Banking Trends

The Rise in Loan-to-Deposit Ratios: Is 80 the New 60?

Liquidity ratios at small banks have climbed in recent decades. Why has this happened? Should regulators be concerned?

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A traditional signal that a bank may not have enough liquid assets to cover a sudden loss of funding has increased dramatically at small banks in recent decades. Small banks' median ratio of the value of their loans outstanding to the value of their deposits has risen from around 60 percent in the second half of the 1980s to around 80 percent today. Meanwhile, the same measure of liquidity has increased about 5 percentage points at large banks. How can we explain this big increase in loan-to-deposit (LTD) ratios among small banks? Are higher LTD ratios here to stay? Do they pose risks to the safety and soundness of our small banks?

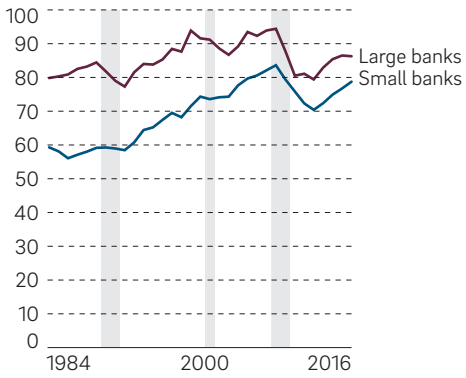
High LTD Ratios Linked to Risk

LTD ratios—defined as total loans divided by total deposits—were basically flat from 1984, when our data begin, until the early 1990s. In the 1990s, the median LTD ratios at both small and large banks increased steadily until the financial crisis hit in 2008, then fell precipitously until 2012 and have been rising again for the past five years.[1] Over the past three decades, the median LTD ratio at small banks increased from about 60 percent to close to 80 percent at the end of 2016 (Figure 1).[2] While LTDs were already higher at large banks, they increased less rapidly, from around 80 percent to over 85 percent during the same period.[3] During the buildup to the real estate bubble in the early and mid-2000s, LTDs at large banks approached 95 percent as their residential real estate lending expanded rapidly. This increase was quickly reversed during the crisis, and LTDs at large banks have settled at roughly their level in 2000. In this article, we focus not on the precrisis rise in LTDs but on the longer-term trend.

FIGURE 1

Big Rise in Small Banks' LTD Ratios

Median loan-to-deposit ratios, 1984–2016, percent.



Source: Federal Financial Institutions Examination Council Call Reports.

Traditionally, analysts and regulators have monitored banks' LTD ratios as a measure of liquidity. For a bank, liquidity essentially comes down to whether it can sell enough assets in exchange for cash without having to accept large discounts in their value. A bank needs a basic amount of liquid assets—such as Treasury securities or cash itself—just to fund its day-to-day operations. But what we are concerned with here is how well prepared a bank would be in the event of unexpectedly large withdrawals of its short-term funds.

Why does comparing a bank's loan exposure against its deposits tell us something about the sufficiency of its liquidity? Deposits (especially, as we will see, insured deposits) are a stable source of funding for banks. A bank that finds itself with too few deposits to fund loans must rely more heavily on nondeposit sources of funds, whose availability and price are much more sensitive to changing economic or financial conditions. For example, rising market interest rates or concerns about a bank's financial health can prompt investors to swiftly move their nondeposit funds to another bank or outside the banking system altogether. If these nondeposit funding sources become too expensive or dry up, the bank could be forced to not renew its borrowers' loans, curtail its overall lending, or even sell off loans or other illiquid assets on its books at a substantial discount, possibly weakening the bank's health or even threatening its viability as a going concern.

That is what happened, on a wide scale, following the failure of the investment banking giant Lehman Brothers in 2008, which triggered a more general crisis in

money markets. Money market conditions grew very tight for all financial institutions that relied on wholesale funds—that is, funds from more costly sources such as institutional investors as opposed to deposits from a bank's own customers.[4] Banks that had relied on nondeposit funding sources found that they were unable to secure funds on the open market except at very high prices and only for a very short term—overnight. In response, these banks had no choice but to stop making new loans and to not renew existing loan commitments as they matured. Some banks even reneged on their commitments to lend and closed down credit card accounts. The government responded by increasing the size of individual accounts covered by federal deposit insurance from up to $100,000 to up to $250,000.[5]

More generally, LTD ratios are related to banks' financial health. Examiners have found that banks with LTD ratios that are well above the average are more likely to be risky along many dimensions besides liquidity risk. For example, banks with large amounts of loans relative to their deposits may be more aggressive lenders. That is, they may have lower lending standards than more conservatively run institutions. They also may invest in riskier securities to generate higher returns to offset the higher cost of borrowing nondeposit funds.

This does not mean that every bank with a high LTD ratio is very risky or that the high LTD ratio is the underlying source of the risks. However, banks with high LTD ratios often score high along other measures of risk monitored by examiners. In the Third District, examiners have found that banks flagged by their early warning model of potential problems often have very high LTD ratios.

Small Banks Have Grown Bigger

The larger the bank, generally the higher the LTD ratio, all else being equal. One reason is that large banks typically have an advantage over small banks in making some kinds of loans. For example, making a very large loan is not feasible for a small bank, even if the funding of the loan is divided up among many banks.[6] And while a large bank has the resources to maintain a department dedicated to making small business loans, the converse is not true: A small bank would find it unduly risky to expose a major share of its loan portfolio to a single large borrower. Its smaller asset size means it needs to spread out its risk of nonrepayment by making numerous smaller loans, each for no more than it could readily absorb in the event of the borrower's default.

Another reason large banks do not rely as heavily on their deposits is that they have greater access to funds from multiple nondeposit sources such as federal funds and commercial paper.[7] Access to these markets requires maintaining a continual presence as a borrower, which requires having the personnel on staff with the specialized knowledge needed to procure and manage these funding sources. Assembling such a department would be excessively costly for many small banks. Also, small banks may have some advantages in securing funds from small depositors and small businesses because of customer relationships.

However, small banks have been getting larger since the 1990s, mainly because regulatory restrictions that had prevented them from achieving an efficient size have been removed.[8] In 1984, the median size of a small bank was about $67.3 million in total assets (adjusted for inflation). By 2016, the median small bank had reached $200.5 million in assets.[9]

This growth raises the question: How much of the increase in LTD ratios is attributable to the increase in banks' size distribution alone? To estimate the effect of increased bank size on LTD ratios, we split small banks into three size categories.[10] The average LTD ratio for 2016 is the sum of the average LTD ratios within each size category weighted by the percentage of banks within that category. Our thought experiment is to ask: If the LTD ratio within each size category had not changed between 1984 and 2016—and the only change was the fraction of banks in each size class—how much would average LTD ratios have changed? This question gives us a measure of how much of the change in LTD ratios can be explained by a change in the size distribution of small banks alone. Then we perform a different thought experiment. We assume that the fraction of banks in each size category did not change from 1984 to 2016, but we allow the average LTD ratio within each size class to change from its 1984 level to its 2016 level. This provides a rough estimate of how much of the change in average LTD ratios might be explained by other factors that affect all banks within a particular size group.[11]

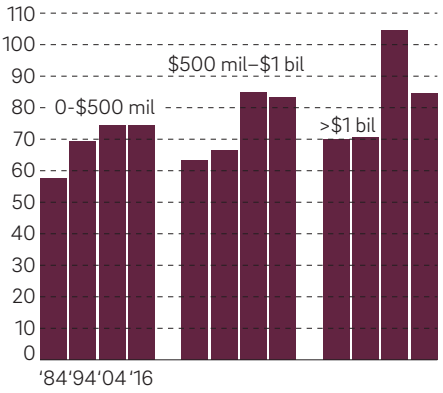
Using this methodology, we calculate that about 8 percent of the change in LTD ratios between 1984 and 2016 was accounted for solely by the change in the distribution of banks among size categories, and about 85 percent of the change in LTD ratios was due to other factors. Indeed, we can see in Figure 2 that average LTD ratios within each size class have increased since 1984.

*See **Factors Explaining Changes in LTD Ratios.***

FIGURE 2

LTDs Have Risen in Each Size Range Since 1984

Average loan-to-deposit ratios in select years from 1984–2016 for small banks, grouped by size, percent.



Source: Federal Financial Institutions Examination Council Call Reports.

Keeping in mind that our exercise provides only a rough estimate of the magnitudes, we conclude that the increase in bank size can explain some of the increase in LTD ratios during this period—perhaps 10 percent. Because this estimated impact of bank size is so modest, we think it is safe to assume that most of the LTD increase has been due to other causes.[12] Looking at the market and regulatory environment for banking during these years, two factors stand out.

Factors Explaining Changes in LTD Ratios

For our thought experiment, we used the following identity:

$$\sum_i \Delta(F_i * (L/D)_i) \stackrel{\text{def}}{=} \sum_i (\Delta F_i * (L/D)_i) + \sum_i (F_i * \Delta(L/D)_i) + \sum_i (\Delta F_i * \Delta(L/D)_i)$$

where F_i is the share of banks in size category i and $(L/D)_i$ is the average LTD ratio in size category i. ΔF_i is the change in the fraction of banks in size category i between 1984 and 2016 and $\Delta(L/D)_i$ is the change in the average LTD ratio within size category i between 1984 and 2016. The summation is over the three size categories. $\sum_i (\Delta F_i * (L/D)_i)$ represents how much the LTD ratio would have changed if the only change was the fraction of banks in each size category. $\sum_i (F_i * \Delta(L/D)_i)$ represents how much of the change in the LTD ratio is explained by other factors, and $\sum_i (\Delta F_i * \Delta(L/D)_i)$ represents the interaction between the change in LTDs due to size and other factors.

Regulatory and Market Changes

One factor behind the rise in LTDs may be greater competition for deposits. Developments in the 1980s and 1990s increased the competition for people's savings. Interest rates soared in the late 1970s and early 1980s, and money market mutual funds and other types of mutual funds began to compete aggressively for depositors' money. At the time, regulations did not permit banks to pay interest on demand deposits (checking accounts), and interest rates on other types of deposits were capped. Savers had always moved their liquid funds away from banks and into other investments whenever market interest rates rose above the regulatory caps. But in the high interest rate environment of the 1970s, banks' loss of funds became endemic.

This competition did not abate after 1980, when regulations changed and banks were permitted to pay interest on demand deposits and interest rate caps on other deposits were removed.[13] Apart from continued competition from nonbanks such as mutual funds and thrifts, competition among banks also heightened. Banks were now increasingly able to search more widely for customers—first anywhere within a state as intrastate banking restrictions disappeared, and then across state lines as interstate banking restrictions fell away. More aggressive competition for savers' funds has become a permanent feature of the banking landscape. The effect of this new competitive environment was to reduce the advantage of funding loans with deposits versus wholesale funds by making deposits more expensive to attract and keep and more likely to be withdrawn.[14]

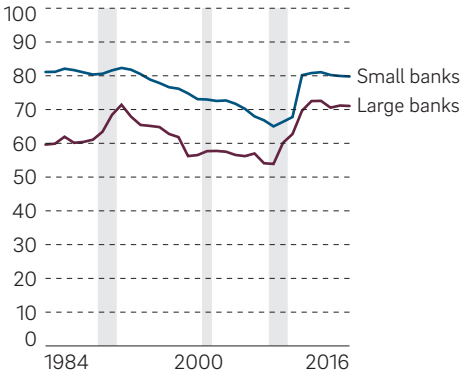
One concrete measure of the effect of this increased competition is the decline in core deposits from the 1990s up until the financial crisis in 2008 (Figure 3). Core deposits are usually defined as insured domestic deposits excluding brokered deposits—deposits that are too large to be insured and so are split into smaller, insurable pieces by insurance brokers.[15] Core deposits are typically a stable source of funding for banks.[16] Insured depositors don't withdraw their money at the first sign of trouble at their bank, as opposed to uninsured depositors and other uninsured funding sources. Also, small depositors, who provide the bulk of core deposits, are typically not very rate sensitive. That is, they don't constantly move their money around in response to competing offers from other banks and nonbank investment vehicles.

From 1992 until 2008, core deposits as a percent of total assets declined around 17 percentage points at small banks and around 18 percentage points at large banks. This trend reversed during the financial crisis, when depositors withdrew their money from money market funds and other investments and placed them in banks, which savers considered safer because their deposits were insured. At least part of the postcrisis increase in core deposits came from the expansion of federal deposit insurance from $100,000 to $250,000, which added to the number of accounts that are considered core deposits.

FIGURE 3

Core Deposits Declined Until the Financial Crisis

Median share of core deposits to total assets, percent.



Source: Federal Financial Institutions Examination Council Call Reports.

A second factor behind the rise in LTDs has been banks' ability to take advantage of funding from Federal Home Loan Banks (FHLBs). Until the late 1980s, the FHLB system exclusively served the thrift industry, providing funding to thrifts so they could make home loans. Banks gained membership to the FHLB system through the Federal Institutions Reform, Recovery, and Enforcement Act of 1989, which allowed banks that held at least 10 percent of their assets in residential mortgage loans to become members.

*See **Federal Home Loan Bank System.***

Following the savings and loan crisis of the 1980s, the thrift industry began its steady decline, and banks replaced thrifts as the primary providers of residential real estate loans. In turn, most banks could satisfy the 10 percent cutoff for borrowing from home loan banks. In 1999, the Gramm-Leach-Bliley Act dropped the 10 percent residential mortgage requirement for banks with less than $500 million in total assets, allowing even more of them to become FHLB members.[19] As of 2016, 2,498 small banks and 87 large banks had FHLB advances on their books.

After passage of the 1989 law, FHLB advances at banks increased rapidly until the financial crisis hit in 2008. After a sharp decline during the crisis, the average ratio of FHLB advances has recovered to 3 percent of assets for small banks and over 4 percent for large banks (Figure 4).[20] Thus, the rise in FHLB funding equals roughly one-quarter of the increase in the average LTD ratio for small banks since 1984.[21]

Following an initial rise in 2006, the share of FHLB advances declined during

the crisis for a number of reasons. On the demand side were government programs such as the increase in deposit insurance limits and the FDIC's guarantee of bank debt under the Temporary Liquidity Guarantee Program.[22] These supports made banks more attractive to depositors and other suppliers of short-term debt, thereby decreasing banks' need for FHLB advances. On the supply side, the value of the residential loans and mortgage-backed securities that banks use to secure FHLB advances decreased substantially. Thus, deposits became cheaper for banks at the same time that FHLB advances became more expensive, resulting in fewer FHLB advances.

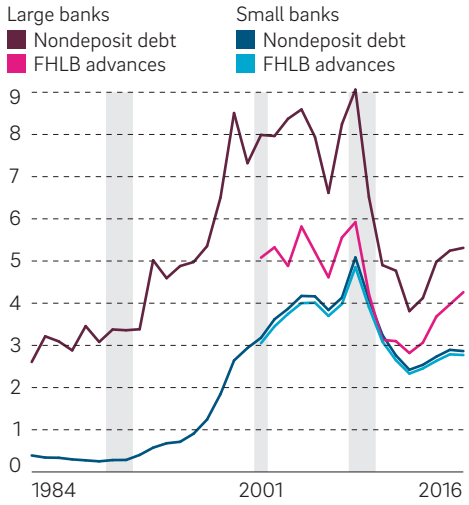
Since FHLBs are government-sponsored entities, they are relatively stable sources of funding, and the home loan banks provide a wide range of maturities and pricing options to help banks manage their liabilities. For example, an advance from a home loan bank might have a five-year maturity, longer than most certificates of deposit. To receive an advance from its home loan bank, the member bank must post mortgages or mortgage-backed securities as collateral. But studies have shown that the availability of collateral is not a binding constraint for most banks seeking advances.[23]

Thus, FHLB advances serve the same purpose as core deposits: They are a stable source of funds even when the economy suffers shocks. Small banks use advances from the home loan banks to avoid reducing their residential real estate lending in the face of rising market interest rates or declines in GDP, according to a study by Scott Frame, Diana Hancock, and Wayne Passmore.

FIGURE 4

1989 Law Paved Way for Rise in FHLB Advances

Average share of nondeposit debt to total assets, percent.



Source: Federal Financial Institutions Examination Council Call Reports.

Is the Increase in LTD Ratios Permanent?

Once the effects of the crisis began to abate, LTD ratios started rising back toward their peak of 2008. This rebound seems to suggest that the decline during

The Federal Home Loan Bank System

The Federal Home Loan Bank (FHLB) System was established in 1932 as a government-sponsored enterprise to promote the development of housing and thereby increase home ownership. It carries out this mission by providing funding to institutions that are primarily engaged in home lending. There are currently 11 regional FHLBs with a total of over 7,000 member institutions, and each FHLB is cooperatively owned by its members. Originally, nearly all FHLB members were thrift institutions—savings and loans and savings banks—with a smattering of insurance companies.

In 1989, as an answer to the savings and loan crisis of the 1980s, Congress enacted the Federal Institutions Reform, Recovery, and Enforcement Act, one provision of which allowed banks to become FHLB members. As a result, thrift institutions now make up only about 11 percent of FHLB members, with nearly all of the rest being banks and credit unions.[17]

The primary way that FHLBs provide funding is through loans, or as the FHLBs refer to them, "advances." These advances are collateralized by the borrowing institutions' residential loans and mortgage-backed securities. The terms on FHLB advances can range from overnight to 30 years, repayment can be through single payments or amortizing, and their interest rates can be fixed or adjustable.

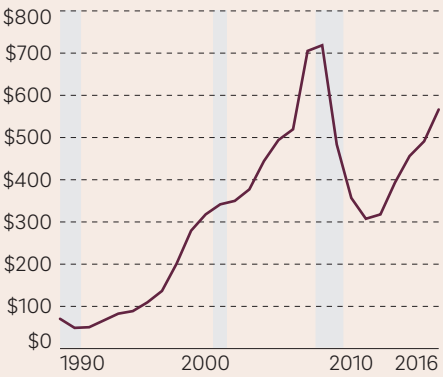
FHLB lending increased substantially at the onset of the financial crisis in 2007, peaking in the third quarter of 2008, as Adam Ashcraft, Morten Bech, and W. Scott Frame have documented (Figure 5). As financial conditions worsened and government programs were put in place that encouraged investors to shift funds back into the banking system, FHLB advances plummeted. Since their low plateau in 2011 and 2012, FHLB advances have risen back to levels like those in the early 2000s.

While the original purpose of FHLB advances was to provide funding for residential real estate, borrowing institutions can use the funding for any purpose. Thrift institutions were mainly residential real estate lenders, so when they were the majority of FHLB members, there was a fairly close link between FHLB advances and overall residential real estate lending. But most banks today have a significant portion of their loan portfolios tied up in commercial real estate and commercial and industrial loans, so the link is substantially weaker.[18]

FIGURE 5

FHLB Lending Shot Up Leading Into Financial Crisis

Federal Home Loan Bank advances, billions, in 2016 dollars.



Source: Federal Reserve Flow of Funds.

the crisis was the aberration and that higher LTD ratios have become a permanent feature of the banking landscape.

We have estimated that perhaps 10 percent—probably somewhat more—of the increase in LTD ratios at small banks is due to an increase in bank size. Certainly, this portion of the rise is permanent because banks will continue to get larger. We have also seen that since the early 1990s, small banks have supplemented their core deposits with FHLB advances, thereby permitting higher LTD ratios. It is possible that legislation could limit lending or investment activities by the home loan banks. But reforms have been proposed that would target home loan bank advances more narrowly toward small financial institutions.[24] It seems unlikely that small banks will lose access to this source of funding any time soon.

The loan-to-deposit ratio is a relatively crude measure of an institution's liquidity. Recently, regulators have focused on more sophisticated measures of liquidity such as the liquidity coverage ratio and the amount of high-quality liquid assets a bank holds, both of which probably provide a more accurate picture of an institution's ability to weather a sudden and unexpected withdrawal of funds or rise in the cost of funds. There is anecdotal evidence from bank regulators that a small bank with an LTD ratio of around 80 percent would have been a source of concern in 1990 but that in 2017 this is no longer the case. For small banks now, regulators consider LTD ratios of around 80 percent to be the new normal.

Notes

1 Average LTDs tell a slightly different story than the median, with a very sharp rise in the 2000s at large banks and an equally sharp decline during the crisis. This rise was driven by very high LTDs at just two now-defunct institutions, MBNA America Bank and Countrywide Financial, that had financed large increases in residential lending with market funding. Unless otherwise indicated, we define the average as the unweighted mean; that is, to get a more accurate measure of the "typical" bank, we do not weight each bank's contribution to the average by its assets.

2 All ratios are calculated for the entire organization; that is, the numerator and denominator are the sum of all banks within a particular holding company.

3 Small banks are defined as those that are not in the top 100 banking organizations in terms of assets in a given year, including only the assets of their commercial bank subsidiaries. Large banks are defined as banking organizations such as bank holding companies that are ranked in the top 100 in banking assets in that year, including assets of only their commercial bank subsidiaries.

4 See Gary Gorton's book *Slapped by the Invisible Hand: The Panic of 2007* for an expanded account of the stresses in money markets that were triggered by the failure of Lehman. Allen Berger, Christa Bouwman, and Dasol Kim provide evidence that during the financial crisis small banks—which are less reliant on wholesale funding than large banks are—provided funding for firms that had previously been customers of large banks.

5 The higher limits were made permanent under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010.

6 For example, a commercial and industrial (C&I) loan to a large firm often exceeds $1 billion, and the money comes from a number of banks—a loan syndicate. But dividing such a loan into pieces tiny enough so that small banks can participate would require a very large syndicate, which would raise the costs of syndication significantly.

7 Commercial paper refers to a short-term (up to nine months but on average about 30 days) unsecured promissory note that a corporation issues as an alternative to taking out a bank loan. Commercial paper is not usually issued on a one-time basis, but rather is continually rolled over. Since it's unsecured, the issuing firm must have an established credit rating. Smaller banks are not publicly traded and therefore don't usually have an established credit rating or file standard reports with the Securities and Exchange Commission.

8 See our *Banking Trends* article, "How Our Region Differs," for a discussion of the underlying reasons for increasing bank size.

9 The corresponding averages were $182.8 million in 1984 and $489.8 million in 2015.

10 Based on small banks' assets in 2016, the three size categories are: (1) less than $500 million in assets, (2) $500 million to $1 billion, (3) $1 billion to the size of the 101st largest banking organization in 2016 (roughly $9.3 billion). We do the same split for banks in 1984, with the size categories adjusted for inflation.

11 Our statistician readers will recognize our thought experiments as the familiar calculation of the between and within components of the change in LTD ratios. They will also note that we have left out a residual component of the change in LTD ratios that is harder to interpret. Broadly, it reflects the interaction between changes in size and changes in LTDs. Since we do not include this, our percentages do not add up to 100 percent. See Factors Explaining Changes in LTD Ratios.

12 Our calculation probably underestimates the effect of size alone because, within each group, the average size is increasing. We could seek a more precise estimate of the effect of size alone, but the three decades since 1984 have witnessed major changes in the structure of banking markets. Any attempt to isolate precisely the effect of changing size would be heroic.

13 The Depository Institutions Deregulation and Monetary Control Act of 1980 allowed all banks to offer negotiable order of withdrawal (NOW)

accounts and ended the Federal Reserve's power to set maximum interest rates on any account other than demand deposits. For further information, see Alton Gilbert's paper.

14 This does not mean that deposit markets became fully competitive and that deposit funding and wholesale funding are equally costly. In their article, Itamar Dreschler, Alexi Savov, and Philipp Schnabl provide evidence that banks have some market power that lowers the rates they must pay depositors.

15 Prior to 2011, core deposits are defined as domestic deposits less the sum of insured brokered deposits and time deposits greater than $100,000. From 2011 onward, they are defined as domestic transactions accounts, money market deposit accounts, other savings deposits, and time deposits less than $250,000, minus insured brokered deposits.

16 In contrast, brokered deposits shift quickly toward whichever banks are paying the highest rates.

17 At the end of 2016, 63.5 percent of FHLB members were commercial banks, 19.5 percent were credit unions, 10.9 percent were thrifts, 5.5 percent were insurance companies, and 0.6 percent were community development financial institutions, according to the Federal Home Loan Banks Office of Finance 2016 Annual Report.

18 For additional information on the FHLB system, see Scott Frame's paper.

19 The 10 percent limit was dropped for institutions with less than $500 million in total assets as of the time Gramm–Leach–Bliley was passed, and there was a provision to adjust that limit for inflation using the consumer price index. As of the end of 2016, the exemption would apply to any institution with a little under $700 million in total assets.

20 FHLB advances were not reported separately by banks until 2001, so Figure 4 shows total nondeposit debt for all years, with separate lines for FHLB advances only after 2001. For small banks, FHLB advances are essentially 100 percent of nondeposit debt. Thus, the rise in small banks' nondeposit debt beginning around 1992 was due to rising FHLB advances. We use only average ratios because the median value was zero for much of the 1990s. While borrowings at small banks increased immediately following the passage of the 1989 Financial Institutions Reform, Recovery, and Enforcement Act, more than half of small banks did not borrow at all from the home loan banks until well into the 1990s.

21 For large banks, the ratio of FHLB advances to assets is now 4.3 percent, down from almost 6 percent before the financial crisis hit. At the onset of the crisis, liquidity-constrained large banks borrowed heavily from the home loan banks, so much so that Adam Ashcraft and his coauthors refer to them as "lenders of next-to-last resort."

22 The Temporary Liquidity Guarantee Program was implemented on October 14, 2008, and fully insured all noninterest-bearing demand deposits, regardless of the amount, for a limited time. It was initially set to expire on December 31, 2009, but was later extended to December 31, 2010. The Federal Deposit Insurance Corporation provides more information at https://www.fdic.gov/regulations/resources/tlgp/index.html.

23 Most banks have portfolios of residential real estate loans or mortgage-backed securities well in excess of their desired level of FHLB borrowings.

24 The Treasury and Housing and Urban Development Departments made these proposals in their 2011 report to Congress. Two components would reduce the FHLBs' connections with larger banks. First, a bank could be a member of only one FHLB at a time. Second, the size of FHLB advances would be capped. Together, these proposals would limit the usefulness of FHLBs to large banks, thus freeing up funds for small and medium-size banks.

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