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All Layoffs Are Not Created Equal

The Free-Banking Era: A Lesson for Today?

Banking Trends

Research Update

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# All Layoffs Are Not Created Equal

U.S. firms use temporary versus permanent layoffs more often than it might appear — a finding that may suggest a different focus for labor market policy.

BY SHIGERU FUJITA

Finding any new job takes time and resources. Finding the right job is especially difficult. For workers and employers alike, it is costly to determine whether they will strike a good match regarding pay, location, schedule, skills, work environment, and so on. These costs hamper not only individual workers and businesses but also the wider economy. The greater the amount of *search friction*, the greater the extent of *mismatch* across the job market and the less efficiently labor is used throughout the economy, raising unemployment and lowering labor productivity.

An exception to this problem occurs when a worker is rehired by the same firm for which he or she worked before. For example, when a manufacturing plant is closed for retooling, as automakers typically do for a couple weeks in July, workers are let go temporarily and are rehired when the retooling is completed. In such cases, workers and firms know in advance what to expect from each other, and thus the usual problem of mismatch, which represents the difficulty of forming a *new* employment relationship, becomes moot.

The prevailing view is that temporary layoffs are largely a thing of the past and that their use is limited to a small number of industries such as durable goods manufacturing and construction. Research has indeed suggested that their use has diminished along with manufacturing jobs since the mid-1980s.<sup>1</sup>

In this article, however, I will show that temporary layoffs and recalls actually remain surprisingly common, even outside manufacturing and construction. Their prevalence matters because, as we will see, failing to account for them masks the true extent of mismatch in the labor market. In particular, their continued pervasive use raises questions

about how much of the lingering unemployment after the Great Recession has actually been due not to that severe *cyclical* downturn but to a deeper *structural* increase in labor market mismatch. This distinction is important, because structural and cyclical unemployment call for quite different policy actions.

## PERMANENT VERSUS TEMPORARY LAYOFFS

When layoffs spike during and after a recession, the natural focus is on the total number of jobs lost.<sup>2</sup> However, for both individuals and the economy at large, the ramifications are quite different depending on whether layoffs are temporary or permanent.

As the term implies, a permanent layoff is one in which the worker has no prospect of returning to that job. A permanent layoff is generally much more costly to the worker. It takes much more time to find a new job compared with the length of a typical temporary layoff. Landing a new job may also require a change in occupation. Given that workers' human capital is often tied to their occupational tenure, switching to a different occupation tends to be accompanied by a large drop in wages.<sup>3</sup> In my *Business Review* article with Vilas Rao, we studied the experience of workers who lost their jobs during the 2001 recession and found that those who switched to a different occupation suffered much larger declines in their wages than those who managed to stay in the same occupation.

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Workers on temporary layoffs are defined — in the Census Bureau’s Current Population Survey (CPS) of households, from which the Bureau of Labor Statistics derives the official unemployment rate — as those who expect to be rehired by the same employer within six months or have been given an expected recall date. Note that normally, there are two qualifiers that define unemployment: joblessness and an active job search. However, workers on temporary layoffs are exceptions to this definition. Although these workers may not be actively searching for jobs, given that they expect to return to their previous employer, they are still counted as officially unemployed.

In my study with Giuseppe Moscarini, we find that those who are recalled earn about the same income as before, whereas those hired elsewhere typically accept a significantly lower wage than they had earned before they were laid off. This finding is consistent with the point made above that occupation switchers experience significant wage losses. The idea is that wages drop when jobless workers cannot find jobs where their skills and experience are as valued as they had been at their previous jobs and so they reluctantly accept jobs where their skills and experience are not valued as much. Moreover, a drop in pay is especially likely when a worker is hired at a new job after a long spell of unemployment.

Workers on temporary layoffs constitute a significantly smaller share of the labor force than those on permanent layoffs (Figure 1). Likewise, among the unemployed, temporarily laid-off workers make up a small slice: In 2015,

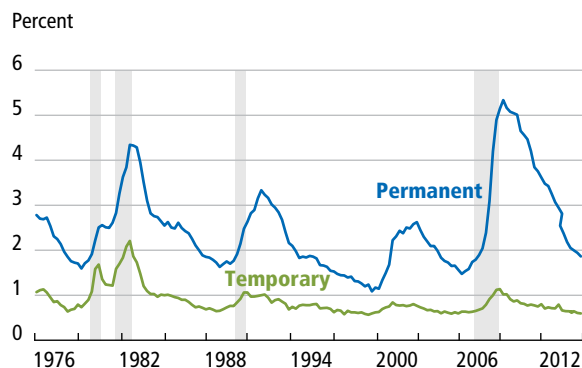
37 percent of the unemployed had been let go permanently — what the Labor Department calls permanent job losers — whereas 11 percent had been temporarily laid off. (The remaining 52 percent were counted as unemployed because they were looking for work either after quitting their jobs or after being out of the labor force altogether.)<sup>4</sup> Thus, within the group of job losers — the sum of permanent job losers and those on temporary layoffs — roughly 20 percent had been temporarily laid off. While one-fifth is a nontrivial share of total layoffs, it is relatively small. Moreover, this share had been higher, at around 30 percent, in the 1970s and 1980s. This declining share of temporary layoffs gives an impression that the role of temporary layoffs in the labor market has decreased over time.

However, note that this small share of temporary layoffs is calculated among the pool, or *stock*, of unemployed workers at a given point in time. It underestimates how frequently firms use temporary layoffs to adjust the size of their workforces. When we compute the share of temporary layoffs among the *flow* of workers moving from employment to unemployment over the course of a month, we discover that the share is much larger. The share in the flow, instead of the stock, is a more appropriate measure to gauge how frequently firms actually use temporary layoffs relative to permanent layoffs. In the 1980s, almost half of total layoffs were actually temporary layoffs (Figure 2). Moreover, while the use of temporary layoffs indeed declined over time, they still made up more than 40 percent of total layoffs in the 2000s and thus are by no means unimportant.

FIGURE 1

### Temporary Layoffs Seemingly Diminished

Stock of those on layoff as shares of labor force.

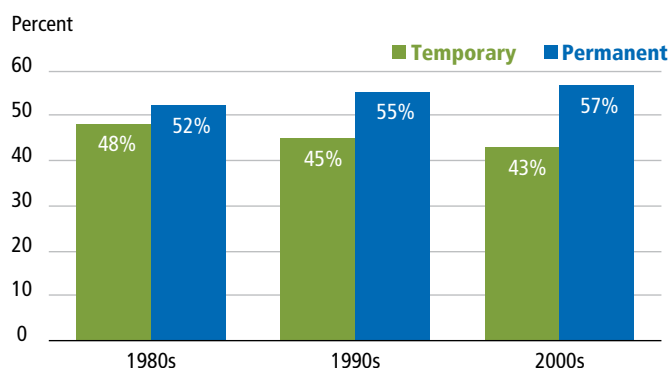


Source: Bureau of Labor Statistics via Haver Analytics.

FIGURE 2

### Temporary Layoffs Still Frequently Used

Composition of layoff flows.



Sources: Bureau of Labor Statistics Current Population Survey microdata and author’s calculations.

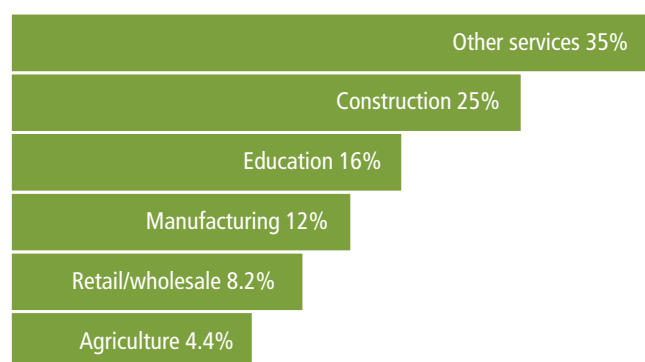
Note: Permanent job losers include those who completed temporary jobs.

The use of temporary layoffs is not only frequent but also fairly widespread among types of workplaces. When we look at the flow by industry, we see that the use of temporary layoffs is hardly limited to manufacturing and construction (Figure 3). In fact, those two sectors together make up only 37 percent of the overall flow of temporary layoffs. Sixty percent of temporary layoffs stem from various service industries.<sup>5</sup>

FIGURE 3

### Use of Temporary Layoffs Is Widespread

Temporary layoffs as shares of total layoff flows.



Sources: Bureau of Labor Statistics Current Population Survey microdata and author's calculations.

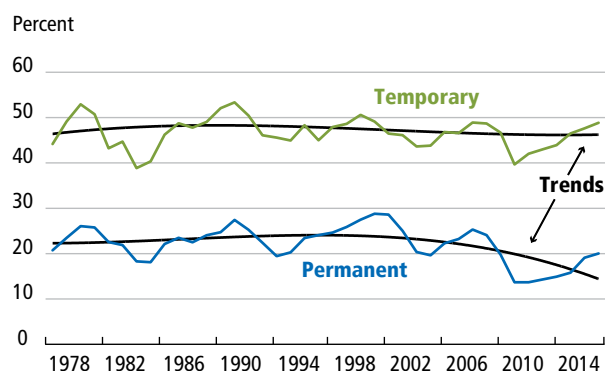
This widespread use raises a question: Why is the share of temporarily laid-off workers in the stock of unemployed workers smaller than their share of the separation flow would suggest? The reason is that those on temporary layoffs are rehired quickly and thus remain in the unemployment pool only a short time, while those who are laid off with no prospect of being recalled tend to spend much more time looking for new jobs. (See *A Tale of Two Types of Layoffs* on page 4.) So, if one looks at the composition of the stock of unemployed workers at any moment in time, the share of temporary layoffs will be smaller than what one would expect from the relatively high incidence of furloughs.

This point is verified by the big difference in the job-finding rates for the two groups of workers (Figure 4). The job-finding rate for permanent job losers is computed by dividing the flow of permanent job losers who find a job in each month by the stock of permanent job losers in the previous month. The job-finding rate for those on temporary layoffs is calculated similarly. The latter is clearly much higher than the former. The job-finding rate for those on temporary layoffs is roughly 50 percent per month. That means that, on average, half of those who lose their jobs this

FIGURE 4

### Longer Search Getting Even Longer

Job-finding rates following temporary vs. permanent layoffs.



Sources: Bureau of Labor Statistics Current Population Survey and author's calculations. Notes: Expressed as annual averages of monthly rates. Black lines represent third-order polynomial time trends. Permanent job losers include those who completed temporary jobs.

month will be reemployed next month. In contrast, permanently laid-off workers find jobs at a much slower pace. This difference in the rate of finding employment is the reason behind the small share of temporary layoffs in the stock of unemployment. Given this large difference in the job-finding rates between the two groups of unemployed workers, the stock measures do not capture the actual incidence of temporary layoffs.

### EVEN MANY 'PERMANENT' LAYOFFS END IN RECALLS

Note that job-finding rates can tell us only how fast workers are transitioning from unemployment to employment. They do not address two presumptions — one, that the job-finding rate for those on temporary layoffs measures the rate at which those workers return to the *same* employer, and two, that the job-finding rate for permanent job losers captures the rate at which they find *new* jobs. However, these presumptions are not necessarily correct. The CPS does not tell us whether the worker is returning to the same job or finding a new job.<sup>6</sup> So in order to know just how prevalent recalls are, we need to ask: Are those on temporary layoffs indeed rehired by the same firm? And how often do those who are *not* on temporary layoffs end up being rehired by the same firm?

Moscarini and I looked at this issue using an alternative to the CPS data and found that more than 85 percent of those on temporary layoffs are indeed rehired. Of course, it is not surprising that not all workers on temporary layoffs

## A Tale of Two Types of Layoffs

Imagine a mammoth skyscraper that houses every employer and every worker. In one big room hangs a sign marked Unemployment. For simplicity, imagine that the only way into the room is through a door marked Layoffs and the only way out is through a door marked Hiring.

As people enter the room, a monitor counts them on a clipboard marked Layoff Flows. He also hands them T-shirts — green if their company told them it expects to call them back to work by such-and-such a date, which the entrance monitor records as a Temporary Layoff, and blue if they have no prospect of returning to their old job, which the monitor records as a Permanent Layoff.

As people leave (the sooner the better, everyone agrees), an exit monitor counts them on a clipboard marked Hiring Flows. He notes how many weeks they've spent in the room, which he records under Duration of Unemployment, and whether they're wearing green or blue shirts.

On a set day every month, the building doorman counts the number of people inside the whole building, including those in the Unemployment room, and calls that the Labor Force (he ignores flows into and out of the Labor Force). At some point that same day, everyone who happens to be in the Unemployment room poses for a group photo. The photographer counts the number of people in the picture and calls that the Stock of Unemployment. She then compares the Stock of Unemployment with the Labor Force and calls the result the Unemployment Rate.

Also that day, the room monitors compare notes. First, the entrance monitor compares that month's Layoff Flow with the Stock of Employment and calls that number the Separation Rate. Then the exit monitor compares that month's Hiring Flow with the prior month's Stock of Unemployment and calls the result the Job-Finding Rate.

Sometimes the room gets crowded. Occasionally it stays that way for months. The entrance monitor is usually the first to predict a logjam. If the Layoff Flow increases sharply, he knows to give the exit monitor a heads-up that the Hiring Flow may soon slow down. And whenever the entrance monitor starts seeing the Layoff Flow slow, he alerts the exit monitor that the Hiring Flow might be about to rise.

Over the years, the monitors notice something else: People are generally spending more time in the room than they used to. Their records confirm that the average Duration of Unemployment is longer whether the room is packed or nearly empty.

Curious, they dig deeper. Looking through past photos of the Stock of Unemployment, the monitors see more blue than green shirts with each passing year. Temporary Layoffs must be falling as a share of overall Layoff Flows. But when the entrance monitor checks his records, he discovers he's giving out the same proportions of green and blue shirts these days as always. So Temporary Layoffs are just as common now as in the past. How could this be?

The answer comes in the Job-Finding Rate breakdown. Workers wearing green shirts always leave sooner than those wearing blue shirts, especially when the overall Hiring Flow slows down. But in recent years the share of people leaving wearing blue shirts has been shrinking. As a result, the proportion of blue shirts in the room on any given day has risen over time and the overall Duration of Unemployment has lengthened.

Now it's clear: The Stock of Unemployment snapshot has been giving an incomplete picture of Temporary Layoffs. Because they're as common as ever but the average time in Unemployment is longer, then anyone on a Permanent Layoff faces a greater chance than before of a prolonged spell in Unemployment.

are recalled. For example, a furloughed worker in the meantime might land a job with a different employer. What was more interesting was our finding that even those who did not expect to be recalled sometimes returned to the same employer. Specifically, we found that about 15 to 20 percent of those who did not expect to be recalled were actually rehired by the same employer. Overall, about 40 percent of all laid-off workers are recalled.

The pervasiveness of recalls highlights the importance of *relationship capital*, or *attachment*, in the workplace. Even when a firm finds it necessary to let some of its workers go, it has a strong incentive to rehire those same people when

business picks up, given that hiring and training new workers would be much more costly.

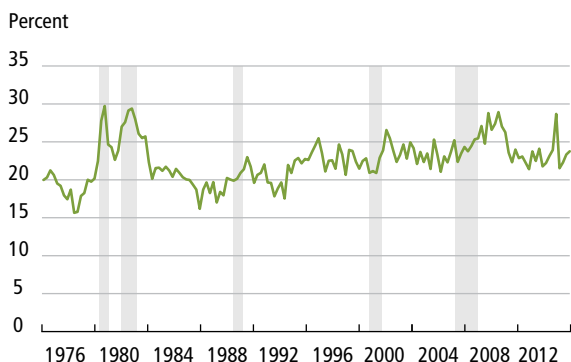
### CYCLICALITY OF TEMPORARY LAYOFFS AND REHIRING

We saw that temporary layoffs account for a significant share of the flow of workers into and out of unemployment. Does their share change much as the economy cycles in and out of recessions and expansions? We can follow what happens to the hiring flows from the pool of temporarily laid-off workers as a share of total hiring from the overall unemployment pool (Figure 5).<sup>7</sup> One can see that the share

FIGURE 5

## Recalls a Larger Share of Recession Hires

Temporarily laid-off share among all unemployed hired.



Source: Bureau of Labor Statistics Current Population Survey microdata.

tends to increase during economic downturns, indicated by the shaded areas, and thus is *countercyclical*: In a recession, recalls make up a larger share of the limited hiring that does occur. So, while the pace of hiring, whether recalls or new hires, slows down in economic downturns, new hires decline more and are slower to recover. This pattern was particularly strong during the Great Recession.

This pattern makes sense because creating a new position is more costly, and firms do so only when they are confident about the strength of the economy. By contrast, firms use temporary layoffs and recalls because of temporary, often seasonal, changes in demand for their products and services, so their use of recalls is less influenced by whether the economy is in a recession.

## IMPLICATIONS FOR STRUCTURAL UNEMPLOYMENT

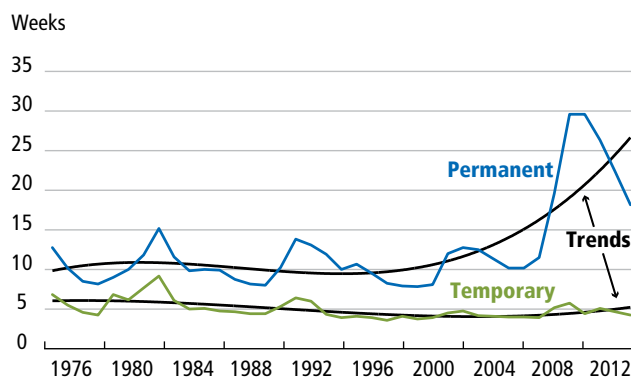
As we saw in Figure 1, the share of temporary layoffs in the unemployment pool has been falling over time. The flip side of this trend is that the share of permanent job losers in the unemployment pool has been rising. In contrast, temporary layoffs as a share of total layoff *flows* have remained surprisingly high, despite some declines in recent years (Figure 2). What do these conflicting trends for the stock and flow imply? They imply that finding a new job following a permanent layoff has become more and more difficult over time. In fact, the job-finding rate for temporary layoffs has always been very high and its trend is flat, whereas the job-finding rate for permanently laid-off workers has been on a downward trend for the past 15 years after peaking around

2000 (Figure 4). The opposite side of the same phenomenon is that the median duration of unemployment for permanent job losers has been on an upward trend over the same period, whereas that of temporarily laid-off workers has remained very low, including during the Great Recession (Figure 6). Recall that a permanent layoff is much more costly for a worker than a temporary layoff, but the divergent trends in job-finding rates imply that the relative cost of a permanent layoff has become even bigger in the past 15 years. In other words, maintaining an attachment to a job and avoiding a permanent layoff have become even more important.

FIGURE 6

## Permanent Layoffs Taking Bigger Toll

Median duration of unemployment following layoff.



Sources: Bureau of Labor Statistics Current Population Survey and author's calculations. Notes: Expressed as annual averages of monthly data. Black lines represent third-order polynomial time trends. Permanent job losers include those who completed temporary jobs.

Remember also that the post-Great Recession labor market has been characterized by a higher share of people caught in long-term unemployment.<sup>8</sup> The share of those who are unemployed more than six months reached 45 percent in 2010 and remained stubbornly high for an extended period. Although there is no doubt that the Great Recession played a prominent role in this phenomenon, the above analysis also suggests that the underlying trend had actually started much earlier, about 15 years ago. And it has been driven mostly by the longer duration of unemployment experienced by permanent job losers.

A more formal statistical analysis of the overall job-finding rate over time reached a similar conclusion. By extracting the structural (or trend) component from fluctuations in the job-finding rate without distinguishing between temporary and permanent layoffs, Murat Tasci found that



the trend component of the job-finding rate has been declining for the past 15 years or so.<sup>9</sup>

## GAUGING MISMATCH IN THE LABOR MARKET

Why is it taking longer for permanently laid-off workers to find new jobs? One possible explanation is greater labor market mismatch. For instance, skill mismatch arises when firms cannot find workers with certain skills, even when jobseekers are plentiful. Geographic mismatch arises when there is a lack of suitable workers in a firm's location, even though qualified workers are located elsewhere.<sup>10</sup> Identifying which forms of mismatch are affecting today's labor market is beyond the scope of this article, but a simple way of measuring the extent of overall mismatch is to estimate the matching function. The *matching function* captures the statistical relationship between the job-finding rate and labor market tightness, which is defined as the ratio between the number of job openings and the number of unemployed jobseekers; the fewer jobseekers per opening, the tighter the market. We expect that when this ratio is high, the labor market is tight, resulting in a higher job-finding rate. The drawback of the matching function is that it provides no clarity on whether the underlying reason that jobseekers and job openings are not matching up is largely because of geographic, skill, or some other form of mismatch. Still, it is a timely way to gauge current labor market frictions. Although the job-finding rate and market tightness are strongly positively correlated, a significant portion of the variation in the job-finding rate cannot be accounted for by labor market tightness alone. This "residual" variation can be considered a measure of mismatch.

To understand the underlying idea behind this residual measure, consider a situation in which the job-finding rate remains low, even though there are many job openings relative to the number of jobseekers in the economy. This means that workers are not finding jobs as quickly as the availability of job opportunities would suggest, thus implying the presence of mismatch.

In estimating mismatch from the matching function, it is important to recall the main theme of this article, that "all layoffs are not created equal." The idea behind the matching function is that searching for a *new* job takes time. Thus, in estimating the matching function, one needs to properly account for the prevalence of recalls. Specifically, those on temporary layoffs may not be looking for a job, expecting to return to the same job, and thus need to be excluded from the estimation of the

matching function. The hiring flow associated with recalls also needs to be excluded. In past studies, this issue has been largely ignored. In my work with Moscarini, we show that the failure to take temporary layoffs and recalls into account results in a significant bias in the estimate of mismatch in the labor market.

## MATCHING EFFICIENCY AND THE GREAT RECESSION

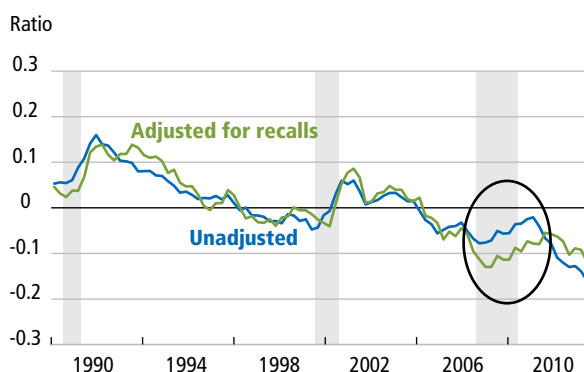
The conventional measure of mismatch and our adjusted measure that accounts for temporary layoffs and recalls tell two different stories (Figure 7).<sup>11</sup>

We can see that the two measures behaved similarly overall until around the middle of 2007, although there were some periods (for example, the mid-1990s) when the two series moved differently. However, the two series started diverging right before the Great Recession: The adjusted matching efficiency series fell sharply immediately before the Great Recession and then stayed low during the recession relative to the unadjusted measure.<sup>12</sup> In contrast, the decline in the conventional measure over the same period was much more modest, and the large drop was concentrated in the postrecession period.

Their divergence between 2007 and 2009 implies that the conventional measure underestimated the extent of mismatch during the Great Recession. The reason for the underestimate is that, during the Great Recession, new hires fell much more drastically relative to recalls, as indicated by the sharp increase in the series in Figure 5. Thus, including recalls in the hiring totals mistakenly implies that there was

FIGURE 7

### Accounting for Recalls Reveals New Story Matching efficiency with and without recalled workers.



Source: Fujita and Moscarini (2013).

Notes: Four-quarter moving average. See the paper for estimation details.



less mismatch in the labor market. This episode shows that to accurately assess mismatch, it is essential to take a proper account of recalls and temporary layoffs.

## SOME CONCLUDING THOUGHTS

An accurate assessment of mismatch in the labor market is important for sound policy decisions as well. One may argue that structural unemployment and cyclical unemployment call for different types of policy responses. For example, monetary and fiscal policies that seek to increase the demand for goods and services are a more effective tool for combating cyclical unemployment, while structural unemployment responds more effectively to policies such as training programs that promote the

reallocation of jobless workers to industries or locations where they are in higher demand.

The different experiences facing permanent job losers and those on temporary layoffs suggest that structural forces have been playing an important role in shaping unemployment for the past 15 years or so. What exactly are those structural forces? Research on job polarization provides a hint on this issue.<sup>13</sup> It points out that many middle-class jobs have evaporated due to global competition and technological advances. If these forces are indeed the underlying causes of the longer duration of unemployment being experienced by permanent job losers, traditional countercyclical policies such as monetary and fiscal stimulus measures are unlikely to be the most effective tools. ■

## NOTES

<sup>1</sup> See Erica Groshen and Simon Potter's 2003 article.

<sup>2</sup> Regarding the overall behavior of the jobless rate over the business cycle, see, for example, the 2009 article that Garey Ramey and I wrote.

<sup>3</sup> See, for example, the 2009 paper by Gueorgui Kambourov and Iourii Manovskii.

<sup>4</sup> Note that there are other types of unemployed workers, for example, those who quit their jobs and those who entered the labor force after graduating from school. Officially, the CPS gives six types: (1) job losers on temporary layoffs, (2) permanent job losers, (3) persons who completed temporary jobs, (4) job leavers, (5) reentrants to the labor force, and (6) new entrants. In this article, I lump the second and third groups together and call them permanent layoffs or permanent job losers.

<sup>5</sup> Note that the data shown in Figure 3 do not convey how frequently temporary layoffs are used *within* each industry. The relatively small share shown for manufacturing is partly due to that sector's small share of jobs among total employment. Similarly, service industries' large shares are partly due to their large share of employment. However, the point remains: Temporary layoffs are not limited to a few industries.

<sup>6</sup> The denominator of the job-finding rate is simply the number of workers who moved from unemployment to employment and does not specify whether the worker returned to the same employer or found a job at a different employer.

<sup>7</sup> The denominator of this series is all hiring flows from the unemployment pool, not just the hiring flows of those laid off. That is, it includes hiring flows of job leavers and entrants. Note also that as mentioned above, the hiring flow of those on temporary layoff does not exactly correspond to recalls and new hires, respectively. However, this series gives a good approximation that is simple to construct.

<sup>8</sup> Note that the job-finding rate and the duration of unemployment are inversely related. The larger share of people caught in long-term unemployment is reflected in the sharp decline in the job-finding rate in and after the Great Recession.

<sup>9</sup> How do we square this evidence of workers remaining unemployed longer after permanent layoffs with the fact that the unemployment rate has fallen fairly quickly in the past three years? It does not necessarily imply that the underlying structural forces have diminished. Note that the unemployment rate is affected by the pace of the flow into unemployment (layoffs are one of the flows) as well as the speed at which these workers find jobs. Our discussion above concerns the latter. A significant portion of the decline in the unemployment rate in the past three years is accounted for by a decline in the former. Although the job-finding rate also recovered over the same period, it remains low. The above discussion shows that slow job finding is concentrated among permanent job losers.

<sup>10</sup> It is natural to always have some labor market mismatch in the economy. But here we are interested in changes in the extent of mismatch over time.

<sup>11</sup> Our paper details the procedure we used to construct these series.

<sup>12</sup> Note that the adjusted matching efficiency series fell somewhat less than 10 log points between 2007 and 2009, whereas during the same period, the job-finding rate for permanently laid-off workers fell 50 log points, suggesting that roughly 20 percent of the decline in the job-finding rate during that period is accounted for by the mismatch in the labor market.

<sup>13</sup> See David Autor's 2010 research for a comprehensive review of job polarization, written for a broad audience.

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# The Free-Banking Era: A Lesson for Today?

A volatile episode in U.S. banking history might have something to teach about current regulatory challenges — though perhaps not the lesson one might expect.

BY DANIEL SANCHES

What would happen if anyone could open a bank at will? What if you or I could hang a sign in a storefront or create a website and start attracting borrowers and depositors with competitive interest rates? What if any sort of firm, big or small, could venture into the banking business in the U.S. with no official charter required? For a time in U.S. history, entry into banking in some states was thrown wide open. The so-called free-banking era from 1837 to 1864 was also a time of numerous bank failures in those states. But exactly what lesson does this colorful yet costly period hold for us today? At a time when too-big-to-fail banks remain a concern and technology seems to point toward a freewheeling future of “cloud” lending and private electronic currency, insight into how to foster stability in the financial system is especially relevant. But as I will show, the main lesson of the free-banking era may not be the one you would think.

## WHAT IS FREE BANKING?

**A brief history of free banking in the U.S.** After the charter of the Bank of the United States was allowed to expire in 1836, several states adopted free-banking laws. The widespread adoption of free-banking laws was part of a political movement led by Jacksonian Democrats to reduce the economic and political power of large banks in the financial centers. In the 1830s, Michigan, Georgia, and New York adopted free banking. By 1860, 15 other states had adopted free banking.<sup>1</sup>

Economic historians largely agree that Michigan’s early experience was a complete failure and that New York’s overall experience was a solid success. In Michigan, bank liability holders suffered large losses in 1837–1838 as a

result of unsound banking practices. In contrast, losses were negligible in New York over the whole free-banking period in that state. The available historical data for the other free-banking states show various degrees of success when it comes to the stability of the banking system.

Free banking ended in 1864 when Congress passed legislation that provided bankers with strong incentives to obtain a national charter. During the debates over the National Banking Act, proponents cited the large number of failures of banks with state charters in the free-banking states and the need to establish a uniform, nationwide currency system.

**Free banking didn’t mean no rules.** It is important to keep in mind that free banking is not the same as *laissez-faire* banking, in which there is no government interference of any kind. Free banking simply means that no charter or permission is needed from a government body to start a bank, unlike the current *chartered banking system* in the U.S. The free-banking laws specified that a state banking authority determined the general operating rules and minimum capital requirement, but no official approval was required to start a bank.<sup>2</sup>

An important rule that states imposed on free banks was the requirement to post collateral in the form of government bonds to back their *banknotes*. Unlike modern banks, whose main liabilities are deposits, the primary liability of a typical 19th century bank, regardless of whether it was located in a free-banking state,

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was its banknotes. These notes were a promise by the bank to pay a specified amount of gold or silver currency, often called *specie*, on demand. For this reason, banknotes were widely accepted as payment outside the banking sector and circulated in much the same way that a \$5 or \$20 bill circulates today. In addition, numerous broker-dealers bought and sold banknotes for speculative purposes, which helped develop a secondary market for banknotes.

Only state and federal government bonds were eligible to be posted as collateral. A typical requirement was for the free bank to deposit with the state banking authority one dollar's worth of eligible bonds for each dollar's worth of banknotes. Most of these bonds traded on the New York Stock Exchange, which helped the state authorities determine the bonds' market values. However, in a significant departure, some states allowed free banks to value the bonds securing their notes at their *par* or face value instead of their market value. As we will see, this practice proved consequential.

Requiring banks to post collateral is very similar to capital requirements today. When a bank fails today, the capital or equity owned by the bank's stockholders must be wiped out before the FDIC or any uninsured depositors lose a cent. In this sense, bank capital acts as collateral protecting the bank's claimants. Allowing free banks to value their bond collateral at par posed the same kind of risk that arises if banks today are allowed to value their assets at book value so that their capital doesn't fall whenever the market value of the banks' assets falls. In both cases, when the market value of a bank's assets falls, depositors (or the FDIC) lose some of their protection.<sup>3</sup>

**How free banks operated.** To start a free bank, the owners would typically sell subscriptions — shares of stock in the bank — and use the proceeds to buy eligible government bonds to deposit with the state authority. If the bonds were approved, the state authorities would allow the bank to start issuing banknotes.

The table illustrates how a free bank would open for business. As we have seen, the first step is to deposit the minimum capital amount determined by the state authorities. Suppose that the minimum capital amount in a given state is \$50,000 and that the owners of our fictitious free bank choose to deposit exactly this amount with the state authority in the form of gold or silver currency. On the first day, on the liability side of its balance sheet, the bank has \$50,000 in capital and, on the asset side, \$50,000 in cash — that is, specie.

Now suppose that on the second day, the owners decide to use the bank's cash balance to acquire \$30,000 worth of state government bonds. Then on the third day, the owners decide to deposit the \$30,000 worth of bonds with the state authority so that they are allowed to issue banknotes. Note that simply depositing eligible bonds with the state authority does not alter the bank's balance sheet. To have any meaningful change in the balance sheet, the bank needs to put at least some of these banknotes into circulation. How can this be accomplished?

One way a free bank can put banknotes into circulation is by making loans to households and firms. We saw that, after depositing the bonds with the state authority, the bank received \$30,000 worth of banknotes at the end of the third day. Suppose that, on the fourth day, a borrower shows up at the bank and applies for a \$25,000 mortgage. If the bank management, after evaluating the borrower's creditworthiness, decides to approve the loan, then the bank can give the borrower \$25,000 in banknotes in exchange for a mortgage. As the liability side of the table shows, the bank now has \$50,000 in capital and \$25,000 in outstanding banknotes; on the asset side, it has \$20,000 in cash, \$30,000 in government bonds, and \$25,000 in outstanding loans. Its assets now total \$75,000.

In reality, a free bank would make many loans to households and firms in the form of banknotes. As borrowers

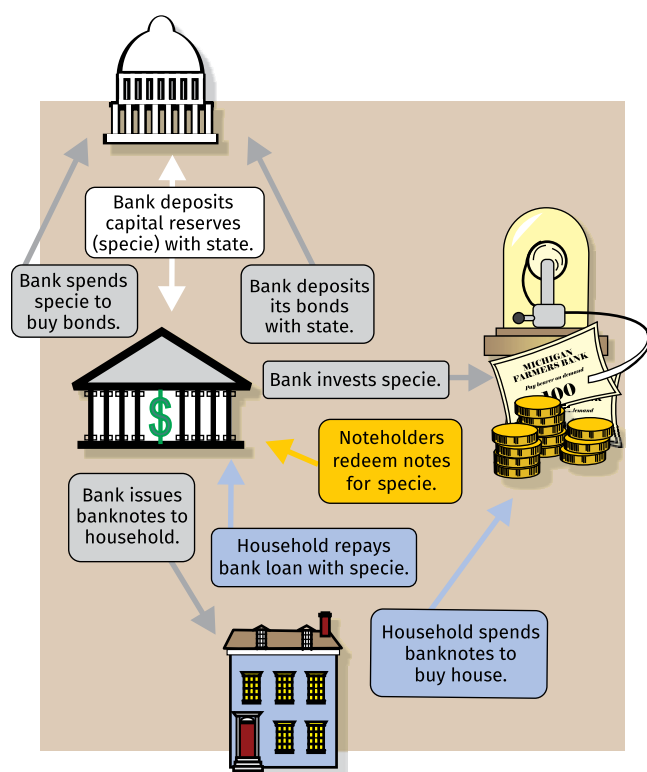
## How a Free Bank Increases Its Balance Sheet

		ASSETS		LIABILITIES	
		Composition	Total value	Composition	Total value
Day 1	Deposits capital required by state.	\$50,000 cash (specie)	\$50,000	\$50,000 gold capital	\$50,000
Day 2	Buys state bonds with some of its cash.	\$20,000 cash \$30,000 bonds	\$50,000	\$50,000 gold capital	\$50,000
Day 3	Deposits bonds with state so it can issue banknotes.	\$20,000 cash \$30,000 bonds	\$50,000	\$50,000 gold capital	\$50,000
Day 4	Circulates banknotes by making loan.	\$20,000 cash \$30,000 bonds \$25,000 mortgage	\$75,000	\$50,000 gold capital \$25,000 banknotes	\$75,000

started spending these notes, they would gain circulation in the general economy. The notes of a successful bank would be widely accepted in transactions across the largest possible geographic area. That way, it would normally take a long time between the issuance of a banknote and the demand for its redemption for gold or silver, which would allow the bank to take advantage of profitable investment opportunities for a longer period.

**Early redemption of banknotes could cause problems.** Continuing my example, suppose that the annual interest rate on the mortgage is 10 percent and that the

## Putting Banknotes into Circulation



mortgage matures in one year, when the borrower needs to pay back the interest and principal. At the end of one year, the bank receives \$27,500 from the borrower, paying off the mortgage. If the \$25,000 worth of banknotes remains in circulation until the mortgage is repaid in full, then the bank has more cash than the value of the banknotes it put into circulation to finance the mortgage. One option for the bank is to hold \$25,000 in cash reserves so it can retire outstanding banknotes when they are eventually presented for redemption. In this case, the bank's profit is \$2,500.

But now suppose that, for some reason, note-holders demand the redemption of the \$25,000 worth of banknotes

before the mortgage is repaid in full. Recall that the bank has only \$20,000 in cash reserves — not enough to make good on the banknotes. One option is to borrow \$5,000 from another bank to meet the note-holders' demand. Let us assume that the bank manages to secure an interbank loan that must be repaid on the same day the mortgage matures. On the maturity date, the bank receives \$27,500 from the borrower and is able to replenish its cash reserves of \$20,000. The bank also needs to repay the \$5,000 interbank loan plus interest. As a result, its profit is less than \$2,500 because the banknotes put into circulation to finance the mortgage were presented for redemption before the mortgage was retired and the bank had to find an alternative source of financing. This example shows that it is best for a free bank to keep its notes in circulation for as long as possible.

A critical assumption in the previous example was that the bank had to keep the promise of paying out one dollar in cash for each dollar's worth of banknotes presented for redemption. An important institutional characteristic of the free-banking era was that state authorities required banks to redeem banknotes on demand at par value. As we will see, redemption at par made free banks subject to runs for the same reason that today's chartered commercial banks are inherently fragile.

## WHY DID SO MANY FREE BANKS FAIL?

**Was it the consequence of unrestricted entry, or something else?** A free bank's reserves of gold and silver were typically small compared with the par value of its notes in circulation. Because their gold and silver reserves paid no interest, banks sought to keep only enough cash in their vaults to meet that day's expected redemptions. But because free banks were required to pay the holders of their banknotes gold or silver on demand at par value, they were subject to runs if for some reason an unusually large number of note-holders decided to redeem their notes at the same time.

Normally, one would expect only a small fraction of outstanding banknotes to return to the issuing bank for redemption within a few days. But should the public suddenly suspect that the bank is in financial difficulty because, for instance, it made too many bad loans, an unusually large number of note-holders might simultaneously choose to redeem their notes, causing a *bank run*. Sometimes, bank runs start not necessarily because people believe that the bank is insolvent but simply because each note-holder believes that other note-holders will choose to redeem their notes today and everyone fears being last in line and coming away

empty-handed. Alternatively, a run may be triggered when depositors become worried about the underlying quality of their banks' assets.<sup>4</sup>

Going back to my previous example, assume now that the bank cannot find a financial institution willing to lend it \$5,000 and is unable to retire, at par value, all the banknotes presented for redemption. In this case, we say that the bank is *illiquid*, which simply means that the value of its outstanding banknotes exceeds the value of its cash reserves. The requirement of redemption at par value automatically converted any illiquid bank that did not manage to secure a loan or quickly sell other assets for cash into an insolvent bank.

In reality, if a free bank did not have enough cash reserves to retire outstanding notes presented for redemption, the state banking authority would intervene to *unwind* the bank. That is, the government bonds deposited as collateral would be sold and the proceeds would be used to pay note-holders. In this process, note-holders would receive the lesser of the proceeds or the notes' par value.

It is important to keep in mind that note-holders had no reason to immediately redeem notes that they acquired in transactions as long as they viewed the bank as healthy. After all, banknotes were useful payment instruments and could be readily exchanged for gold or silver in relatively liquid secondary markets. Because it was possible to quickly determine the market value of most banknotes, they could be easily used as a means of payment in transactions in lieu of specie.<sup>5</sup> In addition, the existence of a liquid secondary market for banknotes limited note-holders' incentive to redeem notes.

Furthermore, the continuous market pricing of a bank's notes tends to impose some discipline on a bank's risk-taking. If a bank starts making too many risky loans, investors will believe that such a bank is more likely to become insolvent and so they will discount its banknotes in the secondary market to reflect this revised perception, increasing the bank's cost of external finance. Knowing that any perception of unsound banking practices will be reflected in the market price of banknotes, a free bank has an incentive to limit risk-taking.

These arguments provide good reasons why banknotes would tend not to be immediately redeemed. Because banknotes are useful payment instruments and the continuous market pricing of a bank's notes imposes discipline on risk-taking, one would expect a stable banking system under free-banking laws. But the historical data tell us a different story. So what explains the unusual number of bank failures in the free-banking states?

### **Was wildcat banking the main cause of bank failures?**

One hypothesis posed by Hugh Rockoff is that free banking made it possible for bankers to engage in a particularly egregious form of risk-taking known as *wildcat banking*. In a typical scheme, banks were created to deliberately fail. Because some states allowed free banks to value the bonds securing their banknotes at par value even when these bonds were trading at a discount, a wildcat banker could deposit depreciated bonds with the state authority and issue banknotes at the higher face value. Once the notes began circulating, the wildcat banker would close the bank's doors and leave town as soon as possible, pocketing the short-term profit.

Let me explain how wildcat banking was profitable under par valuation of bonds. Suppose that the market value of an eligible state bond is less than its face value, which can occur if investors believe that the state might default. For instance, assume that an eligible state bond with a face value of \$100 is traded on the secondary market at \$90. In this case, a wildcat bank can raise \$90 from stockholders to acquire state bonds at the market price. Because these bonds are valued at their face value when deposited as reserves with the state banking authority, the wildcat bank is allowed to issue \$100 worth of banknotes. Then, the bank can lend out \$100 in banknotes, thereby acquiring \$100 worth of assets and sell those assets for cash, absconding with the proceeds. Note-holders will eventually show up at the bank to redeem those notes, especially after hearing the news that the bank owners have disappeared. But the state authority will be able to sell the state bonds for only \$90 and therefore will be able to pay only 90 cents on the dollar for each note, resulting in a 10 percent loss for the note-holders, while the owners of the bank make off with a profit.

The argument that wildcat banking was the main cause of bank failures was based on two observations. First, free banks that failed had typically been in existence for less than a year. Second, failures among free banks were more common in states that permitted par valuation.

**Free entry might increase incentives for risk-taking and fraud.** As we will see, later study identified a different root cause for the widespread failures. Yet, the notion that free entry into the banking business would encourage risk-taking remains a widely — though not universally — held view among economists. The *franchise value* hypothesis holds that the threat of losing a stream of profits (the bank's franchise value) in the event of failure puts a strong damper on risk-taking.

According to this view, a concentrated banking system — that is, a system with a small number of large banks — tends to be more stable than a competitive one. Proponents



of the franchise value hypothesis argue that, holding other factors constant, excessive competition in the banking system tends to reduce the present value of a bank's stream of profits. If several lenders are willing to offer the same kind of loan to a creditworthy firm or household, it is very likely that the borrower will get a lower interest rate on the loan.

Increased competition due to free entry made wildcat banking more attractive in states that allowed par valuation of bonds when the market prices of bonds were significantly below the par value. As we have seen, when the bond's market price is below the par value, a banker can make a substantial short-run profit by engaging in wildcat banking. By doing so, the banker gives up the stream of future profits. But if the present value of this stream of future profits is small as a consequence of increased competition, it is more likely that the banker will prefer the short-run profit associated with wildcat banking. Thus, intense competition leads to a smaller present value of a free bank's stream of profits, making wildcat banking a more attractive choice.

If there are few banks in the banking system because of strict rules to obtain a bank charter, then banks benefit from reduced competition by being able to charge higher interest rates to borrowers and pay lower interest rates to bank liability holders. In this case, the present value of the stream of profits is relatively large, so there is no reason for a bank to take on excessive risk. On the contrary, banks will tend to be more conservative to avoid insolvency and preserve the franchise value stemming from restricted entry.<sup>6</sup>

Under a concentrated banking system, wildcat banking would have been less attractive in states that allowed par valuation of bonds. Because the present value of the stream of future profits is larger under a concentrated banking system, wildcat banking pays off only if there is a very large difference between a bond's par and market values.

**Falling asset prices led to bank failures.** In their 1984 article, Arthur Rolnick and Warren Weber provide evidence that the market value of the state bonds used as collateral for banknotes underwent prolonged periods of decline, reflecting, among other things, the risk of default by the states that issued them. Their hypothesis was that it was not wildcat banking but declines in bond prices that led to bank failures. They argued that if wildcat banking had been responsible for the large number of free bank failures, then these failures would have occurred almost exclusively when state bonds were selling below par and in those states in which banks were permitted to issue banknotes based on the book value of their bonds (the two conditions that make wildcat banking profitable).

Among four free-banking states — Indiana, New York, Minnesota, and Wisconsin — only in Minnesota were the failures consistent with the wildcat hypothesis. If the failures instead had been due to falling bond prices, then the greatest number would have occurred during periods of falling bond prices, while few, if any, would have occurred when bond prices were stable or rising. Among the four states, 79 percent of the failures were consistent with the falling bond price hypothesis.

Importantly, the study demonstrated that the failures in the free-banking states that were consistent with the falling bond price hypothesis were *inconsistent* with the wildcat hypothesis. In the case of Indiana, for example, Rolnick and Weber show that bank failures were concentrated in January 1855. From 1852 to August 1854, state bond prices remained very close to par, making wildcat banking unprofitable during this period. In 1854, Indiana bond prices fell about 26 percent between August and December. This substantial fall in bond prices within a short period, combined with the fact that most failures occurred shortly after bond prices fell in January 1855, certainly confirms the falling bond price hypothesis. What makes this episode inconsistent with the wildcat hypothesis is the fact that all the banks that failed in January 1855 had been established between 1852 and 1854, a period in which wildcat banking was not profitable. Similar evidence is provided for New York and Wisconsin free banks.

Because risky bonds backed banknotes that were callable on demand at par value, a typical free bank found it difficult to maintain the convertibility of its banknotes at par value, which was, according to Rolnick and Weber, the main cause of bank failures. Free banks failed because of substantial declines during tough economic times in the market value of banks' portfolios. The collateral restriction imposed by the state banking authorities artificially increased free banks' exposure to the risk of default by states.

## CONCLUSIONS

This episode in American history suggests that the problems free banks faced were not very different from those encountered by banks in other periods and that the regulatory issues were also not so different. What can we learn from the free-banking episode?

First of all, it is important to be clear about what we *haven't* learned. A close analysis of the free-banking era does not support the view that egregious risk-taking and fraud were the primary cause of bank failures. Thus, this historical episode does not support the contention that freer entry

necessarily leads to instability. The main cause of the large number of bank failures under free banking was collateral restrictions that left banks at the mercy of the ups and downs of state finances and the resulting volatility of state bond values. If state bonds had truly been riskless, free banks' note-holders would have been fully protected and the costs of free bank failures would have been much lower. But like risky sovereign bonds under the Basel II capital rules, risky state bonds were treated by banking regulators as if they were essentially riskless. One lesson for regulators today is that tying bank safety to the presumed risklessness of a particular

asset class is a risky business.

Since the 2007–2008 financial crisis, regulators worldwide have rethought their capital requirements for banks and the collateral requirements for a wide range of transactions in the shadow banking systems — most of which are carried out through banks. Regulators now generally believe that more capital for banks — for example, higher leverage requirements — and a higher degree of collateralization for many trading activities are the best guarantee of stability.<sup>7</sup> ■

## NOTES

<sup>1</sup> Charles Calomiris and Stephen Haber provide an interesting analysis of the political forces that shaped the U.S. banking system in the 19th century.

<sup>2</sup> It is important to emphasize that many influential economic historians view the U.S. free-banking experience as fundamentally different from the free-banking systems that developed in other parts of the English-speaking world. See, for instance, Lawrence White's book and his articles with George Selgin.

<sup>3</sup> Under current regulatory accounting rules, some assets are carried at their book values and some assets are carried at their market values. See Ronel Elul's article "The Promise and Challenges of Bank Capital Reform," which discusses basing capital regulation on book values.

<sup>4</sup> In their 1991 article, Charles Calomiris and Gary Gorton conclude that most bank runs historically were caused by bad economic news that led depositors to worry about losses in their banks' portfolios. For more on the economics of bank runs, see my 2014 *Business Review* article, "Shadow Banking and the Crisis of 2007–08."

<sup>5</sup> Trade publications known as banknote reporters specialized in reporting the market value of banknotes in regional markets.

<sup>6</sup> The presence of market power in the banking industry implies that market interest rates will be higher and the number of loans will be lower than if banking operated in a perfectly competitive environment, resulting in a trade-off between efficiency and safety.

<sup>7</sup> Leverage requirements are capital requirements that do not vary with the risks of a bank's assets. High leverage requirements are one way to address the inherent difficulties of assessing the risks of banks' assets. Also see Michael Slonkosky's account of the new regulations governing derivatives transactions. An overriding goal of all these regulations is to impose higher collateral requirements on the parties to these transactions.

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# BANKING TRENDS

## The Growing Role of CRE Lending

BY JAMES DISALVO AND RYAN JOHNSTON

Commercial real estate (CRE) has grown rapidly as a share of total U.S. economic activity and is the largest lending category for banks.<sup>1</sup> The growth of CRE loans has been particularly dramatic for small and medium-sized banks. CRE is also the riskiest part of bank portfolios, accounting for a disproportionate share of loan charge-offs and bank failures.<sup>2</sup> In the years leading up to the financial crisis, CRE lending had climbed steadily, and in the ensuing recession CRE defaults contributed to a greater than normal number of bank resolutions and closures. As we will explore, although an array of entities besides banks originate and hold CRE loans, banks remain especially exposed to their risks and rewards. In this first in a series of occasional articles on CRE lending, we provide an initial lay of the land: Who are the players in the market? What are the various types of CRE loans? Why is CRE lending increasingly attractive? What makes it risky? And why is it again on the upswing?

### WHAT DISTINGUISHES A CRE LOAN?

A CRE loan is used to build or purchase any income-producing property. Although “commercial” real estate implies private property, the same types of CRE loans are used for privately owned, government, and nonprofit projects. Thus, it can be said that CRE loans finance anything from shopping centers to skyscrapers, assisted living facilities to five-star resorts, even the local pizza parlor. CRE loans are also used to finance the construction of single-family home developments, though not the purchase of individual homes. A developer of a residential tract gets a type of CRE loan — a construction loan — to build the houses, but then the individual homebuyers get residential mortgages to purchase each finished dwelling.

The overriding importance of location is a key factor

that distinguishes CRE lending from other types of bank lending. The importance of location means that much of the competition is local, in both the supply of and the demand for CRE loans. While there are also a number of national developers and lenders, there are plenty of niche opportunities for developers and lenders to exploit their knowledge of local market conditions and their local connections. An example of this local niche industry is a developer in Philadelphia, AMC Delancey, which specializes in walk-up apartment buildings, many of which have retail storefronts on the ground floor. Nearly all of this developer’s properties are in and around Center City Philadelphia. And as we will see, small banks have remained competitive in CRE, even while they have lost market share to large banks in consumer lending and commercial and industrial lending.

Because of this local aspect, CRE is particularly subject to local and regional economic shocks. For example, a shopping mall near Williamsport, PA, can’t offset a decrease in sales due to a drop in employment in the local fracking industry by attracting shoppers from California. Similarly, real estate is immobile. Unlike a machine, the shopping mall can’t be moved to suburban Philadelphia. There is a flip side to this risk, however. Immobility also increases the value of a CRE asset as collateral. A business in financial distress might secretly sell a machine or receivables it had put up as collateral for bank loan. By contrast, land posted as collateral for a CRE loan can’t be sold out from under the development should the developer experience financial distress.

Another major risk factor, unrelated to location, is time. Developing property is not quick under the best of circum-

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stances, and delays can arise from factors out of the developer's control. During all this time between when a loan is made and when a property is ready to be leased or sold — that is, when it starts producing revenue — economic conditions can deteriorate, making a once-promising project not viable. As we will discuss, this risk is especially present in construction projects.

There are three types of CRE loans, depending on the project in question and what the collateral is used for: construction and land development (CLD) loans, commercial mortgages, and multifamily loans. Bank lending across the three categories is volatile. Although construction lending currently represents less than 20 percent of bank CRE lending, it has risen to as high as 40 percent of the CRE portfolio and has averaged 25 percent since the 1980s.<sup>3</sup> Commercial mortgages represent the largest share of CRE lending, currently just under 70 percent and averaging 64 percent since the 1980s. Multifamily housing loans have traditionally been the smallest share of banks' CRE portfolios, approximately 10 percent, but have risen to nearly 20 percent since the Great Recession, for reasons we discuss below.

**Construction and land development loans.** CLD loans cover the cost of acquiring the land, preparing the site, and constructing the buildings. This is the riskiest type of CRE lending. To illustrate how a CLD loan is structured to manage risk, say that a (fictional) developer, Philly Flats Incorporated, wants to buy an old factory and convert it to a street-level brewpub, Beer for Lunch, with apartments above. Building Bank — a specialist in construction lending — provides a three-year line of credit to Philly Flats, the typical maturity for CLD loans.<sup>4</sup> This line of credit carries a balloon payment due when the project is completed. Building Bank's loan provides 80 percent of the financing necessary for the project; this is on the high end of the usual range. The rest of the debt financing comes from a *mezzanine* lender whose loan is unsecured and therefore carries a higher interest rate. The typical ratio of the loan's dollar amount to the market value of the property, or loan-to-value ratio (LTV), for a CLD loan varies depending on the type of project being financed, but the range is about 75 to 85 percent.<sup>5</sup>

The loan from Building Bank is provided in three stages, with each disbursement subject to Building Bank's assessment of whether the project is on time and within budget. This staging of the loan is designed to mitigate Building Bank's risk. Stage one is for buying the land. Once the property is acquired, Philly Flats needs approval from a number of government and quasi-governmental agencies such as the

zoning board, planning commission, and historical review board. A problem with any one of these entities can derail the project before it even starts. They can also significantly increase the development costs by requiring unforeseen features such as additional parking or green space, and they can decrease the projected revenue by reducing the number of units. For example, Philly Flats may have planned on eight floors of apartments but the zoning board allowed only four. Real-life examples of approval risk are commonplace. In Philadelphia, for example, City Council members can exercise their councilmanic prerogative to hold up projects of concern in their districts.<sup>6</sup>

The second stage finances the preparation of the site. Even if the project is in a developed area and much of the basic infrastructure is already in place, the site may require substantial improvements such as plumbing connections, additional sewer access, or additional electrical connections. Projects in undeveloped areas may require roads and sewers to be built and power and water lines to be run. Each of these improvements requires dealing with a separate local utility and increases scheduling risks.

Assuming the project makes it past the first two stages, the third stage is the actual construction. Anybody who has renovated his or her home is familiar with at least some of the risks associated with this stage. Bad weather can delay outdoor work, supplies sometimes aren't delivered on time, and subcontractors don't always show up when they're needed, all of which can result in lost time and increased costs. In a larger, more complicated commercial project, these risks are magnified. For example, a strike by just one of a number of construction unions working on the site can shut down the entire project for weeks or more.

Ultimately, once the project is completed, Building Bank expects Philly Flats to obtain a commercial mortgage from another lender to make the balloon payment and pay off the CLD loan. Until then, though, bad things can and do happen. Imagine that five other brewpubs open within a couple of miles of Beer for Lunch, and now no other bank is willing to take on the financing. This leaves Building Bank in the position of providing the commercial mortgage itself — remember that it specializes in CLD loans and has no expertise in commercial mortgages. It may also have a number of loans in the same area as Beer for Lunch, so another loan there will increase its portfolio risk and invite greater regulatory scrutiny.

**Commercial mortgages.** These loans are used to finance the purchase or partial ownership of existing buildings. A commercial mortgage can be secured by several

types of properties: retail, office, industrial, hotel, as well as mixed-use properties.

To illustrate how a commercial mortgage works and the risks entailed in making one, let's take the fictional example of Hometown Bank lending to a local real estate company to purchase a local mall; let's call it Big Box Mall. The loan is for 10 years, the typical length of a commercial mortgage. At the time the loan is made, the local economy is excellent, the mall is 100 percent occupied, and it has two big department stores as anchors. Hometown believes that it has been prudent and designed the loan to mitigate its risk. The LTV ratio is the industry norm, about 75 percent.<sup>7</sup> Thus, given the state of the local economy, the amount of available space leased, and the terms of the loan, prospects for the loan being paid in full appear good.

But let's say that after three years, the parent companies of the two anchor stores agree to merge, and as part of the deal one of the mall's anchor stores is closed. Partly because the regional economy has cooled, no replacement anchor can be found. The loss of an anchor has ripple effects as mall traffic shrinks and several other tenants close their stores. The mall's owners renegotiate the rents of some other tenants to keep them there and lower the rent on the vacant spaces to attract new tenants. The resulting loss of revenue leaves the mall's owners unable to make their payment to Hometown. Thus, even though the loan appeared prudent at the time it was made — with a strong borrower, a good property, and conservative loan terms — Hometown is faced with a choice: either renegotiate the loan with a lower revenue stream or push the borrower into default.

**Multifamily loans.** These loans are used to purchase residential buildings that house five or more families such as apartment or condominium complexes. Except for the type of properties securing them, multifamily loans are very similar to commercial mortgages. The main contractual difference is that the maturity of the loan may be longer. Although the typical maturity for a multifamily loan is 10 years, it can go as high as 40 years.<sup>8</sup>

## HOW AND WHY HAS CRE LENDING GROWN?

CRE had risen strongly during the real estate boom of the 1990s and 2000s, especially in the years leading up to the Great Recession. Following the deleveraging that took place during the downturn and the subsequent recovery, it has turned around in the past few years. Since the trough in CRE lending in mid-2012, CRE loans outstanding have increased to \$3.6 trillion and now represent 19.8 percent of

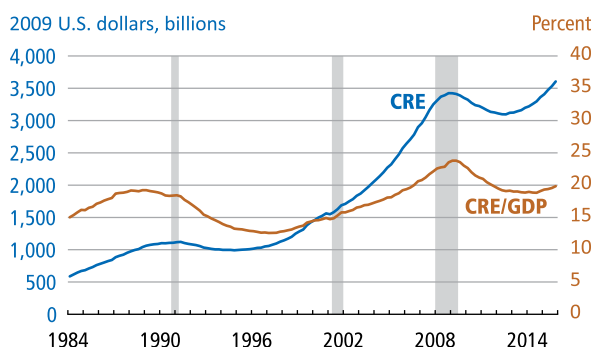
national GDP (Figure 1). Indeed, bank regulators have expressed concern about the rapid growth of CRE lending.<sup>9</sup>

During the past 20 years, a growing source of funding for CRE has been commercial mortgage-backed securities (CMBS). (See *The Securitization of CRE Loans*.) Through securitization, loans are pooled into CMBS and sold to special purpose vehicles.<sup>10</sup> This permits a wide range of investors to hold CRE loans as part of a diversified portfolio. Commercial mortgage pools now account for around 17 percent of total commercial mortgage loans outstanding, rising from nearly zero in the 1980s.

During the recent boom in CRE lending, multifamily loans have been a source of strength, nearly doubling for banks since the trough (Figure 2). This strong growth is partly an aftereffect of the Great Recession on the single-

FIGURE 1

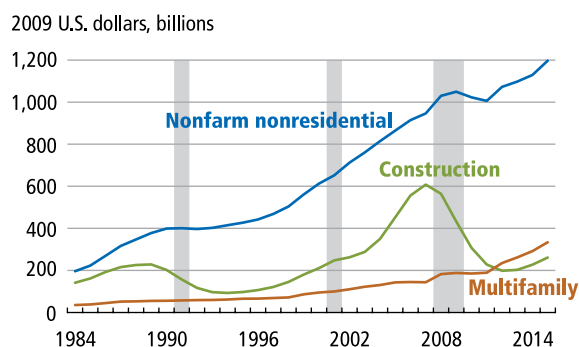
### A Big Part of the Economy Total CRE loans outstanding.



Sources: Federal Reserve Flow of Funds, Federal Reserve Economic Data (FRED), and National Bureau of Economic Research.  
Note: Loans outstanding are from the Flow of Funds data, which include commercial and multifamily CRE but not CLD loans.

FIGURE 2

### CRE Growth Has Been Strong Recently CRE loan categories.

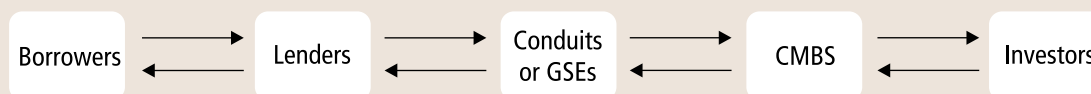


Source: Federal Financial Institutions Examination Council Call Reports.  
Note: Data are from the Federal Financial Institutions Examination Council Call Reports, which include commercial mortgages and multifamily and CLD loans.

## The Securitization of CRE Loans

Like any loan, a commercial mortgage generates an income stream for the lender. Thus, a third party is often interested in buying the mortgage to lay claim to the borrower's promised stream of payments. After originating the loan, the lender can sell it to a private firm known as a mortgage conduit, or, if the commercial mortgage is for a multifamily property, the lender can sell it to one of the government-sponsored enterprises (GSEs), Fannie Mae or Freddie Mac.

These buyers then pool the loan with other loans bearing similar risk profiles and maturities to create a commercial mortgage-backed security (CMBS). In turn, the conduit or GSE sells claims to investors on the cash flows from this pool. These claims are designed to appeal to different types of investors. The original lender often retains the servicing rights — that is, it collects the mortgage payments and is paid a fee for doing so.



By taking loans off their books through securitization, banks transfer to the holders of the CMBS not just the expected returns but also the risks inherent in any loan. These risks can include credit risk — the risk that the loan won't be repaid — and interest rate risk — the risk that changes in interest rates will result in a decrease in the value of an asset or an increase in the lender's cost of funds. In addition, by removing the loans from their books, lenders, at least if they're depository institutions, have additional funds to generate more loans, and they eliminate the need to hold capital against the loans.

Large banks securitize about one-fifth of the loans that they originate and account for 84 percent of the loans securitized by banks. But not all loans are easy to securitize. Smaller loans, complex loans, nonstandard loans, and floating-rate loans are typically held in portfolio. These loans can be more complicated for investors to evaluate, and there is some evidence that they are more difficult to renegotiate when trouble arises.

family housing market — tighter lending conditions for receiving a mortgage; households' weakened financial position, especially among young and lower-income families; a slowing in the rate of household formation<sup>11</sup> — and partly a demographic trend toward living in urban areas that have an abundance of amenities within walking distance.<sup>12</sup> Since the second quarter of 2012, multifamily loans outstanding have increased 26.7 percent, while loans on one- to four-family properties have decreased almost 1 percent.<sup>13</sup> Homeownership rates decreased from an all-time high of 69.2 percent in 2004 to 63.8 percent in 2015. At the same time, apartment vacancy rates decreased from 10 percent to 7 percent, and the median rent increased from \$620 to \$850 per month.<sup>14</sup> Despite the recent growth in multifamily lending, there is a lot of uncertainty among economists, real estate developers, and bankers as to how much of this shift from single-family homes to apartments is temporary and how much is longer term.

### WHO BORROWS? WHO LENDS?

The borrowing side of the CRE loan market is highly fragmented, with borrowers differentiated by geography and industry. On the lending side, while banks remain the dominant lenders, the composition of bank lenders and non-bank lenders has changed over time. Over the past 20 years, banks overall have consistently held about half of all CRE loans. However, for midsize and small banks, the share of CRE loans in their portfolios has roughly doubled. Besides banks, insurers remain a significant player in the CRE lending market, but as we will discuss, their participation has diminished. Another significant supplier of CRE funding is the government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac, which have a strictly multifamily CRE niche. Looking at lenders and borrowers in more detail, some interesting trends emerge.



**Who borrows?** The largest class of borrowers taking out CRE loans consists of noncorporate nonfinancial firms (Figure 3). This class makes up 75 percent of the borrowers in the CRE market and includes everything from large real estate developers to the corner green grocer.

Real estate developers come in a wide range of sizes and degrees of specialization. They can run part of the commercial project, such as buying raw land, or they can oversee and manage the entire development process of designing, preparing, and building the property. For instance, Berger-Epstein Associates of Allentown, PA, owns and develops retail properties mostly in eastern Pennsylvania. Another example of a smaller real estate developer is New Vistas Corporation of Mount Laurel, NJ, which develops office, retail, and multifamily properties in New Jersey.

Large real estate developers can own commercial property all over the world. For example, one of the largest developers of office properties in the country is Hines, a real estate investment, development, and management firm based in Houston, TX. It has properties in 182 cities and 20 countries worldwide with \$89.1 billion of assets under management.

Real estate investment trusts (REITs) represent a steadily increasing share of CRE borrowings and represent around 6.6 percent of total CRE loans borrowed.<sup>15</sup> These companies own and manage income-producing real estate and are required to pay at least 90 percent of their earnings to their investors as a condition for avoiding taxes at the corporate level. REITs own and manage all types of commercial real estate and tend to specialize in a certain type, such as hotels, apartments, storage units, offices, malls, or student housing.<sup>16</sup>

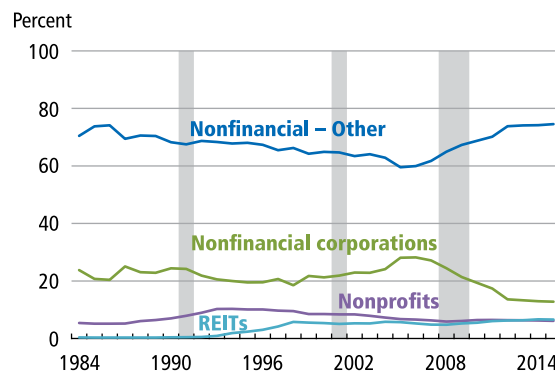
Other borrowers of CRE loans include nonfinancial corporate businesses and nonprofit organizations such as universities, churches, and hospitals. They comprise about 12 percent and 6 percent of CRE borrowings, respectively.

**Who lends?** Banks are the most significant suppliers of funds for CRE, holding over half of total CRE loans in their own portfolios, a share that has been roughly constant for the past 20 years (Figure 4). By the fourth quarter of 2015, banks' holdings of CRE loans totaled \$1.98 trillion. This total actually understates the role that banks play because they also originate loans that are securitized. Taking loans that are securitized into account, depository institutions originate about two-thirds of total CRE loans.<sup>17</sup>

Large banks held about \$775 billion in CRE loans in the fourth quarter of 2015 (Figure 5) — accounting for around 40 percent of all CRE loans held by banks — but they account for the preponderance of CRE loans securi-

FIGURE 3

## Noncorporate Nonfinancials Predominate Major borrowers of CRE loans.

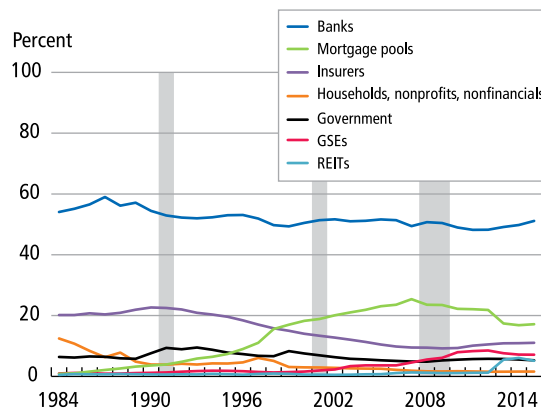


Source: Federal Reserve Flow of Funds.

Note: Shares are from the Flow of Funds, which include commercial and multifamily CRE but not CLD loans.

FIGURE 4

## Banks Still Supply Most CRE Funding Major holders of CRE loans.



Source: Federal Financial Institutions Examination Council Call Reports.

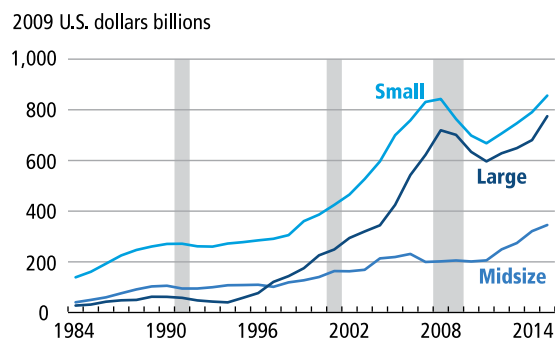
Note: Loans outstanding are from the Flow of Funds data, which include commercial and multifamily CRE but not CLD loans.

tized by banks. (See *The Securitization of CRE Loans*.) The growth in CRE lending by small and medium-sized banks has been particularly striking (Figure 5).<sup>18</sup> CRE loans account for around 21 percent of all banks' loan portfolios, but in the past 20 years they have risen from 15 percent to 30 percent of midsize bank portfolios and from around 20 percent to over 40 percent of small bank loan portfolios (Figure 6). Small banks made approximately \$855 billion in CRE loans while medium-sized banks made approximately \$345 billion in CRE loans in the fourth quarter of 2015.<sup>19</sup> Small and medium-sized banks retain most of what they originate in their portfolios. The loans made by Hometown and Building Bank are good illustrations of the types of loans

FIGURE 5

## Small Banks Do More CRE Lending

Total CRE loans by banks.

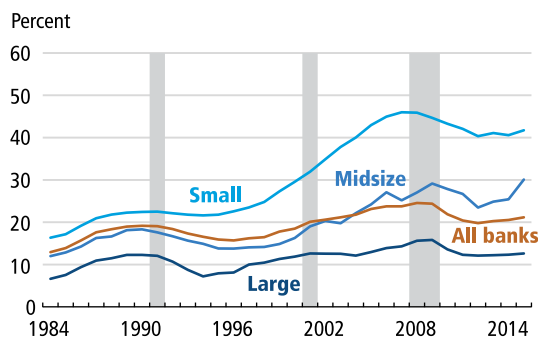


Source: Federal Financial Institutions Examination Council Call Reports.  
Note: Data are from the Federal Financial Institutions Examination Council Call Reports, which include commercial mortgages and multifamily and CLD loans.

FIGURE 6

## Small Banks Rely Heavily on CRE

CRE loans as percent of total bank loans.



Source: Federal Reserve Flow of Funds.  
Note: Data are from the Federal Financial Institutions Examination Council Call Reports, which include commercial mortgages and multifamily and CLD loans.

made by small and medium-sized banks.

Insurance companies hold a significant share — about 11 percent — of total CRE loans (Figure 4). This share has declined from over 20 percent in the 1980s, more or less mirroring the insurance industry's declining share of lending across the board. In CRE markets, insurance companies' declining share has coincided with the growth of mortgage pools, which currently make up about 17 percent of CRE loans outstanding.

The GSEs also directly hold over 7 percent of CRE loans outstanding, holdings that are composed exclusively of multifamily loans. As mentioned earlier, the GSEs are also major players in the CMBS market. Together they held over \$204 billion in CRE loan pools at the end of 2015.

The remaining 15 percent of CRE loans are held by a range of investors including REITs, private investors, mutual funds, and pension funds, each specializing in particular locations, types of loans, and risk profiles.

## LOOKING AHEAD

Although financing for commercial development comes from an array of sources, banks and savings and loans remain by far the largest originators and holders of CRE assets. Smaller banks' detailed knowledge of local real estate markets may now be a more important source of comparative advantage in financing CRE than for other types of loans.<sup>20</sup> Given banks' critical role in the economy, it is fruitful to explore the extent of their investment in this profitable and volatile industry. In future articles, we will explore in more detail which lending markets are local and which are regional or national, who competes with whom, and the differences between securitized and portfolio loans. ■

## NOTES

<sup>1</sup> We refer to depository institutions, a category that includes both commercial banks and savings and loans, as banks. For the purposes of this article, *small banks* are defined as those with assets of less than \$10 billion, *medium-sized banks* are those with assets totaling \$10 billion to \$50 billion, and *large banks'* assets total \$50 billion or more.

<sup>2</sup> For instance, for 2009, banks had net charge-offs on CRE loans of over \$8 billion, representing over 30 percent of all net charge-offs, according to Federal Financial Institutions Examination Council Call Reports. For smaller banks, net charge-offs on CRE loans represented over 50 percent.

<sup>3</sup> Our data begin in 1984, the first year for which we have reliable Federal Financial Institutions Examination Council Call Report data.

<sup>4</sup> See David Ling and Wayne Archer's book for a fuller discussion of CRE contract terms. In addition to having three-year terms, typical CLD loans are interest-only, with variable interest rates.

<sup>5</sup> By regulation, land development loans cannot have an LTV greater than 75 percent, LTVs for construction loans on commercial and multifamily properties cannot exceed 80 percent, and those on residential properties cannot exceed 85 percent.

<sup>6</sup> See the 2015 Pew Report and the May 7, 2016, article by Jacob Adelman about an apartment tower and retail mall proposed for Broad Street and Washington Avenue.

<sup>7</sup> Typical terms on a commercial mortgage are (1) a 10-year term, although terms can go as low as five and as high as 30 years, (2) an LTV ratio of 65 percent, though it can go as high as 75 percent, and (3) a debt coverage ratio (the ratio of monthly net operating income to monthly debt payment) of 1.45 to 1.5 percent, and this can go as low as 1.25 percent. Also, a bank can require the borrower to set aside a reserve per square foot. The industry norm is 15 to 20 cents per square foot. However, these reserves can go as high as 50 cents per square foot depending on the type of property.

<sup>8</sup> Typical terms on a multifamily loan are (1) a 10-year term, though they can go as low as five and as high as 40, (2) an LTV ratio of 75 percent, though ratios can go as high as 85 percent, (3) a debt coverage ratio (the ratio of monthly net operating income to monthly debt payment) of 1.35 percent, which can go as low as 1.2 percent, and (4) a reserve of about \$300 per unit, though this can go as low as \$250 and as high as \$750. The size of the reserve is based on the number of units rather than square feet.

<sup>9</sup> The Federal Deposit Insurance Corporation, the Federal Reserve, and the Office of the Comptroller of the Currency put out a joint “Statement on Prudent Risk Management for Commercial Real Estate Lending” on December 18, 2015.

<sup>10</sup> See Ronel Elul’s *Business Review* article for a more detailed description of how securitization works.

<sup>11</sup> See Burcu Eyigunor’s *Economic Insights* article and Paul Flora’s *Regional Spotlight* for discussions of these issues.

<sup>12</sup> See Jackelyn Hwang and Jeffrey Lin’s working paper for evidence of this trend.

<sup>13</sup> Federal Reserve Flow of Funds data.

<sup>14</sup> Census Bureau Housing Vacancies and Homeownership data.

<sup>15</sup> Mortgage loans account for only about 20 percent of REITs’ total liabilities, which also include bonds, repurchase agreements, and bank lines of credit. Thus, REITs play a larger role than the 6.6 percent might suggest.

<sup>16</sup> There are two basic types of REITS, equity REITs and mortgage REITs. Equity REITs generate income through the collection of rent on, and from sale of, the properties they own. Equity REITs make up around 93 percent of all REITs in the U.S. Mortgage REITs — which have declined in importance over time — invest in mortgages or mortgage securities and generate their income through fees and interest.

<sup>17</sup> While we have precise numbers for the relative shares of CRE held by different types of firms, we can provide only estimates of the shares of CRE loans originated by different types of firms.

<sup>18</sup> Total loans increased from 60 to 65 percent of total assets at small banks and from 61 to 67 percent at midsize banks over this period. Total loans as a percent of assets at small and midsize banks have increased modestly. See our Third Quarter 2015 *Banking Trends* article.

<sup>19</sup> Note that each bank size category’s share of total CRE loans reflects not only the share of assets committed to CRE by banks in that category, but also that category’s share of total bank assets. So, the large number of small banks, each heavily committed to CRE, leads to a large total, even though the assets of each bank are small. Large banks account for a large share of total assets, but CRE represents a small portion of each large bank’s portfolio. Middle-size banks’ loan portfolios look more like those of large banks than small banks.

<sup>20</sup> See our Third Quarter 2015 *Banking Trends* article for evidence of this.

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# RESEARCH UPDATE

These working papers present preliminary findings of research conducted by Philadelphia Fed economists, analysts, and visiting scholars. Visit our website for more **abstracts** and **papers**.

## **CONGESTION, AGGLOMERATION, AND THE STRUCTURE OF CITIES**

Congestion costs in urban areas are significant and clearly represent a negative externality. Nonetheless, economists also recognize the production advantages of urban density in the form of positive agglomeration externalities. The long-run equilibrium outcomes in economies with multiple correlated but offsetting externalities have yet to be fully explored in the literature. Therefore, the author has developed a spatial equilibrium model of urban structure that includes both congestion costs and agglomeration externalities. The author then estimates the structural parameters of the model using a computational algorithm to match the spatial distribution of employment, population, land use, land rents, and commute times in the data. Policy simulations based on the estimates suggest that congestion pricing may have ambiguous consequences for economic welfare.

*Working Paper 16–13. Jeffrey C. Brinkman, Federal Reserve Bank of Philadelphia Research Department.*

*Supersedes Working Paper 13–25.*

## **CREDIT RATINGS, PRIVATE INFORMATION, AND BANK MONITORING ABILITY**

In this paper, the authors use credit rating data from two large Swedish banks to elicit evidence on banks' loan monitoring ability. For these banks, the authors' tests reveal that banks' internal credit ratings indeed include valuable private information from monitoring, as theory suggests. Banks' private information increases with the size of loans.

*Working Paper 16–14. Leonard I. Nakamura, Federal Reserve Bank of Philadelphia Research Department; Kasper Roszbach, Sveriges Riksbank, University of Groningen.*

## **IS BIGGER NECESSARILY BETTER IN COMMUNITY BANKING?**

The authors investigate the relative performance of publicly traded community banks (those with assets less than \$10 billion) versus larger banks (those with assets

between \$10 billion and \$50 billion). A body of research has shown that community banks have potential advantages in relationship lending compared with large banks, although newer research suggests that these advantages may be shrinking. In addition, the burdens placed on community banks by the regulatory reforms mandated by the Dodd-Frank Wall Street Reform and Consumer Protection Act and the need to increase investment in technology, both of which have fixed-cost components, may have disproportionately raised community banks' costs. The authors find that, on average, large banks financially outperform community banks as a group and are more efficient at credit-risk assessment and monitoring. But within the community bank segment, larger community banks outperform smaller community banks. The authors' findings, taken as a whole, suggest that there are incentives for small banks to grow larger to exploit scale economies and to achieve other scale-related benefits in terms of credit-risk monitoring. In addition, the authors find that small business lending is an important factor in the better performance of large community banks compared with small community banks. Thus, concern that small business lending would be adversely affected if small community banks find it beneficial to increase their scale is not supported by their results.

*Working Paper 16–15. Joseph P. Hughes, Rutgers University; Julapa Jagtiani, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit; Loretta J. Mester, Federal Reserve Bank of Cleveland, University of Pennsylvania Wharton School.*

## **THE POLITICAL ECONOMY OF UNDERFUNDED MUNICIPAL PENSION PLANS**

The authors analyze the determinants of underfunding of local governments' pension funds using a politico-economic overlapping generations model. They show that a binding downpayment constraint in the housing market dampens capitalization of future taxes into current land prices. Thus, a local government's pension funding policy



matters for land prices and the utility of young households. Underfunding arises in equilibrium if the pension funding policy is set by the old generation. Young households instead favor a policy of full funding. Empirical results based on cross-city comparisons in the magnitude of unfunded liabilities are consistent with the predictions of the model.

*Working Paper 16–16. Jeffrey C. Brinkman, Federal Reserve Bank of Philadelphia Research Department; Daniele Coen-Pirani, University of Pittsburgh; Holger Sieg, University of Pennsylvania, National Bureau of Economic Research.*

### **DO GDP FORECASTS RESPOND EFFICIENTLY TO CHANGES IN INTEREST RATES?**

The authors examine and extend the results of Ball and Croushore (2003) and Rudebusch and Williams (2009), who show that the output forecasts in the Survey of Professional Forecasters (SPF) are inefficient. Ball and Croushore show that the SPF output forecasts are inefficient with respect to changes in monetary policy, as measured by changes in real interest rates, while Rudebusch and Williams show that the forecasts are inefficient with respect to the yield spread. In this paper, the authors investigate the robustness of both claims of inefficiency, using real-time data and exploring the impact of alternative sample periods on the results.

*Working Paper 16–17. Dean Croushore, University of Richmond, Federal Reserve Bank of Philadelphia Research Department Visiting Scholar; Katherine Marsten, Federal Reserve Board of Governors.*

### **AN EXPERIMENT ON INFORMATION USE IN COLLEGE STUDENT LOAN DECISIONS**

There is ample concern that college students are making ill-informed student loan decisions with potentially negative consequences to themselves and the broader economy. The author reports the results of a randomized field experiment in which college students are provided salient information about their borrowing choices. The setting is a large flagship public university in the Midwest, and the sample includes all nongraduating students who previously borrowed student loan money (~10,000 students). Half of the students received individually tailored letters with simplified information about future monthly payments, cumulative borrowing, and the typical borrowing of peers; the other half is the control group that received no additional information. There are at most modest effects of the letter overall, which suggests that information alone is not sufficient to drive systematically different borrowing choices among students.

However, some key student subgroups changed their borrowing in response to the letter, particularly those with low GPAs. There is also evidence of intended (more contact with financial aid professionals) and unintended (lower Pell Grant receipt) consequences of the letter.

*Working Paper 16–18. Rajeev Darolia, University of Missouri, Federal Reserve Bank of Philadelphia Payment Cards Center Visiting Scholar.*

### **THE CAUSES OF HOUSEHOLD BANKRUPTCY: THE INTERACTION OF INCOME SHOCKS AND BALANCE SHEETS**

The authors examine how household balance sheets and income statements interact to affect bankruptcy decisions following an exogenous income shock. For identification, they exploit government payments in one but not any other Canadian province that varied exogenously based on family size. Receiving a larger income shock from the payment (relative to household income) reduces the count of bankruptcies, with fewer remaining filers having higher net balance sheet benefits of bankruptcy (unsecured debt discharged minus liquidated assets forgone). Receiving an income shock thus causes households that would receive lower net balance sheet benefits under bankruptcy law to select out of bankruptcy.

*Working Paper 16–19. Vyacheslav Mikhed, Federal Reserve Bank of Philadelphia Payment Cards Center; Barry Scholnick, University of Alberta School of Business.*

*Supersedes Working Paper 14–17.*

### **WHAT HAVE WE LEARNED ABOUT THE CAUSES OF RECENT GENTRIFICATION?**

Since 2000, strengthening gentrification in an expanding section of cities and neighborhoods has renewed interest from policymakers, researchers, and the public in the causes of gentrification. The identification of causal factors can help inform analyses of welfare, policy responses, and forecasts of future neighborhood change. The authors highlight some features of recent gentrification that popular understandings often do not emphasize, and they review progress on identifying some causal factors. However, a complete account of the relative contribution of many factors is still elusive. The authors suggest questions and opportunities for future research.

*Working Paper 16–20. Jackelyn Hwang, Princeton University; Jeffrey Lin, Federal Reserve Bank of Philadelphia Research Department.*

## **ASSESSING BANKRUPTCY REFORM IN A MODEL WITH TEMPTATION AND EQUILIBRIUM DEFAULT**

A life-cycle model with equilibrium default in which agents with and without temptation coexist is constructed to evaluate the 2005 bankruptcy law reform. The calibrated model indicates that the 2005 reform reduces bankruptcies, as seen in the data, and improves welfare, as lower default premia allows better consumption smoothing. A counterfactual reform of changing income garnishment rate is also investigated. Interesting contrasting welfare effects between two types of agents emerge. Agents with temptation prefer a lower garnishment rate as tighter borrowing constraint prevents them from over-borrowing, while those without prefer better consumption smoothing enabled by a higher garnishment rate.

*Working Paper 16–21. Makoto Nakajima, Federal Reserve Bank of Philadelphia Research Department.*

## **THE CONSEQUENCES OF GENTRIFICATION: A FOCUS ON RESIDENTS' FINANCIAL HEALTH IN PHILADELPHIA**

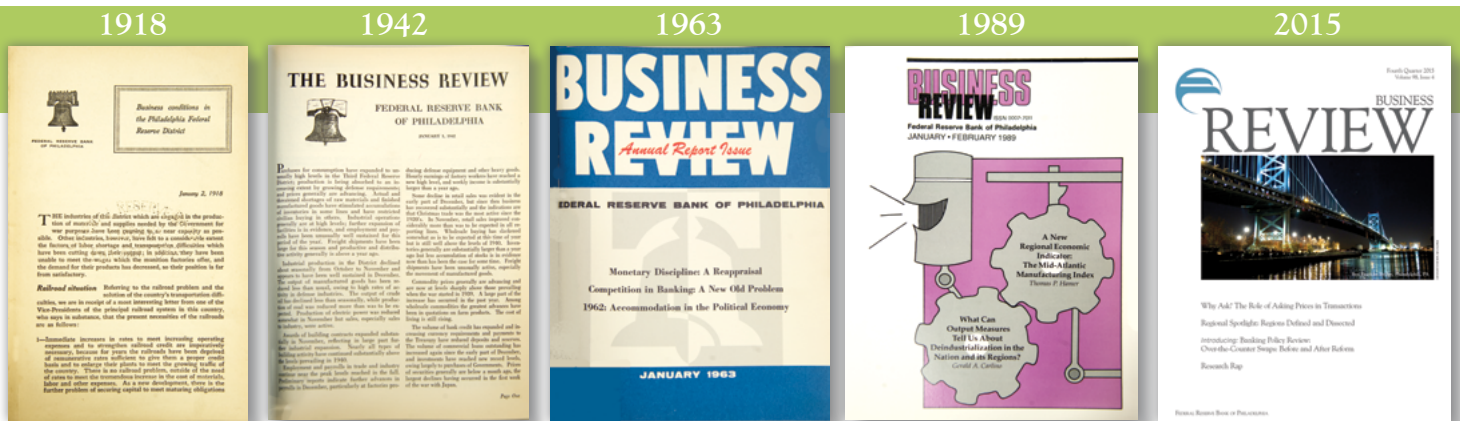
There has been considerable debate and controversy about the effects of gentrification on neighborhoods and the people residing in them. This paper draws on a unique large-scale consumer credit database to examine the relationship between gentrification and the credit scores of residents in the City of Philadelphia from 2002 to 2014. The authors find that gentrification is positively associated with changes in residents' credit scores on average for those who stay, and this relationship is stronger for residents in neighborhoods in the more advanced stages of gentrification. Gentrification is also positively associated with credit score changes for less advantaged residents (low credit score, older, or longer term residents, and those without mortgages) if they do not move, though the magnitude of this positive association is smaller than for their more advantaged counterparts. Nonetheless, moving from gentrifying neighborhoods is negatively associated with credit score changes for less advantaged residents, residents who move to lower-income neighborhoods, and residents who move to any other neighborhoods within the city (instead of outside the city) relative to those who stay. The results demonstrate how the association between gentrification and residents' financial health is uneven, especially for less advantaged residents.

*Working Paper 16–22. Lei Ding, Federal Reserve Bank of Philadelphia Community Development Studies & Education Department; Jackelyn Hwang, Princeton University.*

## **DISTRIBUTIONAL INCENTIVES IN AN EQUILIBRIUM MODEL OF DOMESTIC SOVEREIGN DEFAULT**

Europe's debt crisis resembles historical episodes of outright default on domestic public debt about which little research exists. This paper proposes a theory of domestic sovereign default based on distributional incentives affecting the welfare of risk-averse debt and non-debtholders. A utilitarian government cannot sustain debt if default is costless. If default is costly, debt with default risk is sustainable, and debt falls as the concentration of debt ownership rises. A government favoring bondholders can also sustain debt, with debt rising as ownership becomes more concentrated. These results are robust to adding foreign investors, redistributive taxes, or a second asset.

*Working Paper 16–23. Pablo D'Erasmus, Federal Reserve Bank of Philadelphia Research Department; Enrique G. Mendoza, University of Pennsylvania, National Bureau of Economic Research, Penn Institute for Economic Research.*



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