 largest MSAs a 1 standard deviation higher amenity level was associated with 22 percent higher *rent* growth but slower population growth, which suggests that households moving to the largest cities prefer those with the best amenities. And because those cities—like all large cities—struggle to meet increasing demand with new housing, rents rather than population necessarily rise in those cities.

How Demographic Change Affects Housing Rents

Retirees are an important contributor to population growth in high-amenity areas outside of major cities. Although the 65+ population is increasing everywhere, the growth of this demographic is much higher in high-amenity small towns and rural areas. Retirees are less sensitive to the availability of job opportunities found in large, highly productive cities and therefore can take advantage of small towns and rural areas that offer a lower cost of living. This relocation of retirees partially explains why some small towns have grown while others have stagnated.

The number of households that work from home has also increased relatively more in high-amenity areas outside of major cities. Although they represented a small share of households before 2020, this group grew during and after the COVID-19 pandemic.

High-income and college-educated workers exhibited a different trend. Although these highly skilled workers earn a premium in large cities,¹¹ they are gravitating toward *all* high-amenity locations, not just high-wage urban areas.

These results show that location amenities have become increasingly important in household location decisions, and this increased demand for amenities reveals itself differently based on the local characteristics of each housing market.

Conclusion

As rents continue to rise in supply-constrained cities, some households are seeking lower-cost alternatives that offer a better quality of life. As a result, the population has grown in high-amenity counties outside of urban areas. This growth is driven at least partially by households not dependent on high-paying urban jobs, including retirees and remote workers. Nonetheless, large cities continue to drive overall economic growth and attract particularly young and educated workers in search of high-paying jobs.


These trends have important implications for future growth and affordability. Policies that increase the supply of housing in large cities should alleviate the affordability crisis. On the other hand, as the population continues to age, a growing number of retirees could seek out high-amenity locations away from expensive cities. Likewise, the growth of remote work could contribute to the growth of these locations. These two trends may alleviate some of the pressure on housing markets in large cities even if those cities don't increase their supply of housing. 

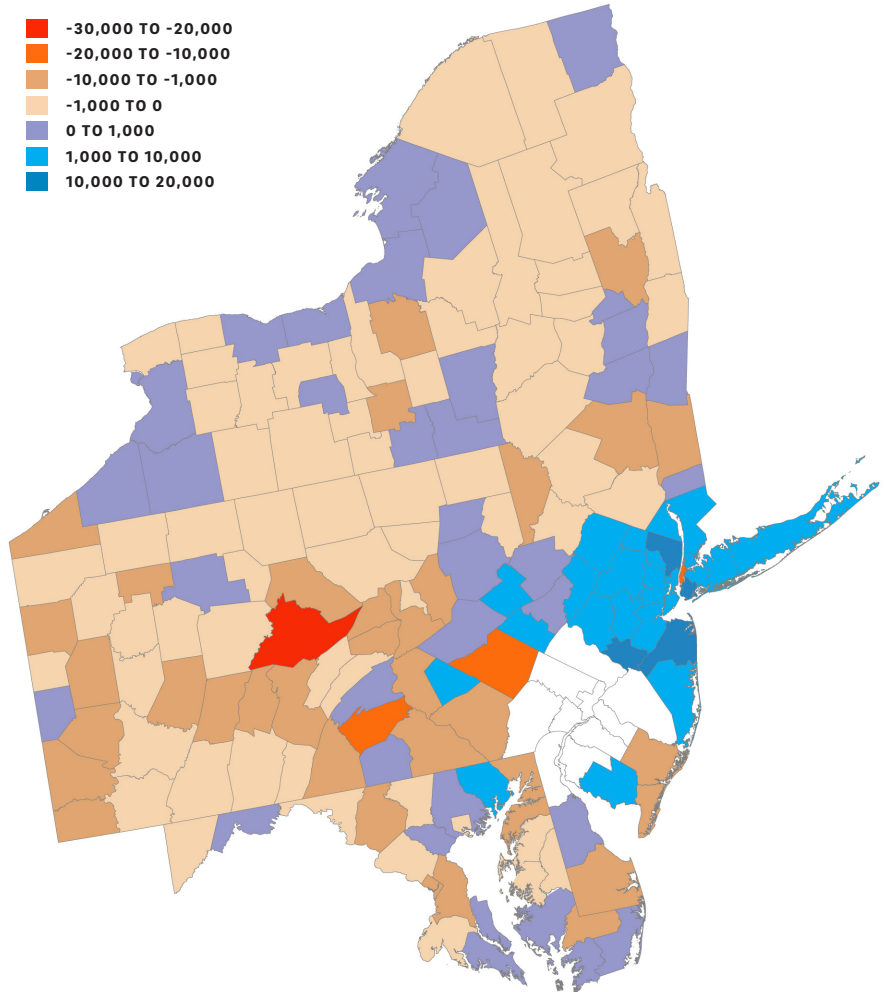
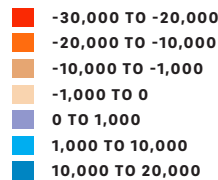
FIGURE 3

Many Households Have Moved from Philadelphia to Places Associated with Natural Amenities and Cheaper Housing

But migrants have also moved to Philadelphia from the more expensive counties near Manhattan.

Net migration flows to the Philadelphia MSA, by county, 2010–2019

AGGREGATE NET MIGRATION FLOWS WITH PHILADELPHIA (MSA)



Data Source: U.S. Census American Community Surveys for 2010 and 2019

Population and Price Dynamics in the Philadelphia Region

The mid-Atlantic region and Philadelphia have much in common with the nation, but they also have unique characteristics. Like other large cities, Philadelphia offers increased productivity for firms and access to high-paying jobs for workers. Also like other cities, Philadelphia has transitioned from a manufacturing-based economy to one more dependent on services. But despite (or perhaps because of) this transition, Philadelphia remains an important economic center for the region and the United States, specializing in health care, education, information services, and professional services. Counties in the surrounding region have experienced more varied outcomes, and many lack the same employment opportunities found in large MSAs.

The differences in demand for housing across the region are partially reflected in housing rents. The median rent for housing in the Philadelphia MSA is considerably higher than in the region's smaller cities and rural areas. However, housing is generally more affordable in the Philadelphia MSA relative to the New York and Washington, D.C., MSAs, which also exhibit higher incomes. Notably, these disparities increased between 1980 and 2019. The median rent increased 48 percent in the Philadelphia MSA after adjusting for inflation, compared to 39 percent in Pennsylvania, 71 percent in the Washington, D.C., MSA, and 74 percent in the New York MSA.

Differing trends in housing rents drive domestic migration patterns. Philadelphia has experienced net outmigration to many rural areas in the region, including central Pennsylvania and counties along the

shore in New Jersey and Delaware. Many of these places are associated with natural amenities or cheaper housing. However, there has been a consistent inflow of domestic migration from counties in Northern New Jersey and New York. These patterns are mostly consistent with the story that households are seeking lower-cost locations with a relatively good quality of life (Figure 3).

But there are some notable exceptions. There is considerable net migration from the Philadelphia MSA to Manhattan. Manhattan delivers a high quality of life as well as productive firms with high-paying jobs, both of which attract young, educated workers despite Manhattan's higher rents. Likewise, households are also migrating to the Washington, D.C., metro area, despite its higher rents. This is due to that MSA's proliferation of upper-middle-class jobs as well as a broader trend of migration to the Southeast.

Finally, domestic migration does not tell the whole story of population dynamics in the Philadelphia MSA. Population growth is also affected by international immigration and the natural increase of the population due to births and deaths. Large cities traditionally act as hubs for immigration. In addition, cities tend to attract younger households, which have higher fertility and lower mortality rates. Philadelphia is no exception. The City of Philadelphia has experienced consistent population growth since 2000 after a long decline starting in 1950. This growth has been driven by immigration and the natural increase from births and deaths.

NOTES

- 1** Metropolitan statistical areas are defined by the U.S. Office of Management and Budget. Each MSA is a group of counties consisting of a core county with a high population density and surrounding counties with a high degree of economic integration.
- 2** In this article I use data on median housing rents in different locations. House prices and other local costs follow a similar pattern.
- 3** Data on median rent and population come from the U.S. Decennial Censuses for 1980, 1990, and 2000, and from the U.S. Census American Community Surveys for 2010 and 2019. Rents are calculated as the population-weighted average rent for all counties in each category and are adjusted to 2019 dollars using the Consumer Price Index (CPI).
- 4** See Duranton and Puga (2004), Rosenthal and Strange (2004), and Lin (2011) for examples of research on agglomeration benefits.
- 5** See Glaeser et al. (2001) and Carlinio and Saiz (2019) for research that documents the growth of high-amenity locations.
- 6** Couture and Handbury (2017) and Baum-Snow and Hartley (2020) document and study the revival of U.S. inner cities.
- 7** See, for example, Capozza and Helsley (1989) and Green et al. (2005).
- 8** In Artigue, Brinkman, and Karnasevych (2022), we provide a theory for and evidence of the increased demand for high-amenity locations, and we document population, rent, and demographic changes and their correlation with amenities and city size.
- 9** This method was developed by Roback (1982).
- 10** As noted earlier, rents, as opposed to house prices, are generally a better measure of contemporary housing costs because house prices are more volatile and sensitive to macroeconomic conditions or speculation.
- 11** See Baum-Snow and Pavan (2013) for an example of research on the city-size skill premium.

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Inequality Research Review

Gender Gaps in the Labor Market

The gap in earnings between men and women has narrowed, but why haven't we closed it entirely?

Bryan A. Stuart

Economic Advisor and Economist
FEDERAL RESERVE BANK OF PHILADELPHIA

The views expressed in this article are not necessarily those of the Federal Reserve.

One of the most remarkable changes in the U.S. economy starting in the early 20th century was the rise of women's participation in the labor force. The share of women participating in the labor force has increased from around 20 percent in 1900 to around 57 percent as of 2022. During the same period, men's labor force participation rate fell from 86 percent to 68 percent.¹ This period also saw enormous changes in women's education and career opportunities. But women overall are still paid less than men, and this is the subject of public and academic debate. In this article, I review recent research into the determinants of the gender gap in earnings, and I suggest how this gap might evolve.

Measuring the Gender Gap

The conventional measure of the gender gap in earnings is the ratio of median annual earnings among women to median annual earnings among men. Each year, the U.S. Census Bureau estimates two versions of this ratio, one for full-time, full-year workers and one for all workers.

The Census Bureau's most recent (2022) estimate of the ratio for full-time, full-year workers is 0.84 (Figure 1). This estimate is the source of statements such as, "For every dollar a man makes, a woman makes 84 cents." But this more limited category excludes many workers. When we include those workers, the ratio is 0.79. The fact that the ratio for all workers is smaller than the ratio for full-time, full-year workers allows us to identify one source of the gender gap: Women are more likely to work in part-time jobs, which tend to be lower paid. But this can only be a partial explanation. Otherwise, there would be no gap for full-time, full-year workers.

After remaining quite stable in the 1960s, the ratio for full-time, full-year workers began to shrink in the 1970s and 1980s, and since then the gender gap has continued to shrink at a steady pace. Why has this gap shrunk since the 1960s? One explanation is that women are increasingly catching up to men in terms of work experience and have surpassed men in terms of high school and college degree attainment. Another explanation is that structural changes in the economy have increased the demand for cognitive skills and lowered the demand for manual skills, which are usually more associated with male workers.² And yet, despite these changes, the gender gap in earnings persists.

What Explains the Gender Gap Today?

Researchers are converging on a consensus view of what drives much of the gender gap.³ This explanation centers around the time allocation decisions a couple must make after having a child. For a couple, there is an incentive to have the parent with better labor market opportunities spend more time working while the other parent focuses on child care. This *specialization* can increase the couple's total earnings. Meanwhile, a worker's hourly wages rise as they spend more time working. These *increasing returns to time spent working* can come from the skills the worker learns on the job and the value an employer places on having someone willing to work longer hours. Together, specialization and the increasing returns for time spent working can explain why one half of a couple spends more time working and the other half spends more time on child care.

But why do *women* tend to specialize in child care? Economists have focused on four explanations. First, women may earn less than men on average, so that couples simply allocate their time in a way that maximizes total income. Second, childbirth could affect a mother's health and, thus, her ability to work. Third, women may face discrimination in the labor market, and this discrimination may encourage them to focus on child care. And fourth, individual preferences or social norms could influence a mother's decision to spend more time on child care.

We can use empirical evidence to assess each of these explanations.

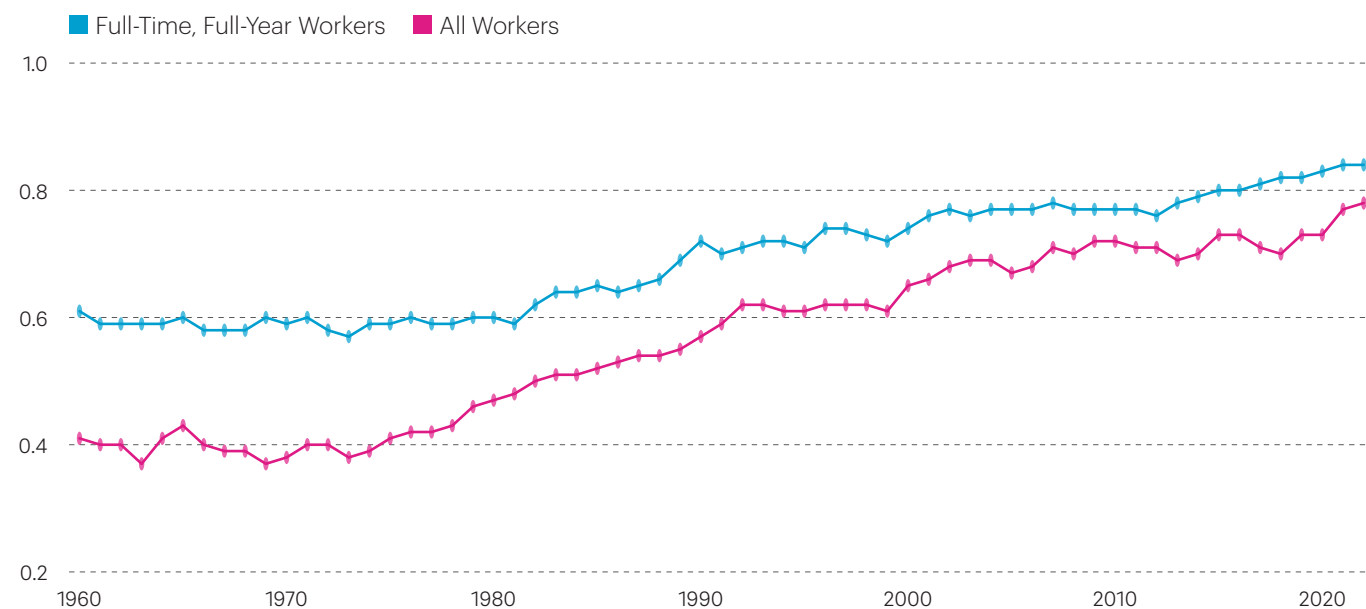
The gender gap in earnings is small for entry-level workers but grows over time (Figure 2). Between the ages of 18 and 25, women and men have similar median annual earnings. But start-

FIGURE 1

Men Earn More Than Women

But the gender gap has narrowed over time.

Median annual earnings for women as a share of the median for men, 1960–2022



Data Source: U.S. Census Bureau Analysis of Current Population Survey, Annual Social and Economic Supplements

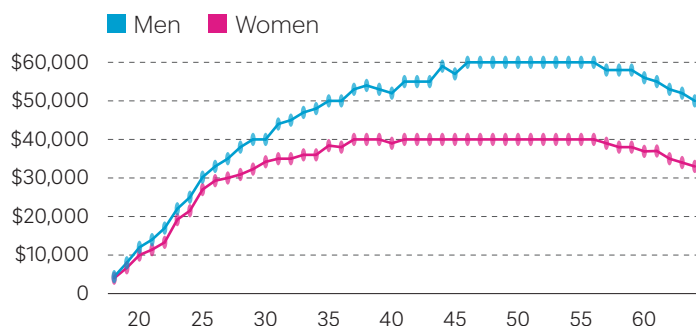
Note: Sample contains workers ages 15 and above. Full-time, full-year workers are defined as those working at least 50 weeks per year and 35 hours per week.

FIGURE 2

The Gender Gap in Earnings Is Small at the Start of Workers' Careers

But it grows over time.

Median annual wage and salary earnings for working women and men, by age in years, 2019



Data Source: 2019 U.S. Census Bureau American Community Survey

Note: Sample contains individuals ages 18–64 who are not institutionalized or in the armed forces and have positive annual wage and salary earnings. Annual earnings data in the American Community Survey are rounded to the nearest \$100 and show substantial heaping at each \$1,000 value.

ing in their late 20s, men's earnings grow faster than women's, and by the time they are 45, men earn almost 50 percent more than women. This divergence coincides with the age at which many couples have their first child. Indeed, when looking at workers who do not have children, there is very little difference in median earnings between women and men (Figure 3). This suggests that women's lower earnings are the result rather than the cause of women specializing in child care.

Evidence in support of this hypothesis comes from an analysis of how workers' earnings evolve around the time of the birth of their first child. In the United States, mothers experience a nearly 25 percent decrease in their annual earnings in the year after their first child's birth.⁴ This decrease grows in subsequent years, amounting to over 40 percent within a decade. The decrease in earnings reflects decreases in the probability that a mother will work, in the number of hours she will work, and in how much she is paid per hour of work. In contrast, fathers experience little change in their annual earnings in the first year of their first child's life and a much smaller decrease in earnings thereafter. These differences account for around two-thirds of the total gender gap in earnings today.⁵

Education is strongly correlated with an individual's current and future income, so if couples are simply having the parent with lower earnings specialize in child care, we would expect that parent to have less education regardless of gender. But that's not what we see in the data. On average, a mother experiences a decline in earnings even when she has substantially more years of schooling than her child's father.⁶ This suggests that differences in potential income do not drive a mother's decision to specialize in child care.

We also don't see a change in how mothers' earnings evolve after the arrival of a new child when the child is adopted, which suggests that we can't explain the wage gap by looking at the

health consequences of childbirth or the biological link between mother and child.⁷

Discrimination against women is another potential explanation for the gender gap. Assessing this explanation is very difficult because researchers usually cannot observe discrimination directly. A common approach to studying discrimination today is an audit study, where researchers submit randomized, fictitious résumés to job postings and note how many employers reply with an invitation to an interview. There is little evidence that women receive fewer contacts from employers on average.⁸ However, other studies find evidence that *mothers* receive fewer contacts than *fathers*.⁹ Although audit studies provide valuable evidence of discrimination in one part of the hiring process, it is not clear how much of the contemporary gender gap in earnings is explained by discrimination.¹⁰

It seems that preferences and social norms account for women's greater specialization in child care. Preferences and norms are closely linked. For example, a social norm that "women are the primary caretaker" can shape women's and men's preferences regarding how much time to spend in school and what kinds of jobs they want to do.

How to Narrow the Gender Gap

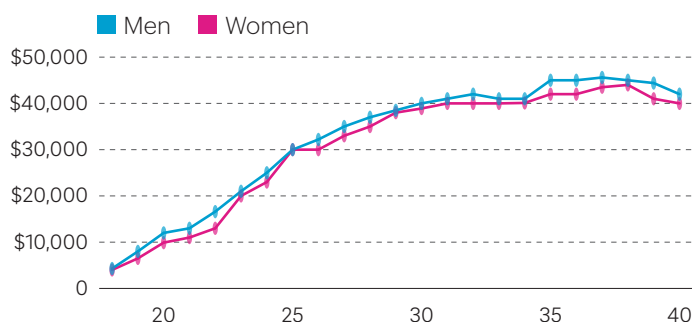
Expanded parental leave could narrow the gender gap by helping new mothers stay attached to the labor market, which would help them preserve job-specific skills and relationships. On the other hand, extended time away from the labor market could lead to an earnings penalty for mothers, either because of reduced skills or discrimination by employers who anticipate their parental leave.

In the United States, the best evidence on this question comes from California's expansion of paid family leave from six to 12 partially paid consecutive weeks for births after May 20, 2004.¹¹ This sharp change in eligibility allows researchers to

FIGURE 3

The Gender Gap in Earnings Is Small for the Childless

Median annual wage and salary earnings for working women and men without children, by age in years, 2019



Data Source: 2019 U.S. Census Bureau American Community Survey

Note: Sample contains individuals ages 18–40 who do not have a child, are not institutionalized or in the armed forces, and have positive annual wage and salary earnings. Annual earnings data in the American Community Survey are rounded to the nearest \$100 and show substantial heaping at each \$1,000 value.

control for several factors that could confound the relationship between paid leave and postbirth earnings. Researchers found little evidence of paid family leave's impact on employment or earnings. Indeed, there is evidence that the policy *lowered* first-time mothers' employment and earnings. Although these results are limited to a single policy change, other papers have found little evidence that an expansion of paid leave in other countries reduced the gender gap.¹² Paid parental leave can be valuable for many reasons, but it does not seem to be a promising tool for closing the gender gap in earnings.


A second policy would make child care more affordable. Lowering the cost of child care can raise mothers' earnings by increasing their availability for work and the predictability of that work. Public kindergarten in the United States is the largest source of subsidized child care nationwide, and research has found an increase in the employment of single mothers when their youngest child enters kindergarten.¹³ The introduction of universal, low-cost child care for children ages 3 and above in the Canadian province of Quebec provides further evidence that this policy increases mothers' participation in the labor force.¹⁴ Child care could help narrow the gender gap, and providing child care for younger children could help mothers pursue their careers after childbirth.

The gender gap may also evolve for reasons that do not relate to gender-based policies. For example, the pharmacist profession has become much friendlier to working women in recent decades because of technological and organizational changes that make it easier for a pharmacist's work to be subdivided among coworkers in a team.¹⁵ These changes, which were not motivated by gender equity concerns, eliminated the penalty faced by women who work fewer hours than men. Another potentially important development is the rise of work-from-home opportunities. Although we have yet to fully understand how the rise in work-from-home that emerged during the COVID-19 pandemic affected people's careers, evidence from before the pandemic suggests that expanded work-from-home opportunities can increase mothers' employment.¹⁶ If large enough, both changes could address the gender gap in earnings, and policy-makers could implement policies that encourage these changes. But these changes might be limited to white-collar jobs; closing the gender gap might require additional changes.

The gender gap could be addressed by changing social norms. Gender norms have become more supportive of working women. The share of men who agree with the statement that "it is much better for everyone involved if the man is the achiever outside the home and the woman takes care of the home and family" decreased from 68 percent in 1977 to 29 percent in 2022, with a similar decrease of 62 to 21 percent for women. Research suggests that changing social norms partly result from the increase in women's employment, which raises the possibility that changes in norms are self-reinforcing.¹⁷

Conclusion

The gender gap in earnings has narrowed considerably since the early 20th century. However, a sizable gender gap remains, and research ties this disparity to mothers' role in child care, which

is reinforced by preferences and social norms. In the rest of the 21st century, changes in the gender gap are likely to depend on changes in the affordability of child care, in the nature of work, and in social norms. 

Notes

- 1 The 2024 numbers come from the Current Population Survey. The 1900 numbers come from Acemoglu et al. (2004). Labor force participation rates do not include individuals doing unpaid labor (such as raising one's own children).
- 2 See Goldin et al. (2006) and Beaudry and Lewis (2014).
- 3 See Goldin (2021) and Cortés and Pan (2023).
- 4 See Cortés and Pan (2023). For an alternative view, see Lundborg et al. (2024).
- 5 The contribution of child-related inequality to the overall gender gap in earnings combines estimates of the share of adults who have children with the differential evolution of earnings among parents.
- 6 See Cortés and Pan (2023).
- 7 See Kleven et al. (2021).
- 8 There is, however, evidence that some employers systematically favor women while others favor men. See Deming et al. (2016) and Kline et al. (2022) for more about these studies.
- 9 See Correll et al. (2007) and Becker et al. (2019).
- 10 Labor market discrimination against women was once widespread and institutionalized. Bailey et al. (2024a) find that federal antidiscrimination legislation passed in the 1960s narrowed the gender gap in earnings.
- 11 See Bailey et al. (2024b).
- 12 See Olivetti and Petrongolo (2017).
- 13 See Gelbach (2002), Cascio (2009), and Fitzpatrick (2012).
- 14 See Baker et al. (2008).
- 15 See Goldin and Katz (2016).
- 16 See Harrington and Kahn (2023).
- 17 See Fernández et al. (2004) and Fárre and Vella (2013).

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Banking Trends

Why Banks Finance Their Nonbank Competitors

The explosive growth in nonbank financial institutions seems to have come at the expense of banks, but a closer look reveals otherwise.

Jim DiSalvo

Banking Structure Specialist
FEDERAL RESERVE BANK OF PHILADELPHIA

The views expressed in this article are not necessarily those of the Federal Reserve.

In the past quarter century, nonbank financial institutions (NBFIs) have seen explosive growth, and today the NBFI sector is in some ways larger than the banking sector.¹ Globally, assets under management at NBFIs grew from about \$50 trillion in 2002 to over \$200 trillion in 2020,² and their share of global financial assets increased from around 40 percent to about 48 percent. Meanwhile, banks' share of global assets dropped from about 46 percent to around 38 percent. In the U.S., banks' market share of home mortgage originations was cut nearly in half from 2000 to 2022, while NBFIs' share nearly tripled.³ And NBFIs are making inroads into other types of lending as well, such as business lending to middle-market firms.⁴

It may look like NBFIs are simply taking business away from banks, but recent data document a symbiotic relationship: Banks are now in the business of providing liquidity to NBFIs in the form of lines of credit, rather than just originating and holding term loans.

This paper will attempt to answer four questions about banks' relationship with NBFIs. First, how much has bank lending to NBFIs increased?

Second, what kinds of NBFIs are banks lending to? Third, what kinds of credit are they extending? And last, why do banks specialize in providing lines of credit to NBFIs?

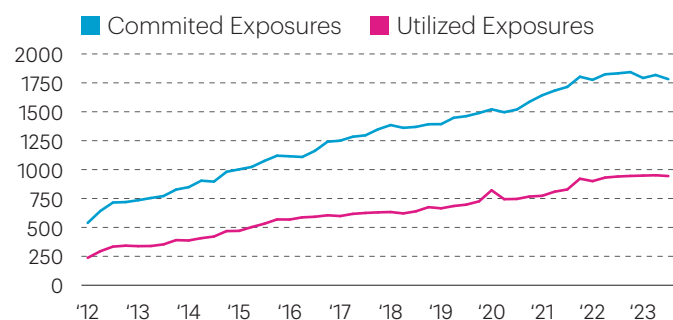
A Surge in Bank Lending to NBFIs

Since 2012, bank lending to NBFIs has more than quadrupled in real terms, from just over \$237 billion to over \$944 billion. Loan commitments—that is, bank commitments to lend when the borrowing firm needs funds—have increased even more (Figure 1).⁵ At the same time, assets at banks, bank holding companies, and financial holding companies grew just 13.2 percent, from \$23.1 trillion to \$26.1 trillion, and their total loans grew just 17.1 percent, from \$9.5 trillion to \$11.2 trillion. In other words, the growth in lending to NBFIs far exceeded the growth in banks' assets and overall lending. Also, nearly all the lending to NBFIs is done by the largest banks, which account for nearly 90 percent of all loans to NBFIs by bank holding companies and financial holding companies.⁶

FIGURE 1

Bank Lending to NBFIs Has More than Quadrupled in Real Terms

Total term loans and credit lines to NBFIs by large organizations, 2012–2023, in constant 1q2023 dollars, billions



Data Source: Federal Reserve FR Y-14Q, Schedule H.1

Note: Nearly all the lending to NBFIs is done by large banks.

Banks make two types of loans: credit lines and term loans. Credit lines (sometimes called loan commitments) are like credit cards. The borrower pays a fee for the ability to draw funds and are subject to an overall limit on total borrowings. For credit lines with a maturity greater than one year, the interest rate typically floats with market interest rates—that is, the bank guarantees the spread above some reference rate, not the rate itself.

Term loans, on the other hand, are like car loans or mortgages. Typically, a borrower receives the full amount of the term loan, which the borrower must repay on a fixed schedule. The rate can be fixed or variable.

Over 81 percent of the funds committed to and nearly 68 percent of funds used by NBFIs are credit lines (Figure 2). Credit lines to NBFIs are also growing much more rapidly than term loans. Credit lines have more than tripled, from over \$390 billion in 2012 to nearly \$1.5

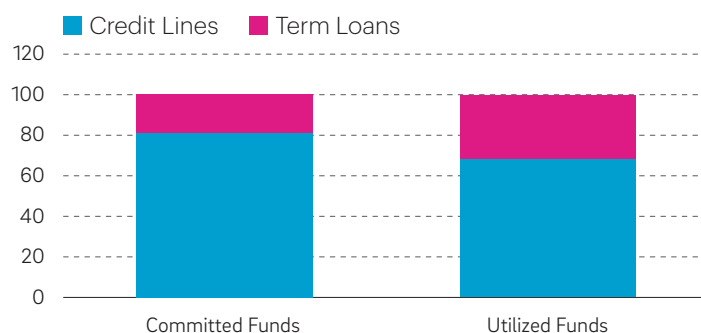
See *FR Y-14*
Data Explained.

trillion in 2023 (Figure 3), whereas term loan commitments have only doubled, from about \$148 billion to \$306 billion. However, on average, NBFIs use just over 40 percent of funds available in credit lines.⁷ With such a low utilization rate for credit lines, they must serve some purpose in addition to supplying operating funds to NBFIs. That purpose: supplying liquidity to various financial institutions and markets.

FIGURE 2

Credit Lines Dominate Loans to NBFIs

Credit lines and term loans committed to NBFIs, as shares of total committed loans, average for 2012–2023

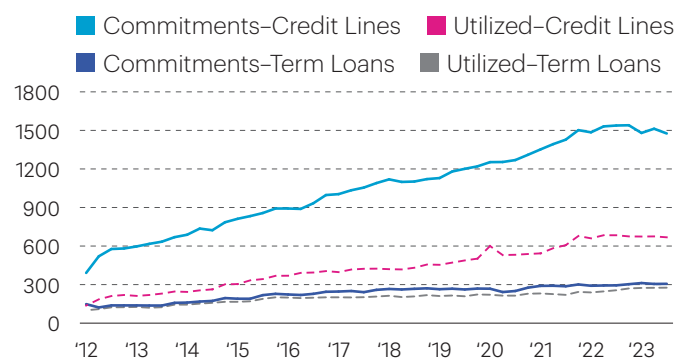


Data Source: Federal Reserve FR Y-14Q, Schedule H.1

FIGURE 3

Credit Lines Represent the Bulk of the Increase in Lending to NBFIs

Term loans and credit lines to NBFIs by large organizations, 2012–2023, in constant 1q2023 dollars, billions



Data Source: Federal Reserve FR Y-14Q, Schedule H.1

Note: Nearly all the lending to NBFIs is done by large banks.

The NBFIs That Banks Lend To

Not all NBFIs are the same. Many types of NBFIs engage in a wide variety of activities. We can categorize NBFIs by the types of intermediary services they provide. The relative growth rates of the different types of intermediaries provide insight into the changing role of banks in the intermediation process. (See Table 1 for the specific types of firms in each category.)

Providing Liquidity to Securities Markets

This category includes broker-dealers, financial processing houses and clearinghouses, and open-end investment funds. It also includes payment processing firms such as Venmo and PayPal.

Underlying some of the growth of NBFIs, especially in this category, is the trend whereby many nonfinancial corporations secure financing by selling bonds to investors rather than borrowing from banks.⁸ One attractive feature of bonds is that they are marketable—that is, they can be bought and sold on demand. But in practice, bonds are liquid only because these NBFIs serve as specialized intermediaries. For example, broker-dealers provide liquidity by matching buyers and sellers in securities markets. And open-end investment funds such as bond mutual funds provide liquidity by assembling a portfolio of securities and then selling investors shares—redeemable on demand—of the portfolio.

Transforming Loans into Securities

Many NBFIs create marketable securities from a portfolio of bank loans. Here's how it works: Banks originate loans; an NBFI purchases these loans; the NBFI securitizes its portfolio of bank loans; and the NBFI sells the resulting securities to investors. The two most notable examples of these securities are asset-backed securities (ABS), which receive their cash flow from a portfolio of nonmortgage loans such as credit cards or automobile loans, and mortgage-backed securities (MBS), which receive their cash flow from a portfolio of mortgages.⁹ Investors value being able to buy and sell these securities so that they can adjust their own portfolios as conditions change. In both cases, the issuer of the securities uses short-term funding from the bank under a credit line, often referred to as a *warehouse line of credit*. Borrowings under the line of credit are collateralized by the mortgage or credit card receivables. The issuer uses the proceeds from the issued securities to repay its bank loans.¹⁰

Some of these NBFIs directly make loans that are subsequently transformed into securities. For example, nonbank mortgage lenders originate mortgage loans, which they sell to Fannie Mae, Freddie Mac, or Ginnie Mae to be packaged into MBS. In this case, the funding process is similar to the case of bank-originated loans. The mortgage lender funds its loan using a warehouse line of credit and the bank loans are repaid from the funds received from Fannie Mae, Freddie Mac, or Ginnie Mae.

These securities are designed to appeal to investors with different risk preferences. For example, MBS and their derivatives, such as collateralized mortgage obligations (CMOs), are designed to provide investors with a cash flow protected from prepayment risk, as when lots of households refinance their mortgages at lower rates.¹¹ In addition, securities are designed to provide tax advantages to investors. For example, real estate investment trusts (REITs) are not taxed so long as they pass through all cash flows to investors.

Directly Financing Borrowers

This category includes business development corporations, private debt funds, venture capital firms, and hedge funds, each of which manages a portfolio of high-risk investments. Investors are promised a high return on the portfolio in exchange for

committing funds for up to 10 years. Although these NBFI intermediaries do not primarily provide liquid liabilities to investors, they need ready access to liquid funds to finance their portfolios. For example, a hedge fund makes financial bets that fluctuate in value. Even a temporary decline in the value of the bet typically requires the hedge fund to transfer funds to the counterparty on the opposite side of the bet. Without access to a line of credit, the hedge fund would be forced to liquidate the position or ask its investors for additional funds.

Investing a Predictable Stream, Paying Out a Predictable Stream

This category includes insurance, financial planning, and pension funds. These NBFIs invest income so that they can regularly pay out income. Insurance companies, for example, invest their premiums so they can reimburse customers for their losses, and pensions invest their contributions so they can mail pension checks to retirees. These NBFIs require liquidity when their investment returns become unstable in times of uncertainty. The growth of these intermediaries is driven by demographics, such as aging and retirement trends, rather than changes in the economics of intermediation.

The Kinds of Credit That Banks Are Extending

In terms of money borrowed, the biggest users of credit lines—for actual funds and as a warehouse for credit—are NBFIs that transform loans (originated by banks or the NBFIs themselves) into securities. This is also the fastest-growing category of NBFIs, in both dollar terms and market share.

Credit line commitments to these NBFIs grew nearly 700 percent, from about \$89 billion in 2012 to nearly \$660 billion in 2023 (Figure 4). Utilized funds at these firms also grew substantially, from \$36 billion to \$351 billion. As of 2023, credit lines to these NBFIs represented nearly 45 percent of all funds committed to NBFIs and 53 percent of all funds utilized by NBFIs. Additionally, these NBFIs utilized their credit lines at a higher rate than most other categories of NBFIs.

Lending to other categories of NBFIs is growing rapidly, too. Among NBFIs that provide liquidity in securities markets, commitments more than tripled, from about \$85 billion in 2012 to \$270 billion in 2023. Among NBFIs that make investments but do not themselves generate liquid liabilities, credit lines nearly tripled, from \$118 billion to \$321 billion. And even among NBFIs that pay out a predictable income stream, commitments more than doubled, from \$98 billion to \$227 billion. However, NBFIs that transform loans into securities dominate the overall growth in lending to NBFIs.

Why Banks Provide Credit to NBFIs

Passage of the Dodd-Frank Act, adoption of the Basel III accords, and the ensuing regulations associated with them have substantially increased the cost for banks of making and holding certain types of loans. NBFIs don't face these costs because they are not subject to bank regulation.¹²

As NBFIs increase their market share of loans, they increas-

TABLE 1

Categories of NBFIs

Category	Includes	NAICS Codes	What They Do
Liquidity providers to securities markets.	Broker/Dealers Financial Processing + Clearinghouses Open-End Funds	522320 523110 523120 523130 523140 523210 523910 523920 523999 525910 523940	Financial transactions processing, reserve, and clearinghouse activities Investment banking and securities dealing Securities brokerage Commodity contracts dealing Commodity contracts brokerage Securities and commodities exchanges Miscellaneous intermediation Portfolio management Miscellaneous financial investment activities Open-end investment funds Portfolio management and investment advice [2022 code]
Firms that transform loans into securities.	SPVs, ABS, and CLOs Real Estate Lenders Real Estate Lessors Consumer Lenders Leasing + Non-Real Estate Lessors	525990 522292 522294 522310 5311 531110 531120 531130 531190 522210 522220 522291 532210 532283 532289 532291 532299 532310 532411 532412 532420 532490 533110	Other financial vehicles—where flagged as a special-purpose entity Real estate credit Secondary market financing Mortgage and nonmortgage loan brokers Lessors of real estate Lessors of residential buildings and dwellings Lessors of nonresidential buildings (except miniwarehouses) Lessors of miniwarehouses and storage units Lessors of other real estate property Credit card issuing Sales financing Consumer lending Consumer electronics and appliances rental Home health equipment rental All other consumer goods rental Home health equipment rental [2012 code] All other consumer goods rental [2012 code] General rental centers Commercial air, rail, and water transportation equipment rental and leasing Construction, mining, and forestry machinery and equipment rental and leasing Office machinery and equipment rental and leasing Other commercial and industrial machinery equipment rental and leasing Lessors of nonfinancial intangible assets (except copyrighted works)
Nonsecuritizers. Includes other financial vehicles.	Other Financial Vehicles	525990	Other financial vehicles—where not flagged as a special-purpose entity
Income/payout streams.	Insurance Financial Planning + Pension Funds Other Lenders	524113 524114 524126 524127 524128 524130 524210 524291 524292 524298 523930 523991 525110 525120 525190 525920 522293 522298 522390 522299	Direct life insurance carriers Direct health and medical insurance carriers Direct property and casualty insurance carriers Direct title insurance carriers Other direct insurance carriers Reinsurance carriers Insurance agencies and brokerages Claims adjusting Pharmacy benefit management and other third-party administration of insurance and pension funds [2022 code] All other insurance-related activities Investment advice Trust, fiduciary, and custody advice Pension funds Health and welfare funds Other insurance funds Trusts, estates, and agency accounts International trade financing All other nondepository credit intermediation Other activities related to credit intermediation International, secondary market, and all other credit intermediation [2022 code]

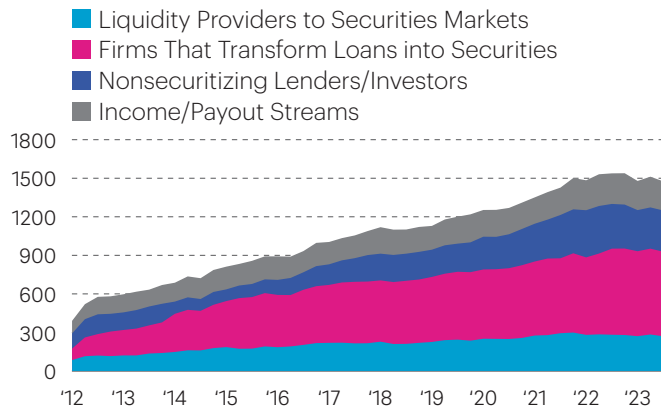
Data Sources: Categories courtesy of author and Pablo D'Erasmus of the Philadelphia Fed; 2017 NAICS codes (unless otherwise noted) sourced from the U.S. Census Bureau

Note: "NAICS Code" stands for North American Industrial Classification System Code. These 2- to 6-digit codes describe what industry a firm operates in. This article uses the codes supplied for the borrowers in the Y-14 data.

FIGURE 4

NBFIs That Transform Loans into Securities Have Seen the Biggest Increase in Committed Credit Lines

Credit lines committed, by borrower type, 2012–2023, in constant 1q2023 dollars, billions



Data Source: Federal Reserve FR Y-14Q, Schedule H.1

ingly turn to banks for their funding. Banks are specialists in providing this liquidity because they are unique in their ability to gather deposits. Deposit services and lines of credit are complementary goods—that is, both deposit services and lines of credit can be provided at lower cost if they are provided by the same firm.¹³ In order to provide borrowing firms with funds on demand (that is, to provide a line of credit), a bank needs a stockpile of liquid funds—that is, a steady amount of deposits.

For a bank to jointly provide deposits and lines of credit, deposit withdrawals must not be too highly correlated with line-of-credit borrowings. Otherwise, the bank could not honor its commitments to lend while providing borrowers with access to their savings on demand. However, deposit withdrawals are not highly correlated with line-of-credit borrowings.¹⁴ Indeed, in economically stressed conditions the two are *negatively* correlated. Whenever there is market uncertainty due to an external or internal economic shock, investors move funds out of other assets, which usually have higher returns, and into bank deposits, which they see as safer because they are insured. This inflow of deposits ensures that banks can accommodate even a large usage of lines of credit.

These deposits provide a stable and low-cost source of funding unavailable to NBFIs because deposits are the lowest-cost funds, and because core deposits—that is, transaction and savings accounts—are particularly sticky, meaning they generally don't move in response to variations in interest rates.¹⁵

Because core deposits are sticky, they allow banks to provide credit lines that insulate borrowers from economic shocks.¹⁶ For example, at the outset of the COVID-19 pandemic, many firms increased their borrowing on their credit lines to secure access to funds in the face of significant uncertainty.¹⁷ And thanks to their deposits, banks were the only financial institutions capable of meeting the demand for funds.

Conclusion

Bank lending to NBFIs has increased dramatically. Although NBFIs compete with banks in certain loan markets—most notably, home mortgage markets—NBFIs rely on bank funding to finance their own lending. The substitution of marketable securities for loans, and the transformation of portfolios of loans into marketable securities, are key trends in the growth of NBFIs and, in turn, bank lending to NBFIs. The bulk of this bank lending takes the form of lines of credit. Banks play this role because deposit services and lines of credit are complementary goods. Thus, banks provide the liquidity that makes the entire arrangement possible. Metaphorically speaking, banks provide the grease that keeps the machine going. [\[E\]](#)

FR Y-14 Data Explained

Much of the data presented in this article are from Form FR Y-14Q, which collects data used in the Dodd–Frank Act Stress Tests (DFAST). (The Dodd–Frank Act mandates these stress tests so bank regulators can find out how the largest financial institutions would react to shocks to the financial system.)

Any financial institution that had \$100 billion in total consolidated assets as of its last financial statement, or that had an average of \$100 billion in total consolidated assets over the previous four calendar quarters, is subject to the Supervisory Stress Tests. All data and analyses involved are tightly restricted and can only be presented in a highly aggregated form.¹⁸

The data presented here consist of approximately 1.8 million loans and lines of credit extended between January 1, 2012, and September 30, 2023. The data are from Schedule H.1, which collects data on exposures and potential exposures to individual corporate borrowers. The data include loans extended, used and unused loan commitments, standby letters of credit, commitments to commit, other real estate owned, and other repossessed assets for loans of \$1 million or more. This article examines only bank lending, so the data presented here do not include those last two classes because they are not loans.

Notes

1 The various types of NBFIs are defined below—see the section **The NBFIs That Banks Lend To** and Table 1.

2 See Acharya et al. (2024). The term “assets under management” is a catch-all accounting term for the assets an institution controls or is responsible for but may or may not own. Examples include fiduciary accounts, the individual securities underlying mutual funds, and loans that have been sold to a third party but the lender still services.

3 See DiSalvo (2023).

4 See Chernenko et al. (2022) and Jang (2024).

5 Unless otherwise noted, all data presented here are from FR Y-14 reports, Schedule H.1. Y-14 data provide details on many of the loans at the 30 to 40 largest banks in the United States beginning in 2012. See the sidebar, **FR Y-14 Data Explained**, for a full description of the FR Y-14 data. All dollar figures are in real terms—specifically, first quarter 2023 dollars.

6 Source: Federal Reserve FR Y-9C reports.

7 For nonfinancial corporations over the same period, 79 percent of funds committed and 57 percent of funds used were credit lines. These firms used only 29 percent of their available credit. Greenwald et al. (forthcoming) found that for all firms, including nonfinancial corporations, 78 percent of all funds committed and 53 percent of all funds utilized were credit lines from 2012 to 2019. Borrowers on average used about 22 percent of their available credit lines. Chodorow-Reich et al. (2022) found that the COVID-19 pandemic caused borrowers to substantially increase their utilization of existing credit lines.

8 See Berg et al. (2021) and Crouzet (2021).

9 Most privately issued (called private label) MBS are actually backed by commercial mortgages and are referred to as commercial mortgage-backed securities (CMBS). Residential MBS are mostly issued by Fannie Mae (the Federal National Mortgage Association) and Freddie Mac (the Federal Home Loan Mortgage Corporation), which purchase mortgages from private lenders, securitize the cash flows, and sell the securities. Fannie Mae and Freddie Mac are generally referred to as government-sponsored enterprises (GSEs). Ginnie Mae (the Government National Mortgage Association) is a government-owned corporation that does much the same thing with mortgages and loans secured by multifamily properties guaranteed by the federal government via Federal Housing Administration and Veterans Administration loans.

10 See Strahan (2008).

11 More specifically, GSEs issue “passthrough” pools, where all investors receive a proportionate share of the cash flows. These pools are sometimes res securitized into CMOs, which are tranch ed, like nonagency MBS and ABS. This is done to reallocate interest rate risk and prepayment risk.

12 Technology has also given some NBFIs an advantage in terms of cost and quality of service. For example, there is evidence that NBFIs have captured market share in the mortgage market by providing loans more quickly and conveniently than banks. See Corbae et al. (2023) and DiSalvo (2023).

13 See Kashyap et al. (2002).

14 See Gatev and Strahan (2023).

15 See Berlin and Mester (1999) and Drechsler et al. (2016). The stickiness or rate-inelasticity of deposits is to a significant extent due to their being federally insured. Only banks have deposit insurance.

16 See Berlin and Mester (1999).

17 This is shown in Figures 1 and 3, in which there is a spike in utilized credit lines in 2020.

18 The Federal Reserve Bank of Philadelphia provides a public version of this data: the Large Bank Credit Card and Mortgage Data (<https://www.philadelphiafed.org/surveys-and-data/large-bank-credit-card-and-mortgage-data>).

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Research Update

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

The views expressed in these papers are solely those of the authors and should not be interpreted as reflecting the views of the Federal Reserve Bank of Philadelphia or Federal Reserve System.

Paying Too Much? Borrower Sophistication and Overpayment in the U.S. Mortgage Market

Comparing mortgage rates that borrowers obtain to rates that lenders could offer for the same loan, we find that many homeowners significantly overpay for their mortgage, with overpayment varying across borrower types and with market interest rates. Survey data reveal that borrowers' mortgage knowledge and shopping behavior strongly correlate with the rates they secure. We also document substantial variation in how expensive and profitable lenders are, without any evidence that expensive loans are associated with a better borrower experience. Despite many lenders operating in the U.S. mortgage market, limited borrower sophistication may provide lenders with market power.

WP 24-11. Neil Bhutta, Federal Reserve Bank of Philadelphia Consumer Finance Institute; Andreas Fuster, Swiss Finance Institute at EPFL; Aurel Hizmo, Federal Reserve Board of Governors.

The Price of Housing in the United States, 1890–2006

We construct the first consistent market rent and home sales price series for American cities across the 20th century using millions of newspaper real estate listings. Our findings revise several stylized facts about U.S. housing markets. Real market rents did not fall during the 20th century for most cities. Instead, real rental price levels increased by about 20 percent from 1890 to 2006. There was also greater growth in real housing sales prices from 1965 to 1995 than is commonly understood. Using these series, we document several new facts about housing markets. The return to homeownership has varied considerably across cities and over time, but rental returns were historically much more important than capital gains in every city. We discuss the implications of our indices for the business cycle and the consumer price index. Finally, we provide evidence that housing prices increased unevenly across cities over time in response to natural building and regulatory constraints.

WP 24-12. Ronan C. Lyons, Trinity College Dublin; Allison Shertzer, Federal Reserve Bank of Philadelphia Research Department; Rowena Gray, University of California, Merced; David Agorastos, University of Pittsburgh.

Institutional Investors, Rents, and Neighborhood Change in the Single-Family Residential Market

Institutional investors that buy and rent out single-family homes have continued to increase their presence after the Great Recession. We examine their neighborhood entry choices and rent-charging behavior by leveraging tax and deed transfer records and Multiple Listings Service (MLS) data for 2010–2021. We find that investor share is higher in markets with lower housing values and higher shares of Black and noncollege residents, but higher median income. We also find that investors raise rents at 60 percent higher rates than the average increase when first acquiring the property, and higher investor share in a neighborhood is correlated with faster rent increases for noninvestor landlords. We do not find evidence that investor entry is associated with gentrification, as neighborhoods with high investor activity saw reductions in White and college-educated resident share relative to other neighborhoods in their metro area.

WP 24-13. Keyoung Lee, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit Department; David Wylie, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit Department.

Beneath the Crypto Currents: The Hidden Effect of Crypto “Whales”

Cryptocurrency markets are often characterized by market manipulation or, at the very least, by a sharp distinction between large and sophisticated investors and small retail investors. While traditional assets often see a divergence in the success of institutional traders and retail traders, we find an even more pronounced difference regarding the holders of Ethereum (ETH), the second-largest cryptocurrency by volume. We see a significant difference in how large holders of ETH behave compared with smaller holders of ETH relative to price movements and the volatility of the cryptocurrency. We find that large ETH holders tend to increase their ETH holdings prior to a price increase, while small ETH holders tend to reduce their ETH holdings prior to a price increase. In other words, ETH returns tend to move in the direction that benefits crypto “whales” while reducing returns (or increasing loss) to “minnows.” Additionally, we find that the volatility of ETH returns seems to be driven by small retail investors rather than by the crypto whales.

WP 24-14. Alan Chernoff, The College of New Jersey; Julapa Jagtiani, Federal Reserve Bank of Philadelphia.

xtevent: Estimation and Visualization in the Linear Panel Event-Study Design

Linear panel models and the “event-study plots” that often accompany them are popular tools for learning about policy effects. We introduce the Stata package xtevent, which enables the construction of event-study plots following the suggestions in Freyaldenhoven et al. (forthcoming). The package implements various procedures to estimate the underlying policy effects and allows for nonbinary policy variables and estimation adjusting for pre-event trends.

WP 24-15. Simon Freyaldenhoven, Federal Reserve Bank of Philadelphia; Christian B. Hansen, University of Chicago; Jorge Pérez Pérez, Banco de México; Jesse M. Shapiro, Harvard University and NBER.

Driving, Dropouts, and Drive-Throughs: Mobility Restrictions and Teen Human Capital

We provide evidence that graduated driver licensing (GDL) laws, originally intended to improve public safety, impact human capital accumulation. Many teens use automobiles to access both school and employment. Because school and work decisions are interrelated, the effects of automobile-specific mobility restrictions are ambiguous. Restricting teen mobility significantly increases short-run school-going and long-run educational attainment while reducing teen employment. We develop a multiple discrete choice model that rationalizes unintended consequences and reveals that school and work are weak complements. Thus, improved educational outcomes reflect decreased access to leisure activities rather than reduced labor market access.

WP 22-22R. Valerie Bostwick, Kansas State University and IZA Institute of Labor Economics; Christopher Severen, Federal Reserve Bank of Philadelphia Research Department.

The Heterogeneous Impact of Referrals on Labor Market Outcomes

We study the impact of referrals on labor market outcomes. First, we document a new set of facts exploiting data that allow us to distinguish directly between different types of referrals—those from family and friends and those from business contacts—and different types of jobs, as measured by the skill requirements of the occupation. We then develop a structural framework to interpret these facts and quantify the effects of social and business networks on employment, earnings, output, and inequality. Referrals from family and friends generate good jobs for all workers but are relied upon by those who struggle to generate offers through other channels. Referrals from business contacts are used predominantly by more productive workers who receive offers through other channels relatively frequently. An important implication is that referrals from business contacts exacerbate earnings inequality, while referrals from family and friends actually reduce inequality.

WP 21-34R. Benjamin Lester, Federal Reserve Bank of Philadelphia; David A. Rivers, University of Western Ontario; Giorgio Topa, Federal Reserve Bank of New York and IZA.

How Much Does College Cost and How Does It Relate to Student Borrowing? Tuition Growth and Borrowing Over the Past 30 Years

The rising cost of college and graduate school is often cited as a cause of rising student loan borrowing. This paper analyzes long-term trends in tuition and student financing using data from the National Postsecondary Student Aid Study. While real top-line "sticker prices" have increased 114 percent since 1993, after accounting for increases in financial aid and tax benefits net tuition prices have not changed. Over the same period, student borrowing tripled. While certain groups, like graduate students and affluent undergraduates, have faced higher prices, aggregate increases in borrowing are hard to explain by average changes in net tuition prices.

WP 24-16. Adam Looney, University of Utah and Federal Reserve Bank of Philadelphia Consumer Finance Institute Visiting Scholar.

Data in Focus

Historical Housing Prices Project

Everyone needs housing, which is why it's central to economics. But economists have long been hamstrung by a lack of housing data, especially for the decades prior to the 1970s. How much did housing prices rise in Chicago compared to the rest of the nation in the 1920s? How did the rental housing markets in Los Angeles and Phoenix evolve over the 1950s? Without easily available data, it was difficult to answer these questions.

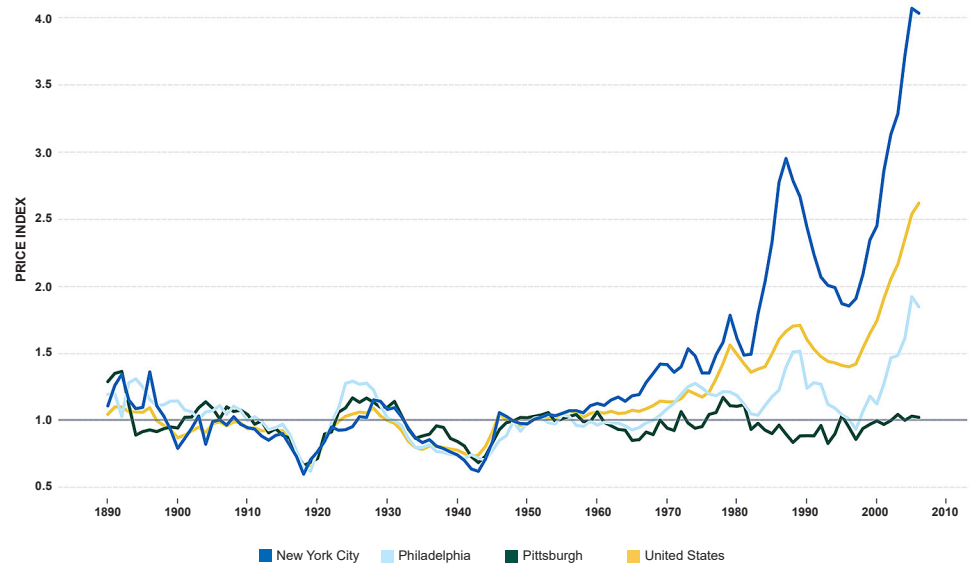
But the data was there. For decades, you could find your area's sales and rental prices in your local newspaper. Although the Internet badly disrupted this side of the media industry after 2007, it also became a reservoir for digitized versions of old newspapers. With enough time and patience, one could assemble a useful data set from all those old, digitized newspapers.

That's what Economic Advisor and Economist Allison Shertzer did with her colleagues, Ronan Lyons of Trinity College Dublin and Rowena Gray of the University of California, Merced. With funding from the National Science Foundation, the Lincoln Institute of Land Policy, and Trinity College in Dublin, they assembled what is likely the first data set comprising rents and sale prices over the 20th century in 30 U.S. cities and the entire United States. On our new Historical Housing Prices Project webpage, you can use an interactive and dynamic visualization of this data to look up changes in

FIGURE 1

Home Sale Price Indexes

Compared to 1948 (1 = 1948), 1890–2006



Source: Federal Reserve Bank of Philadelphia, Historical Housing Prices (HHP) Project

Note: Indices are adjusted for inflation.

rents and sale prices in any of these cities from 1890 to 2006, and you can compare cities to see how rents and prices varied from one to the next.

But this data is useful for more than just idle comparisons. Allison and her coauthors used this data to, among other things, calculate the total return to owning housing from 1890 to 2006. Surprisingly, they find that, until the 1970s, landlords made more money from renting their properties than owner-occupants did from capital gains. "Over the long run, the return to housing has been dominated by the rental income component. The post-1980 period, with its high and sustained capital gains, is somewhat of an anomaly from a historical perspective" (p. 4).¹ If economics is to live up to its reputation as a vigorously empirical discipline, it can thank researchers like Allison who do the painstaking work of assembling data sets like this one. 📊

Learn More

Online: <https://www.philadelphiafed.org/surveys-and-data/regional-economic-analysis/historical-housing-prices>

E-mail: allison.shertzer@phil.frb.org

1. Ronan C. Lyons, Allison Shertzer, Rowena Gray, and David Agorastos, "The Price of Housing in the United States, 1890–2006," Federal Reserve Bank of Philadelphia Working Paper 24-12 (2004), <https://doi.org/10.21799/frbp.wp.2024.12>.



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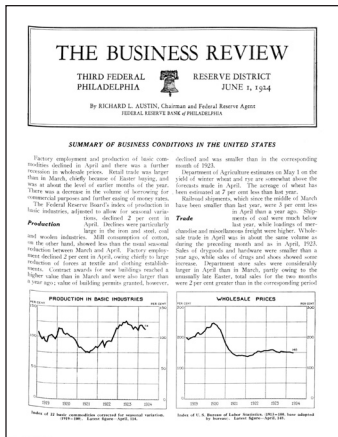
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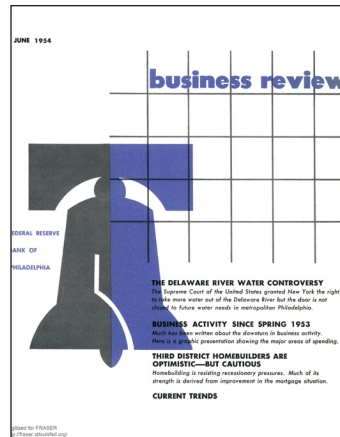
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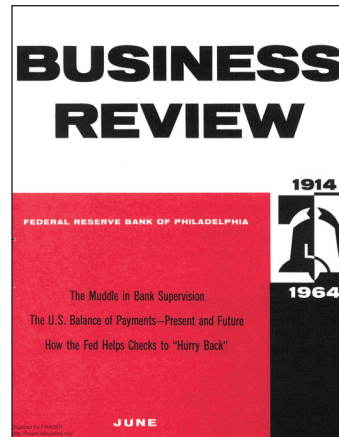
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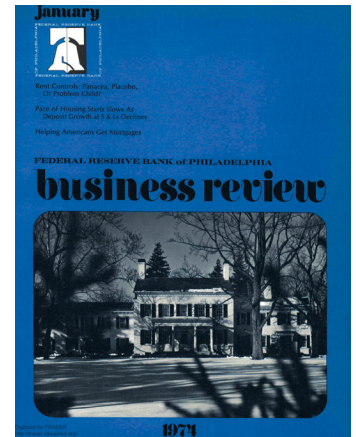
1920s



1930s



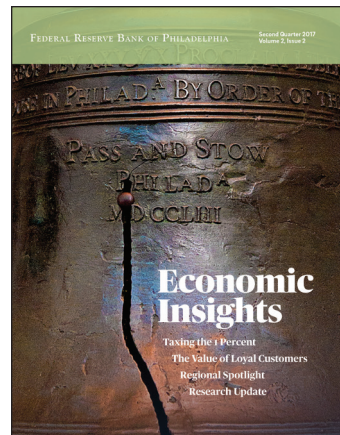
1960s



1970s



1980s



2010s



2020



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