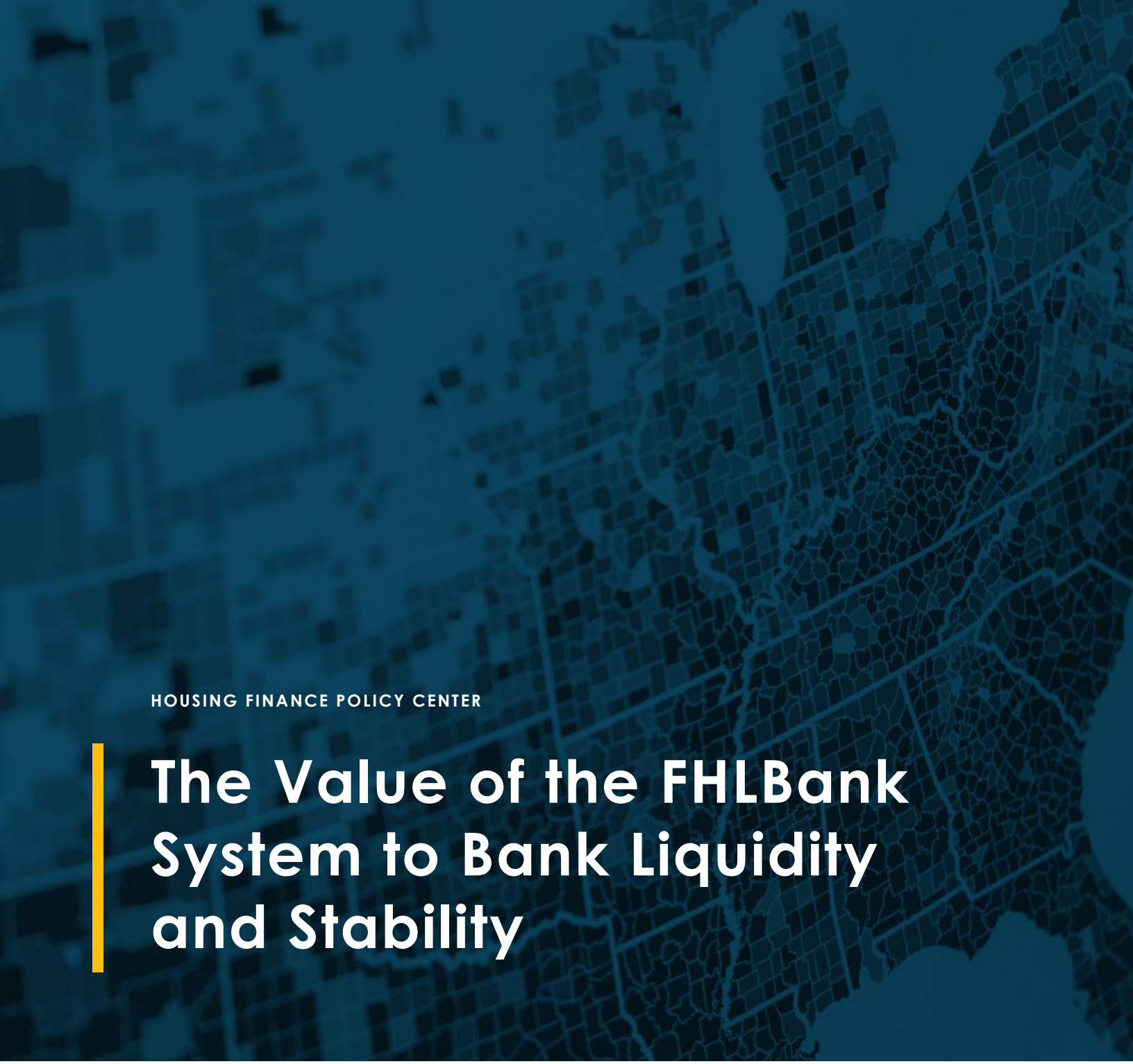

HOUSING FINANCE POLICY CENTER

The Value of the FHLBank System to Bank Liquidity and Stability

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RESEARCH REPORT

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Executive Summary

The primary mission of the Federal Home Loan Bank (FHLBank) System, a network of 11 regional government-sponsored enterprises (GSEs) established in 1932, is to provide member financial institutions reliable funding through collateralized advances (i.e., loans). Using call report data from 2002 to 2024, this report evaluates how effectively the FHLBank System fulfills this mission by enhancing US banks' liquidity and financial stability, particularly during periods of financial distress.

Specifically, we conducted a four-part empirical analysis to examine whether

- FHLBank advances are used more when banks face liquidity constraints,
- FHLBank advances enhance the financial stability of individual banks,
- FHLBank membership reduces the likelihood of bank failures, and
- FHLBank advances reduce systemic risk of the overall banking system.

From rigorous quantification through regression analyses, we find the following:

- **Liquidity support**: Member banks increase FHLBank borrowing when liquidity tightens. Regression analysis shows that a 1 percentage-point drop in liquid assets corresponds to a 0.37 point increase in advances, underscoring the system's role as a flexible liquidity backstop.
- **Improved solvency**: FHLBank funding strengthens individual bank resilience. A 1 point rise in advances (as a share of assets) increases a bank's z-score—an indicator of solvency—by 19 points, on average.
- **Lower failure risk**: FHLBank membership reduces the likelihood of bank failure. Probit analysis found FHLBank membership reduces the bank failure rate by about 10 percent after controlling for all other variables.
- **Reduced systemic risk**: FHLBank advances reduce the banking system's overall systemic risk. The impulse response function shows that a 1 percent increase in advances is associated with a persistent 0.30 percentage-point decline in the CATFIN (Conditional Tail Financial Risk Indicator) index.

Based on these results, we estimate that the FHLBank System directly saves the Federal Deposit Insurance Corporation (FDIC) roughly $950 million annually in avoided bank failures and indirectly

generates $13.2 to $21.4 billion in economic value from reducing systemic crisis risk. Together, these benefits are two to three times larger than the $6.9 billion in annual benefit the FHLBanks receive from their GSE status, as estimated by the Congressional Budget Office.

Our analysis suggests that the overall economic benefits of mitigating bank financial distress and systemic crises far exceed the benefits the FHLBank System receives from its status as a GSE. Our research provides evidence of the FHLBank System's value in promoting financial stability. The findings inform ongoing policy discussions about the FHLBank System and establish a framework for further research on other dimensions of the FHLBank System.

The Value of the FHLBank System to Bank Liquidity and Stability

This study examines whether the Federal Home Loan Bank (FHLBank) System influences the liquidity of its member banks and the overall stability of the financial system. The FHLBank System was chartered by Congress in 1932 to help revive the housing market after the Great Depression. The intention was to provide a reliable source of liquidity to support financial institutions engaged in home lending and community development. As President Herbert Hoover stated upon signing the legislation,

> *"The purpose of the system is both to meet the present emergency and to build up homeownership on more favorable terms than exist today. The immediate credit situation has for the time being in many parts of the country restricted the activities of building and loan associations, savings banks, and other institutions making loans for home purposes, in such fashion that they are not only unable to extend credit for the acquirement of new homes, but in thousands of instances they have been unable to renew existing mortgages with resultant foreclosures and great hardships."*[1]

Since the 1930s, the system has evolved to respond to shifts in the mortgage and financial markets. Congress has expanded the range of institutions eligible for membership, and the types of collateral that can be pledged and the range of product offerings have also been increased. But the FHLBanks have remained true to Hoover's vision that providing liquidity to members is critical to ensuring sustainable lending. This liquidity provision has been particularly valuable during periods of market stress.

The current FHLBank System is divided into 11 districts, each with its own regional bank.[2] These 11 privately owned government-sponsored enterprises (GSEs) are regulated by the Federal Housing Finance Agency. Each bank is structured as a member-owned cooperative and is governed by a board of directors made up of member financial institution leaders and independent board members. These members include commercial banks and savings banks, credit unions, community development financial institutions, and insurance companies. The members purchase and hold capital stock with their regional FHLBank and receive a quarterly dividend on that stock as a benefit of membership. Most banks that can be members choose to do so. Currently, member banks hold 86 percent of the US banking system's total assets.[3]

Although the FHLBanks are private, the government sponsorship, or "implicit federal backing," allows these institutions to borrow at favorable rates. The FHLBank debt securities are exempt from federal and state income taxes, and FHLBanks enjoy some regulatory exemptions.[4] An additional

benefit of FHLBanks' GSE status is having priority over any unperfected security interests of creditors in case of a member's insolvency. The intent of this statutory authority was "to improve the standing of the FHLBanks as secured creditors by giving them priority in receivership over lien creditors such as the Federal Deposit Insurance Corporation ("FDIC") acting as receiver or conservator" (Scott and O'Shields 2019, 12). As FHLBanks are pass-through entities, their income is paid out to the FHLBank members as dividends, which are taxable to the member.

The FHLBank Office of Finance issues debt securities (known as consolidated obligations, including bonds and discount notes) on behalf of the entire system. The funds from these issuances are principally used to provide secured loans (i.e., advances) to member institutions.[5] Advances provide a reliable source of liquidity to members throughout the economic cycle, including during times of market stress (Office of Finance 2025), hence forming the backbone of the FHLBank System liquidity provisions.

Despite almost 100 years of presence, the FHLBank System has been largely understudied. A multidimensional evaluation of the FHLBank System is needed to understand the value the system provides, given the support it receives as a GSE. The FHLBanks receive no federal appropriations, but in fiscal year 2024, the Congressional Budget Office has estimated that the benefit to the FHLBank System is $6.9 billion annually.[6] Although questions have arisen about the Congressional Budget Office's methodology and calculations,[7] we use this estimate at face value as a benchmark to assess whether the FHLBank System generates value exceeding the value of these GSE benefits.

Our research aims to fill the void by conducting a three-part evaluation of the FHLBank System. This first report looks into the FHLBank System's contribution to the financial system's bank liquidity and the overall stability. Two upcoming papers will further examine the value of FHLBanks related to its mission of promoting sustainable lending, affordable housing, and community development. The second report will investigate whether membership and advances affect members' lending activity, and the third report will investigate FHLBanks' direct support for homeownership, affordable housing, and community investment–related activities. Together, these three reports will provide a comprehensive new framework to better understand the FHLBank System's overall value.

After providing background information on FHLBank membership and advances, this report looks at how much the FHLBank System contributes to its bank members' liquidity and adds to the system's financial stability. This is critical, as liquidity constraints are associated with bank failures and bank runs, which can, in turn, trigger or exacerbate a financial crisis. In this report, we address four empirical questions related to FHLBank membership and advances, as well as members' liquidity and financial stability:

1. Are members more likely to take out advances when they face liquidity constraints?
2. Do advances strengthen member banks' financial stability?
3. Does being an FHLBank member lower the likelihood of bank failure? How much is saved from preventing bank failures?
4. Do FHLBank advances promote financial stability in the overall banking system?

This report focuses on bank members, both commercial banks and savings banks (savings banks include savings banks, savings associates, and savings and loan banks).[8] Bank members account for about 81 percent of the members in our sample period (2002 to 2024). Our analysis finds that bank members draw on FHLBank advances when they face liquidity constraints, and advances are associated with greater financial stability and a lower likelihood of bank failure. Through these mechanisms, our analysis suggests that FHLBank advances strengthen the banking system's overall financial stability. Using the findings from our analyses, we quantify that the FHLBank System generates substantial economic value from preventing bank failures and mitigating the risk of bank failures, which trigger or exacerbate financial crises. The estimated value exceeds the benefits conferred by the FHLBanks' GSE status.

Background on FHLBank Membership and Advances

FHLBank Membership

Before examining the FHLBank System's contributions, it is worth understanding its membership and the role of advances, which is the core function of the FHLBanks' mission and a crucial source of members' liquidity. The contemporary FHLBank System comprises 11 banks, independent FHLBanks, and the Office of Finance, all regulated by the Federal Housing Finance Agency, with each of the 11 FHLBanks operating as a member-owned cooperative. The system, as of March 31, 2025, includes approximately 6,468 member financial institutions.

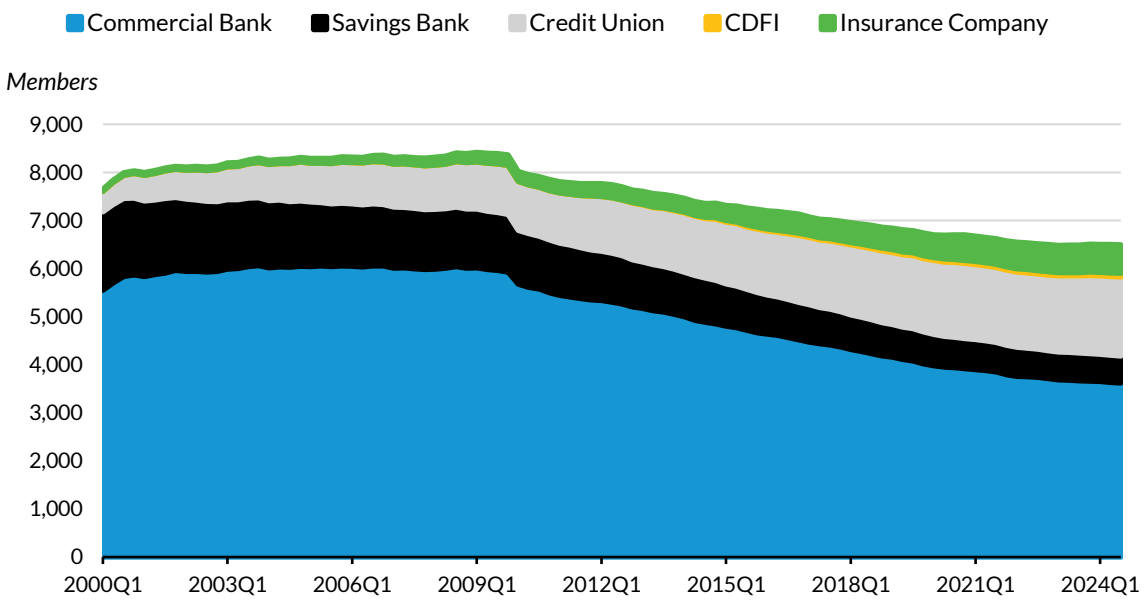
The membership composition has evolved significantly (figure 1). When the FHLBank System was founded in 1932, the initial membership was reserved for savings and loan associations, savings banks, and a few insurance companies, all of which were mortgage portfolio lenders. Following the savings and loans crisis, the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 made commercial banks and credit unions eligible for FHLBank membership if at least 10 percent of their

assets were in residential mortgages at the time of membership. Community development financial institutions became eligible to join the FHLBank System in 2010 through the Housing and Economic Recovery Act of 2008.

Since 2000, the number of commercial banks has dropped in the face of consolidation. But the FHLBank System's reach is notable. Banks that are eligible for membership generally choose to join; 86 percent of the US banking system's assets are held by banks that are FHLBank members. Moreover, the percentage of the nation's commercial banks covered by the system has also been increasing. In the first quarter of 2002 (Q1 2002), 65.8 percent of commercial banks were FHLBank members. This share increased to 88.1 percent in Q4 2024. Moreover, the number of credit unions and insurance company members has increased substantially, especially among life insurers that hold and invest in mortgage-related assets, reflecting the benefits of FHLBank membership.

FIGURE 1

FHLBank Membership over Time, by Institution Type



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Source: "Federal Home Loan Bank Membership Data," Federal Housing Finance Agency, accessed July 29, 2025, https://www.fhfa.gov/data/fhlb-membership.
Notes: CDFI = community development financial institution; Q = quarter. Savings banks include savings banks, savings associates, and savings and loan banks.

Among bank members (both commercial and savings), FHLBank members and nonmembers vary in size. FHLBank member banks are more likely to have total assets between $100 million and $10 billion

(table 1). FHLBank member banks with assets below $10 billion represent 96.4 percent of member banks, with most defined as community financial institutions. Non–FHLBank members, on the other hand, are disproportionately likely to be small banks with assets below $100 million or large banks with assets above $10 billion. The latter is almost all international banks with branches[9] in the US, and are ineligible to be FHLBank members. Although the number of non–FHLBank members accounts for 27 percent of banks with assets above $10 billion, they hold less than 14 percent of total assets among banks in this category, suggesting they are smaller than the FHLBank members with more than $10 billion in assets. There is also likely to be a difference in the activity mix between FHLBank members and nonmembers, as FHLBank member banks must hold at least 10 percent of their assets in residential mortgages to qualify for initial membership. Some nonmember institutions may miss this threshold and be more concentrated in nonresidential real estate activities.

TABLE 1

Bank Asset Size, by FHLBank Membership, as of Q3 2024

	FHLBank Member		Non–FHLBank Member	
Asset size	**Observations**	**Percent**	**Observations**	**Percent**
< $100 million	472	11.4%	232	42.2%
$100 million–500 million	1,932	46.5%	136	24.7%
$500 million–1.25 billion	908	21.9%	49	8.9%
$1.25 billion–10 billion	688	16.6%	78	14.2%
≥ $10 billion	149	3.6%	55	10.0%
Total	**4,140**	**100.0%**	**550**	**100.0%**

Source: Federal Financial Institutions Examination Council call report.
Notes: Q = quarter. Commercial and saving banks only.

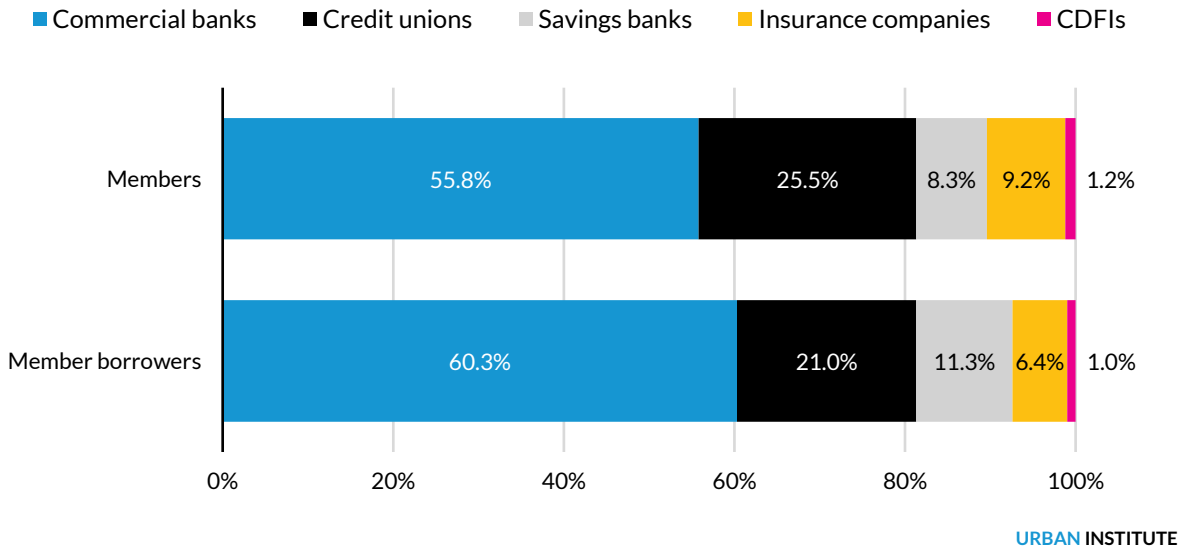
FHLBank Advances

As of year-end 2024, the 11 FHLBanks collectively held $1.28 trillion in assets. Advances to FHLBank members are the single largest asset on the FHLBanks' collective balance sheets. Advances represent the primary method for providing liquidity to members in the form of fully collateralized loans from FHLBanks to member institutions (Office of Finance 2025). Member banks use these advances for various purposes, including cash flow management, liquidity management, and asset liability management. Advances are an integral part of day-to-day risk management. These advances become even more critical during periods of financial stress. According to the December 31, 2024, Combined Financial Report, 57.4 percent of these assets were advances to members, 36.5 percent were investments consisting of long-term investments and liquidity holdings, 5.4 percent were mortgage loans held in portfolio, and the remaining 0.7 percent were cash and other assets (Office of Finance 2025).

Figure 2 shows the composition of membership by member type versus advances by member type. Although this composition can change depending on financial condition, at year-end 2024, 55.8 percent of the members were commercial banks, and 60.3 percent of the members that took out advances were commercial banks. Saving banks also took out advances at a slightly higher rate than their membership percentage. But many institutions used only a relatively small dollar amount of advances as part of their risk management practices.[10]

FIGURE 2

Share of Membership and Member Borrowers, by Member Type



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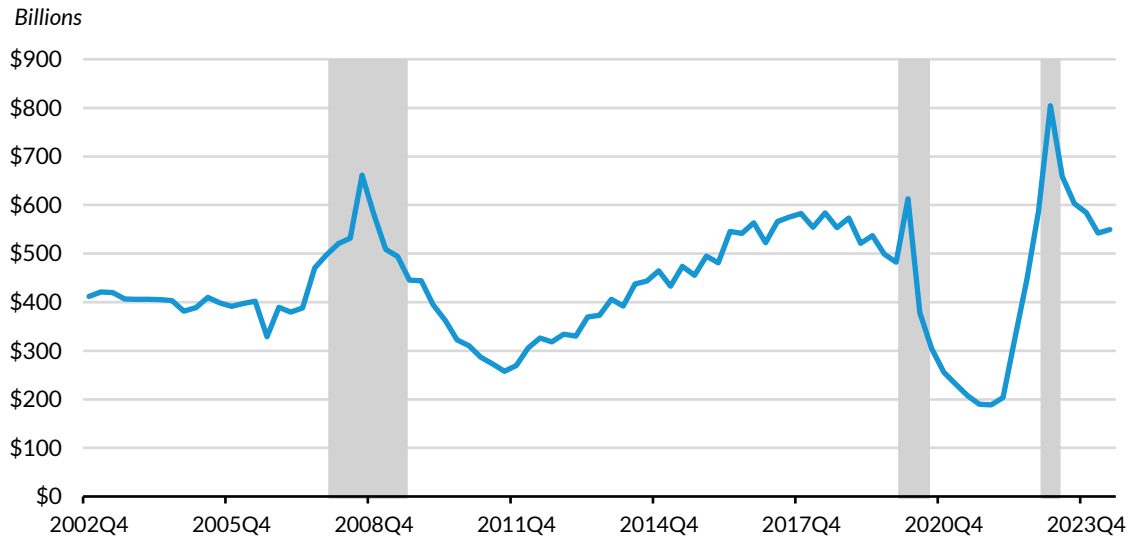
Source: Office of Finance, *Federal Home Loan Banks Combined Financial Report for the Year Ended December 31, 2024* (Reston, VA: Federal Home Loan Banks, Office of Finance, 2025).
Notes: CDFI = community development financial institution. Savings banks include savings banks, savings associates, and savings and loan banks.

To evaluate the importance of advances to systemic stability, we examine how bank members use advances during periods of financial stress (figure 3). Total outstanding advances increase quickly during financial crises. In particular, three peaks in advance use stand out: the financial crisis in 2007 and 2008, the COVID-19 pandemic in 2020, and the regional banking crisis in 2023. When Silicon Valley Bank failed in 2023, it triggered a run on other regional banks, with funds flowing into the largest banking institutions that were deemed systemically important financial institutions.[11] During the March 2023 crisis, not only did the three failed banks (Silicon Valley Bank, Signature Bank, and First Republic) increase their outstanding FHLBank advances, but so did many other banks that experienced heavy deposit outflows, and they did not fail. Cipriani, Eisenbach, and Kovner (2024) found that access to these advances helped prevent bank failures.

FIGURE 3

FHLBank Total Outstanding Advances over Time

Commercial and savings banks only



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Source: Office of Finance, *Federal Home Loan Banks Combined Financial Report for the Year Ended December 31, 2024* (Reston, VA: Federal Home Loan Banks, Office of Finance, 2025).
Notes: Q = quarter. Gray bars indicate the financial crisis, the outbreak of the COVID-19 pandemic, and the 2023 regional bank crisis. Savings banks include savings banks, savings associates, and savings and loan banks. Total outstanding advances of all financial institutions show similar time trends and can be found at "Government-Sponsored Enterprises; FHLB Advances; Asset, Level," Federal Reserve Bank of St. Louis, last updated June 12, 2025, https://fred.stlouisfed.org/series/BOGZ1FL403069330Q.

Another important source of liquidity for banks, especially during financial stress, is the Federal Reserve's discount window. Like FHLBank advances, discount window loans also must be collateralized. But many banks perceive the discount window to be a last resort.

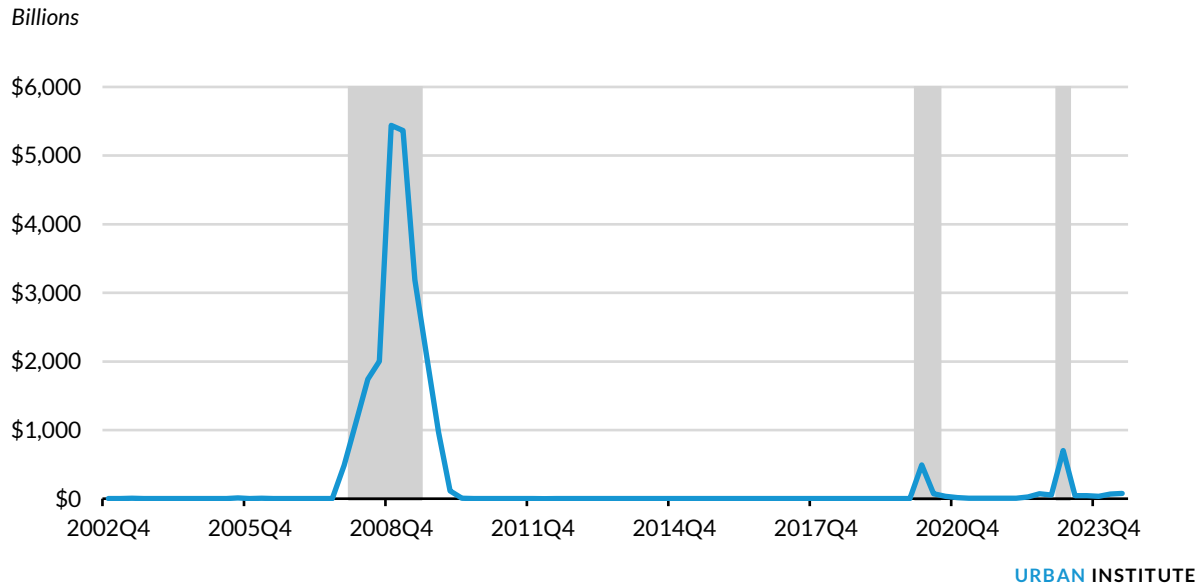
The Federal Reserve has three facilities through the discount window: primary credit, secondary credit, and seasonal credit. Under the primary credit facility, banks in sound financial condition can borrow up to 90 days, prepayable and renewable daily, generally at a rate at the upper end of the federal funds target rate. Banks that do not qualify for primary credit can use the secondary credit facility, which allows only overnight borrowing. The seasonal credit facility is available for smaller institutions with significant seasonal fluctuations in their balance sheets. Only banks with total deposits less than $500 million are eligible for the seasonal credit facility.[12]

Usage patterns differ significantly between the discount window and FHLBank advances. Figure 4 shows the pattern of discount window outstanding loans—it is more concentrated than the use of the FHLBank advances, operating more like an on-off switch during moments of significant stress. This

usage difference reflects several factors that make FHLBank advances more attractive to many institutions than discount window borrowing.

FIGURE 4

Outstanding Loans to Domestic Banks through the Federal Reserve Discount Window



Source: Office of Finance, *Federal Home Loan Banks Combined Financial Report for the Year Ended December 31, 2024* (Reston, VA: Federal Home Loan Banks Office of Finance, 2025).
Notes: Q = quarter. Gray bars indicate the financial crisis, the outbreak of the COVID-19 pandemic, and the 2023 regional bank crisis.

First, FHLBank advances offer more flexibility. FHLBank advances provided a wide range of terms, including overnight to 30-year maturities. At year-end 2024, approximately 55 percent of the FHLBank advances had maturities of one year or less, with another 27 percent with maturities from one to three years. The advances can also have fixed or floating rates. Approximately 57 percent of advances at year-end 2024 were fixed rate. These flexible terms help member banks better perform their asset and liability management, a sharp contrast to the 90-day maximum term and overnight-only rate on Federal Reserve borrowing.

Second, stigma effects discourage banks from using the discount window as their first option. One report noted that banks are reluctant to use the discount window, as it signals financial weakness (Armantier, Cipriani, and Sarker 2024). McLaughlin notes that before 2003, discount window credit was extended at below-market rates but only when the borrower had exhausted other sources of funding.[13]

This attestation, combined with the significant administrative oversight and monitoring that accompanied discount window credit, stigmatized discount window borrowing.

Since 2003, to eliminate the stigma, the Federal Reserve has tried to communicate that the primary credit is a legitimate source of funding. For example, during the COVID-19 pandemic, the Federal Reserve required the largest banks to hold some level of discount window borrowing. Even so, the stigma remains, and many banks are not set up to access Federal Reserve discount window borrowing. In 2023, neither Silicon Valley Bank nor Signature Bank was operationally set up to access the Federal Reserve discount window. The Federal Reserve has since issued supervisory guidance that encourages (but does not require) banks to be operationally ready to borrow as part of their contingency funding plans.[14]

In practice, banks prefer FHLBank advances for routine funding needs and during the initial period of financial stress, while the discount window plays a crucial role as the backstop liquidity provider for the entire banking system when other funding options are inadequate. As a result, the FHLBank System provides liquidity earlier in the crisis timeline, giving regulators and policymakers more time to respond. Ashcraft, Bech, and Frame (2010) show that in 2008, the FHLBank System provided large amounts of liquidity before the Federal Reserve intervened. During the week beginning March 13, 2023, the FHLBanks funded $675.6 billion in advances (largely in overnight issuance), the largest one-week volume in FHLBank history. By the end of the week, the total overall outstanding advances grew by $223.3 billion (FHFA 2024).

There are other private market sources of funding available (e.g., uninsured deposits, warehouse funds, and capital markets debt), but these sources of debt make the banking system vulnerable to dramatic swings in market confidence, as access to these funding sources tends to freeze or become expensive during periods of stress. As Parrott and Zandi (2023, 10) point out, “The FHLBanks help fill the gap between these two sources of funding [lender of last resort and market funding] with access to low-cost liquidity through the cycle for institutions operating in the mortgage market. This helps stabilize the cost and availability of mortgage credit and with it the housing market and broader economy.”

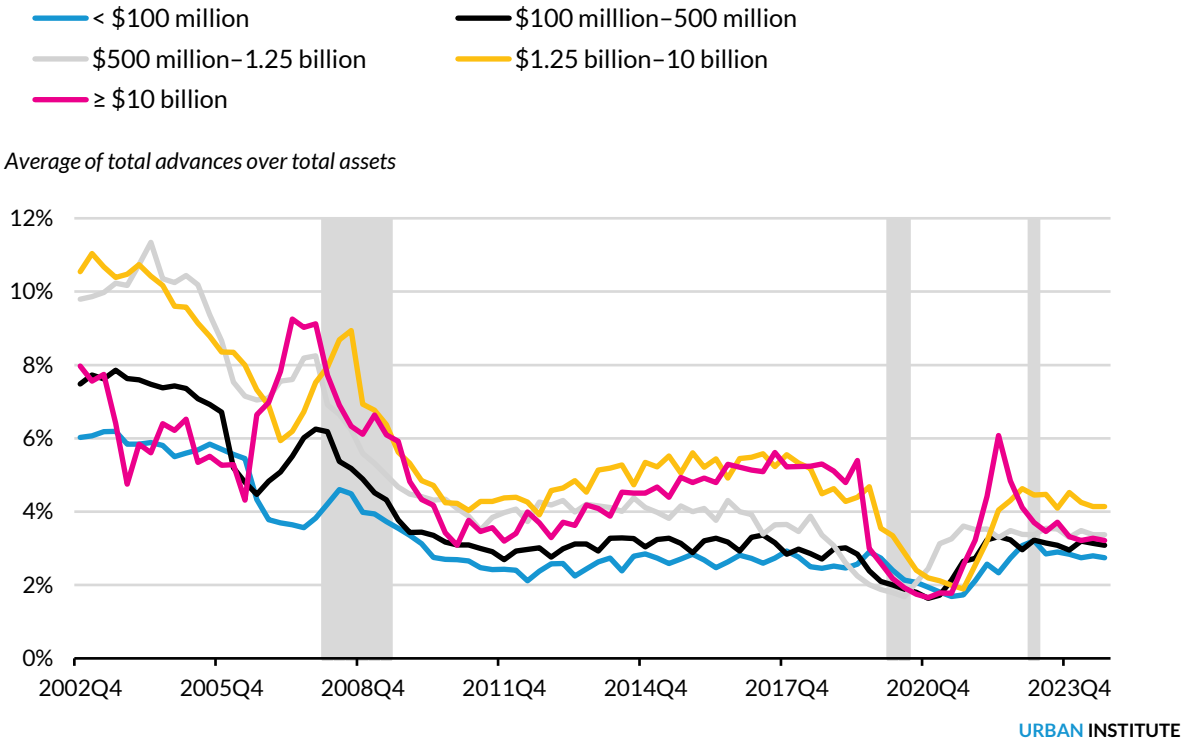
The FHLBank System is important to all its members, but the use of advances varies by asset size (figure 5). Banks with between $500 million and $10 billion in assets, which account for about 38.5 percent of the FHLBank members, are particularly apt to rely on FHLBank advances for their liquidity needs. This makes sense, as larger banks (with more than $10 billion in assets) have more avenues for

capital market access and smaller banks (with less than $500 million in assets) rely more on deposits and tend to have a more stable borrower base.

Smaller banks, which account for 58 percent of current FHLBank bank members, show relatively lower utilization of advances relative to their asset size, but FHLBank advances become critical during liquidity stress periods. These institutions might face higher rates and more limited capacity in wholesale funding markets and might have less favorable terms in the federal funds market, and they are often more sensitive to the stigma associated with discount window borrowing.

FIGURE 5

Average FHLBank Advances over Total Assets, by Asset Size



Source: Federal Financial Institutions Examination Council call report.
Notes: Q = quarter. Gray bars indicate the financial crisis, the outbreak of the COVID-19 pandemic, and the 2023 regional bank crisis. Data include only commercial and savings banks that are FHLBank members at the time of estimation.

Large banks (with more than $10 billion in assets) demonstrate more variable usage patterns, notably increasing their use of FHLBank advances during periods of market stress or when other wholesale funding sources become expensive or unavailable, as evidenced during the both the 2007–08 financial crisis and the 2023 banking turmoil. That is, during periods of crisis, the largest banks, which rely the most heavily on wholesale funding, turn to the FHLBanks to meet their liquidity needs.

Since the Great Recession, the share of FHLBank advances relative to total assets has declined for all bank sizes, as their deposit bases have grown considerably. In addition, higher capital and liquidity requirements were imposed. The cost of this capital and the liquidity requirements provide banks incentives to reduce balance sheet leverage, reducing the need for advances. In addition, some of the most highly leveraged institutions, which were heavy users of FHLBank advances, failed during the Great Recession.

Empirical Analysis: FHLBank Contributions to Banking Stability

This section presents empirical assessments of the FHLBank System's contributions to banking stability through four analyses. We first examine whether FHLBank members increase advance usage during periods of liquidity constraints. Second, we test whether advances strengthen individual members' financial stability. Third, we compare the likelihood of bank failure between members and nonmembers. Finally, we investigate whether FHLBank advances affect the broader banking system's aggregate systemic risk. Together, these analyses provide a new empirically based approach to assess the value of the FHLBank System as a liquidity provider for individual institutions and the broader financial system.

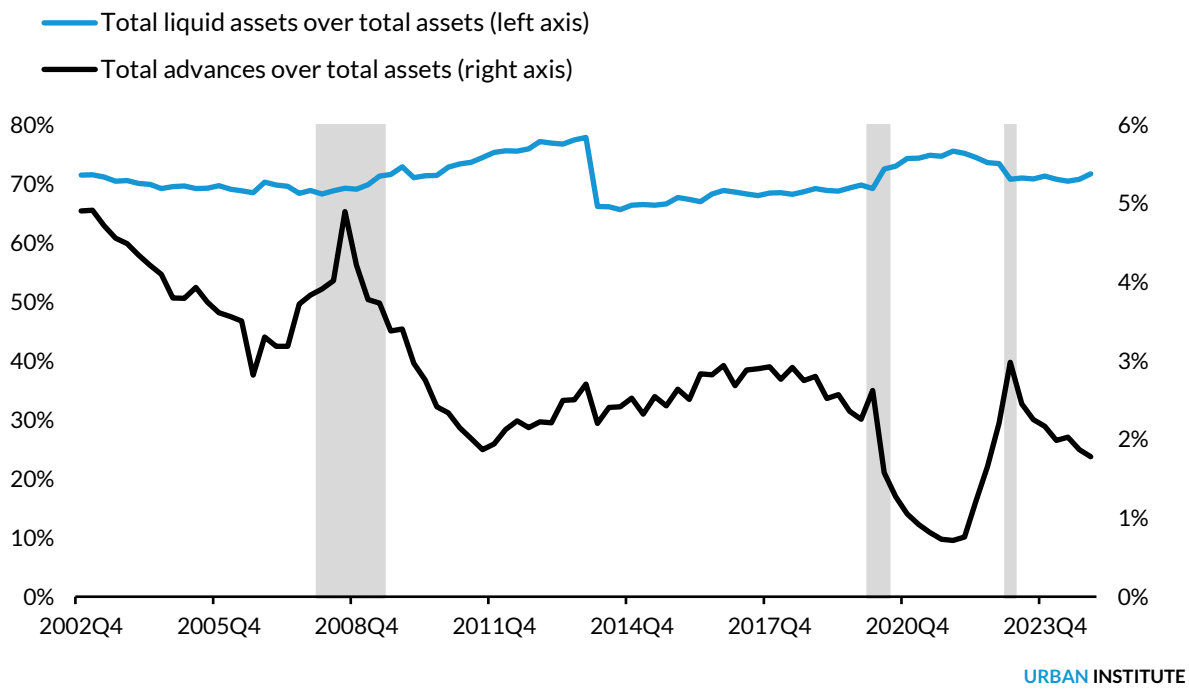
Question 1: Do Members Take Out More Advances When They Face Liquidity Constraints?

Before evaluating the FHLBank System as a systemic risk mitigant, we must test whether member banks actually turn to advances when facing liquidity pressures. The FHLBank System was designed to provide liquidity in both stable economic environments and stress situations. The second function is especially critical for systemic stability, as liquidity constraints are associated with bank runs, which can lead to bank failures and potentially trigger or exacerbate financial crises.

Figure 6 demonstrates an inverse relationship between liquid assets—defined as the sum of cash, deposits, and federal funds sold, following Moore et al. (2023)—and FHLBank advances. This is a broad definition of liquid assets, which include deposits that account for around 95 percent of liquid assets. When liquid assets are low, advance usage increases. Intuitively, it appears the FHLBanks provide a cost-effective way to bolster liquidity when alternatives are either expensive (brokered deposits) or perceived as signaling financial weakness (Federal Reserve discount window borrowing).

FIGURE 6

Bank Liquidity and FHLBank Advances



Source: Federal Financial Institutions Examination Council call report.
Notes: Q = quarter. Gray bars indicate the financial crisis, the outbreak of the COVID-19 pandemic, and the 2023 regional bank crisis. Data include only commercial and savings banks that are FHLBank members at the time of estimation.

Data and Methodology

To rigorously confirm this relationship, we conduct regression analysis using quarterly Federal Deposit Insurance Corporation (FDIC) call reports from 2002 to 2024. We estimate the impact of changes in FHLBank advances on total assets as a function of changes in liquidity constraints for member banks.

We conduct a fixed effect analysis that includes both time (quarter) and bank fixed effects to examine how changes in within-bank liquidity are associated with changes in advances. Our dependent variable is the value of FHLBank advances divided by total assets, and our key explanatory variable is liquid assets (cash, deposits, and federal funds sold) divided by total assets. For robustness, we also use the sum of cash and federal funds sold as a narrow definition of liquid assets, following Drechsler, Savov, and Schnabl (2017). We also include control variables (tier 1 capital, 90-day delinquent loans, and credit loss provisions, all normalized by total assets), as well as the total-loan-to-total-deposit ratio and the return on assets. We further control for asset size by including the log value of the four-quarter moving average total assets. The control variables are in one-quarter lag values, though including the values in the same quarter as the dependent variable does not change our results.

Results

Regression results in table 2 confirm that member banks increase advance usage when facing liquidity needs or constraints. The coefficients on liquid assets are negative and statistically significant across all specifications, with the effect substantially larger for current FHLBank members (column 1). The consistent negative relationship between liquid assets and advance usage across our sample period, which includes both normal and stressed market conditions, indicates that FHLBank advances serve as a regular liquidity management tool throughout the economic cycle. For member banks, a 1 percentage-point decline in liquidity over assets produces a 0.37 percentage-point increase in FHLBank advances over assets. That is, for a bank with $10 billion in assets, a $100 million decrease in liquidity is associated with a $37 million increase in FHLBank advances.[15]

Because smaller institutions might have different liquidity management patterns and represent most FHLBank members, we restrict our sample to member banks in the FHLBank System with assets under $500 million (column 2). The magnitude of the FHLBank member coefficient (column 4) is marginally lower than for all institutions but remains statistically significant. The findings are similar if we restrict the sample to banks with assets under $1.25 billion.

For robustness, we also examine the relationship when we use a narrow definition of liquid assets: cash plus federal funds sold. We find a smaller but statistically significant coefficient (columns 3 and 4). The difference in the coefficients suggests that banks, on average, are more sensitive to the fluctuation in deposits, which generally account for the largest component of liquid assets.

TABLE 2

Fixed Effect Regression Results: FHLBank Advances and Liquidity

Dependent variable: FHLBank advances over total assets, $_t$

	(1)	(2)	(3)	(4)
Variables	**All banks**	**Banks with assets < $500 million**	**All banks**	**Banks with assets < $500 million**
Liquid assets / total assets$_{t-1}$	-0.368***	-0.317***		
	(0.008)	(0.010)		
Cash + FFS / total assets$_{t-1}$			-0.072***	-0.024**
			(0.005)	(0.011)
Tier 1 capital / total assets$_{t-1}$	-0.536***	-0.514***	-0.311***	-0.325***
	(0.015)	(0.016)	(0.014)	(0.018)
D90+ loans / total assets$_{t-1}$	-0.175***	-0.149***	-0.189***	-0.125***
	(0.009)	(0.010)	(0.011)	(0.013)
Credit loss provision / total assets$_{t-1}$	0.173**	0.098	0.623***	0.003
	(0.074)	(0.088)	(0.074)	(0.151)
Total loan / total deposit$_{t-1}$	0.000	0.029***	0.000***	0.080***
	(0.000)	(0.008)	(0.000)	(0.016)
Return on assets$_{t-1}$	-0.038***	-0.041***	0.015	-0.042**
	(0.012)	(0.014)	(0.012)	(0.020)
Log(total assets), 4-quarter MA	-0.018***	-0.020***	-0.016***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.647***	0.595***	0.281***	0.189***
	(0.013)	(0.021)	(0.010)	(0.021)
Quarter FE	Y	Y	Y	Y
Bank FE	Y	Y	Y	Y
Observations	457,682	352,840	457,682	352,840
R^2	0.281	0.262	0.053	0.107
Number of RSSD ID	7,363	6,566	7,363	6,566

Source: Federal Financial Institutions Examination Council call report.

Notes: D90+ = loans that are 90 days or more delinquent; FE = fixed effects; FFS = federal funds sold; MA = moving average; RSSD = research, statistics, supervision, discount. Robust standard errors in parentheses. Within-group R^2 is presented in the table. The low R^2 indicates that the unobserved heterogeneity (the fixed effects) accounts for a significant portion of the overall variation in the dependent variable, leaving less to be explained by the included time-varying predictors. If we include the variation of the dependent variable explained by the fixed effects, R^2 in the four columns are 0.696, 0.703, 0.601, 0.635, respectively.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Question 2: Do Advances Strengthen Member Banks' Financial Stability?

Question 1 establishes that FHLBank advances can be valuable for financial institutions to smooth liquidity in both normal times and times of stress. But a critical policy question is whether these advances strengthen or weaken the institution's financial stability. The theoretical prediction is ambiguous. Although additional liquidity should reduce funding risk, lower-cost funding might encourage member banks to take excessive risks as the banks further deteriorate.

Some have argued that access to lower-cost FHLBank advances can provoke moral hazard, giving member banks incentives to undertake a more highly leveraged profile and increasing their likelihood of failure.[16] This is a recognized concern that requires ongoing attention from both FHLBank management and member institution regulators. Critics note that banks would achieve similar funding through the repurchase market. Yet, repurchase markets might impose greater market discipline through more frequent repricing and collateral monitoring. The empirical evidence on the magnitude of this moral hazard effect remains limited.

Davidson and Simpson (2014) empirically examined the moral hazard issue and found limited evidence of moral hazard when the probability of bank failure was low. Under these circumstances, FHLBank advances were not associated with greater interest rate risk, credit risk, liquidity risk, or increased leverage. But when the probability of bank failures was higher, FHLBank advances were associated with higher interest rates and credit risk and higher leverage, suggesting that during a high-stress period, advances could increase moral hazard activity. Using a mixed-frequency vector autoregression (VAR) model, Kanas and Zervopoulos (2022) showed that the FHLBanks' stabilizing role outweighs the risk from moral hazard. Their analysis suggests that although moral hazard effects exist, the net impact of FHLBank advances on financial stability remains positive.

Data and Methodology

Kanas and Zervopoulos (2022) have examined the role of FHLBank advances on financial stability using aggregated time series data. But research has yet to examine the role of FHLBank advances on financial stability at the individual bank level. We fill this gap by calculating the z-score for each bank in the call report data and conducting a fixed-effect analysis. The z-score—a widely used proxy[17] of a bank's solvency risk—compares banks' buffers (capitalization and returns) with risk (volatility of returns), using the following formula:

$$Z - score = \frac{ROA + (\frac{Equity}{Asset})}{SD(ROA)}$$

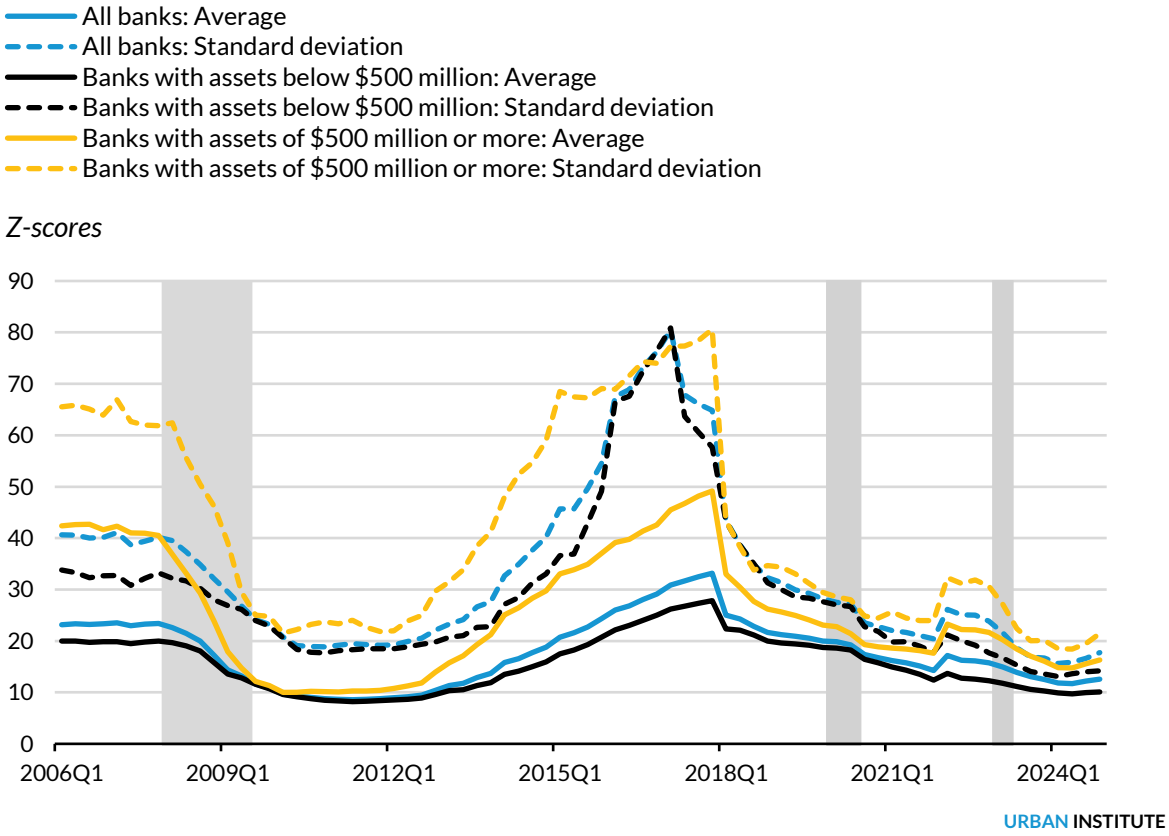
where ROA is the return on assets and SD is the standard deviation. Following Li, Tripe, and Malone (2017), we use the 16-quarter moving average of ROA and its standard deviation to calculate the z-score. A higher z-score indicates a lower risk and greater ability to withstand financial shocks.

Figure 7 presents the average and standard deviation (dotted line) of the z-score over time. The solid blue line, which is the average z-score for all banks, shows that average z-scores declined following the Great Recession and are declining following the outbreak of the pandemic.

FIGURE 7

Bank Z-Scores over Time

Average and standard deviation



Source: Federal Financial Institutions Examination Council call report.
Notes: Q = quarter. Gray bars indicate the financial crisis, the outbreak of the COVID-19 pandemic, and the 2023 regional bank crisis. Data include only commercial and savings banks that are FHLBank members at the time of estimation.

We also find that, on average, larger banks (solid yellow line) have higher z-scores compared with smaller banks. The standard deviation of z-score is much higher than the average value (in many years, more than double the average), indicating a large variation in z-scores across banks. Also, in most years, the yellow dotted line representing the standard deviation for larger banks is higher than that of smaller banks.

To examine the relationship between FHLBank advances and z-scores, we also run a fixed-effect model. Here, we restrict the sample to those that are FHLBank member banks at the time of estimation. Additionally, because z-scores are calculated using 16 quarters of data, the start of the sample is from Q1 2006. Our dependent variable z-score, and our core independent variable, is the FHLBank advances over total assets in the prior quarter.[18] We control for liquidity, financial health, and asset size, as well as time and bank fixed effects. Again, the control variables are in lag values, but the results remain similar if we change these variables to the same period as the dependent variable.

Results

Table 3 presents the results of the fixed-effect model. We find that a 1 percentage-point increase in FHLBanks' advances over total assets is associated with a 19-point increase in the z-score in the following quarter. Relative to the average z-scores shown in figure 7, this represents a meaningful improvement in the financial stability measure.[19]

The size of the coefficient is smaller for the member banks with assets below $500 million, in line with figure 7, which shows that there is less variation in the standard deviation of z-score among smaller bank members.[20] In both columns, the size of the coefficient is comparable with the average value of the z-score and is about half the standard deviation of the z-score in the sample period. By providing stable liquidity, advances allow banks to avoid asset fire sales or costly borrowing, which in turn can protect earnings. The results are in line with the work of Kanas and Zervopoulos (2022), confirming the stabilizing benefits of FHLBank advances even in the bank-level analysis.

TABLE 3

Fixed-Effect Regression Results: Z-Score and FHLBank Advances

Dependent variable: Z-score$_t$

Variables	(1) All FHLBank members	(2) Members with assets < $500 million
FHLBank advances / total assets$_{t-1}$	19.106***	11.597***
	(4.359)	(3.854)
Liquid assets / total assets$_{t-1}$	-8.822***	-10.175***
	(2.005)	(1.809)
Tier 1 capital / total assets$_{t-1}$	2.060	17.910***
	(6.247)	(5.862)
D90+ loans / total assets$_{t-1}$	-128.872***	-97.319***
	(5.527)	(5.000)
Credit loss provision / total assets$_{t-1}$	-333.193***	-217.008***
	(35.327)	(26.386)
Return on assets$_{t-1}$	32.004***	23.209***
	(6.533)	(5.804)
Log(total assets), 4-quarter MA	-1.454***	2.060***
	(0.380)	(0.438)
Constant	45.569***	0.260
	(5.394)	(5.757)
Year FE	Y	Y
Bank FE	Y	Y
Observations	390,234	292,120
R^2	0.014	0.014
Number of RSSD ID	7,309	6,276

Source: Federal Financial Institutions Examination Council call report.

Notes: D90+ = loans that are 90 days or more delinquent; FE = fixed effects; MA = moving average; RSSD = research, statistics, supervision, discount. Robust standard errors in parentheses. Within-group R^2 is presented in the table. The low R^2 indicates that the unobserved heterogeneity (the fixed effects) accounts for a significant portion of the overall variation in the dependent variable, leaving less to be explained by the included time-varying predictors. If we include the variation of the dependent variable explained by the fixed effects, R^2 in the two columns are 0.398, and 0.466, respectively. We were initially puzzled about the negative coefficient on the log of liquid assets over total assets. Although liquid assets reduce volatility, they also reduce profitability, leaving the expected sign ambiguous.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Question 3: Does FHLBank Membership Reduce the Likelihood of Bank Failure?

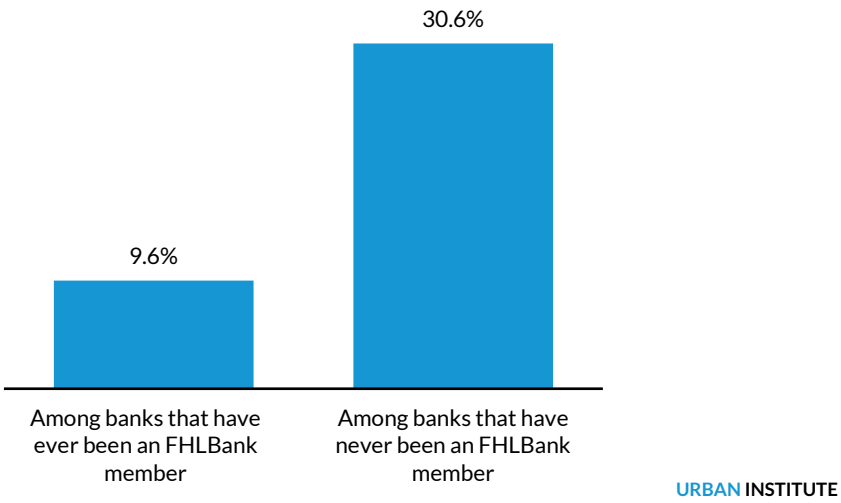
The core test of the FHLBank System's stabilizing effects is whether membership reduces the likelihood of bank failure. Bank failures impose costs on failed institutions and on the federal deposit insurance system and the broader economy.

Data and Methodology

There were 569 bank failures between 2002 and 2024, according to the FDIC failed bank list. Among these, 172 banks had never been FHLBank members, while 397 banks had held FHLBank membership at some point. The failure rate among banks that were never FHLBank members substantially exceeds that of banks with any history of FHLBank membership (figure 8).

FIGURE 8

Share of Failed Banks, 2002–24



Sources: Call report and Federal Deposit Insurance Corporation failed bank list data.

But the temporal variability in FHLBank membership status—with banks frequently transitioning into and out of membership—calls for a more rigorous analytical approach. To determine whether FHLBank membership exhibits a negative (or positive) association with bank failure probability, we examine membership status at the time immediately preceding failure while controlling for other factors potentially correlated with institutional distress.

Following Moore et al. (2023), we conduct a probit analysis where the dependent variable equals 1 if a bank fails in the quarter and 0 otherwise. Our key explanatory variable is FHLBank membership status in the quarter before the failure. The control variables include year-over-year changes in liquidity (FHLBank advances over total assets, liquid assets over total assets), and changes in financial health (tier 1 capital over total assets, credit loss provisions over total assets, return on average equity, and four-quarters' moving average log value of advances and total assets). The explanatory variables are all lagged by one quarter, as failed banks do not submit call reports to the FDIC from the quarter when they failed.

Results

Table 4 shows the results. Once we include controls for size and financial status, we find that FHLBank membership is negatively associated with the likelihood of bank failure. Columns 1 and 2 show the results for all banks, with column 2 adding year fixed effects to control for time-specific factors. We also run the same model a second time, restricting the banks to those with assets below $500 million. The size of the coefficient becomes slightly larger, but the results remain similar. We also find that banks experiencing an increased likelihood of failure take out more advances. This is because struggling banks do disproportionately take out advances: some of these fail, but others survive partly because of their access to liquidity at a critical time. Although this might raise concerns about moral hazard issues on the part of the failed banks, it must be weighed against the benefit to the system's stability of the banks that do not fail. Our methodology allows us to do this.

We estimate marginal effects from the probit model[21] and find that FHLBank membership decreases the likelihood of bank failure by about 1 basis point per quarter. This number is small, reflecting the historically low probability of bank failures. Even during the Great Recession, the quarter with the highest share of bank failures (Q2 2010) had just 0.56 percent of banks fail. Applying the marginal effect to the historical average of bank failure rates (10 basis points) in years that were included in columns 2, we estimate that FHLBank membership reduces the bank failure rate by about 10 percent after controlling for all other variables in table 4.[22]

TABLE 4

Probit Model Results I: Bank Failure and FHLBank Membership

Dependent variable: Bank failure dummy$_t$

	(1)	(2)	(3)	(4)
Variables	**All banks**		**Banks with assets < $500 million**	
FHLBank member$_{t-1}$	-0.193***	-0.285***	-0.197***	-0.307***
	(0.037)	(0.039)	(0.044)	(0.048)
ΔFHLBank advances / total assets$_{t-1}$	1.251***	1.754***	1.154**	1.848***
	(0.339)	(0.592)	(0.493)	(0.678)
ΔLiquid assets / total assets$_{t-1}$	1.482***	1.596***	1.713***	1.904***
	(0.244)	(0.267)	(0.262)	(0.302)
ΔTier 1 capital / total assets$_{t-1}$	-2.009***	-2.099***	-2.041***	-2.154***
	(0.357)	(0.429)	(0.367)	(0.450)
ΔCredit loss provisions / total assets$_{t-1}$	15.443***	13.859***	12.316***	11.773***
	(3.349)	(3.357)	(3.871)	(4.000)
ΔReturn on total assets$_{t-1}$	-0.720***	-0.638***	-0.675***	-0.593***
	(0.204)	(0.234)	(0.195)	(0.228)
Log(FHLBank advances), 4-quarter MA	1.157***	1.465***	1.025***	1.539***
	(0.139)	(0.245)	(0.173)	(0.283)
Log(total assets), 4-quarter MA	0.041***	0.061***	0.142***	0.166***
	(0.008)	(0.010)	(0.023)	(0.025)
Constant	-3.614***	-4.520***	-4.777***	-5.617***
	(0.098)	(0.223)	(0.261)	(0.342)
Year FE	N	Y	N	Y
Observations	532,215	378,846	421,286	299,572

Sources: Federal Financial Institutions Examination Council call report and Federal Deposit Insurance Corporation failed bank list data.

Notes: FE = fixed effects; MA = moving average. Robust standard errors in parentheses. Δ indicates the difference in the value from a year earlier. All control variables are in one-quarter lags.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Two main factors that could explain this: (1) FHLBank members can access liquidity when needed and (2) the FHLBank System has the ability to terminate a member or restrict borrowing because of credit deterioration. The FHLBanks are charged with monitoring their member institutions, reviewing their financial statements, and imposing borrowing limits. If the institution fails to meet plans for shoring up its capital, it can be terminated.[23]

This means the negative coefficient for the FHLBank member dummy variable can be attributable to selection biases. Banks self-select into FHLBank membership based on their business models and funding needs, and the FHLBank System can terminate members for credit deterioration. Additionally, FHLBank membership also requires most depository institutions to hold at least 10 percent of their assets in residential mortgages at the time of initial membership. Although this indicates that the FHLBank System is successful at evaluating applicants' financial status, it does not fully capture the

benefits of FHLBank membership. To address this issue, we select banks with z-scores below 0.62, the bottom 10 percent of the z-score distribution. These banks have a higher likelihood of failing.[24]

The marginal effect of FHLBank membership is −0.36 percentage points (calculated from column 2 in table 5). That is, for banks with a higher risk of failure, FHLBank membership reduces the likelihood of bank failures by 0.36 percentage points. Low-z-score banks typically reflect some combination of low capital, low profitability, or high earnings volatility. Once we limit the sample to banks with higher solvency risks, we see a stronger negative relationship between FHLBank membership and the likelihood of bank failure, suggesting that FHLBank membership and access to advances help prevent member banks from failing.

TABLE 5

Probit Model Results II: Bank Failure and FHLBank Membership: Banks with Z-Scores below 0.62

Dependent variable: Bank failure dummy$_t$

	(1)	(2)	(3)	(4)
Variables	**All banks**		**Banks with assets < $500 million**	
FHLBank member$_{t-1}$	-0.618***	-0.524***	-0.606***	-0.473***
	(0.121)	(0.135)	(0.142)	(0.157)
ΔFHLBank advances / total assets$_{t-1}$	4.748***	3.856***	4.840***	3.458**
	(0.913)	(1.203)	(1.174)	(1.530)
Control	Y	Y	Y	Y
Year FE	N	Y	N	Y
Observations	76,980	16,879	64,374	14,022

Sources: Federal Financial Institutions Examination Council call report and Federal Deposit Insurance Corporation failed bank list data.

Notes: FE = fixed effects. Δ indicates the difference in the value from a year earlier. All control variables are in one-quarter lags and are the same as those included in table 4.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Recent studies have also quantified the number of banks prevented from failure. A Federal Reserve Bank of New York study (Cipriani, Eisenbach, and Kovner 2024) examined high-frequency interbank payment data to trace deposit flow and showed that 22 banks experienced bank runs during March 2023, and 2 of them failed. Banks that experienced a run and survived it did so by borrowing new funds and raising deposit rates, not by selling liquid assets. Virtually all the banks that experienced a run borrowed from the FHLBank System. FHLBank Dallas did a similar exercise, using quarterly FHLBank advance changes, FHLBank advances over total assets, and outflows of uninsured deposits to identify banks that experienced a large outflow of uninsured deposits in early 2023 but did not fail. These studies do not definitively establish causality; they identify banks that survived runs. These institutions

increased their use of FHLBank advances, though these banks might have also increased their use of other funding sources and benefited from various regulatory interventions.

Question 4: Do FHLBank Advances Promote Financial Stability in the Overall Banking System?

Beyond effects on individual banks, the FHLBank System's GSE status suggests it is meant to improve overall financial system stability. This analysis examines whether FHLBank advances actually reduce systemic risk in the banking sector by stabilizing individual institutions. The question of system-wide effects is particularly important given ongoing policy debates about the FHLBank System's role. Critics such as Gissler, Narajabad, and Tarullo (2023) argue that the system might amplify financial stability risks through increased maturity transformation, but proponents contend that the system's liquidity provision helps stabilize the entire financial system (Kanas and Zervopoulos 2022). Our analysis provides empirical evidence that supports the latter position.

Data and Methodology

Our two core variables for this analysis are the monthly FHLBank advances outstanding and the CATFIN (Conditional Tail Financial Risk Indicator) index. The index measures the aggregate systemic risk in the banking sector. We use the CATFIN data from Allen, Bali, and Tang (2012), updated to 2024 and available from the paper's database. The CATFIN index, expressed as a percentage, proxies the likelihood of severe financial losses across a large cross-section of financial firms using several methodologies, including the value-at-risk approach. The value at any point in time is a cross-section of the included firms; an increase in CATFIN for banking indicates rising aggregate risk in the system. A higher value indicates greater systemic risk. The CATFIN index is known to be a strong predictor of future macroeconomic downturns (Allen, Bali, and Tang 2012).

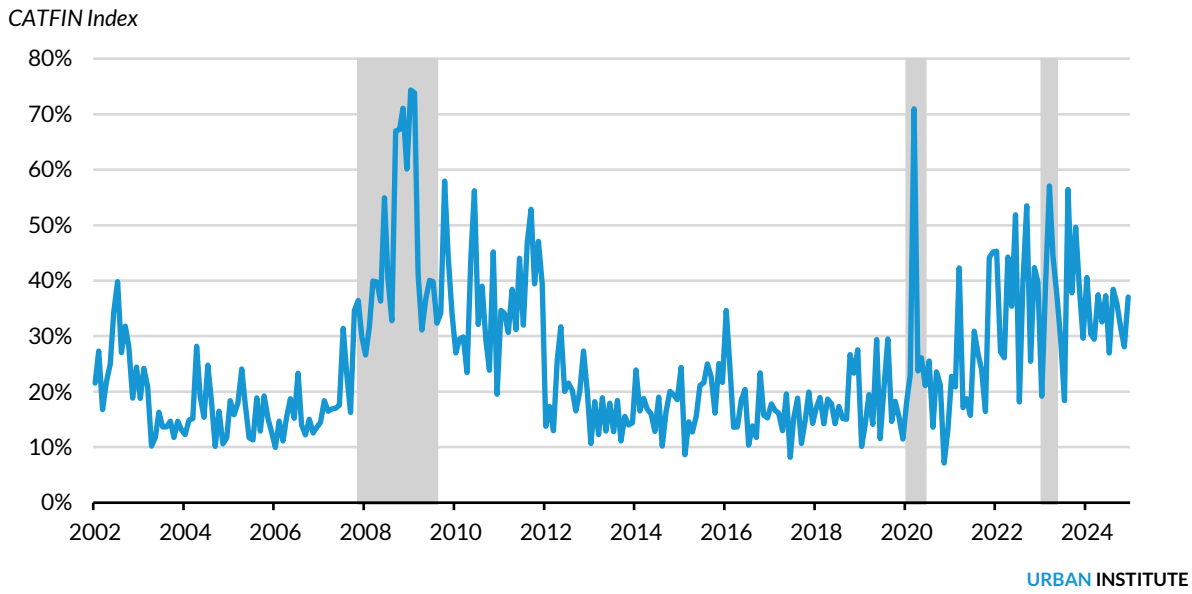
Figure 9 shows the CATFIN index over time. The index exhibits significant variation over the sample period, reflecting major episodes of financial stress in the US banking system. The index shows relatively low and stable values (generally below 20 percent) during the early 2000s, followed by a dramatic spike approaching 70 percent during the financial crisis.

Following the financial crisis, the CATFIN index gradually declined but remained somewhat elevated compared with precrisis levels through the early 2010s. The index shows another notable spike to around 70 percent in March 2020, corresponding to the initial COVID-19 pandemic shock when financial markets experienced severe disruption and banking sector stress intensified rapidly.

Since 2020, the index has continued to show substantial volatility, with values fluctuating between 20 and 60 percent. The most recent period (2022–24) shows a somewhat elevated reading compared with the pre-2008 baseline, suggesting that systemic risk in the banking sector remains above historical norms despite the absence of acute crisis conditions.

FIGURE 9

CATFIN Index



Source: See the CATFIN data at "Data and Working Papers," Turan G. Bali, accessed September 5, 2025, https://sites.google.com/a/georgetown.edu/turan-bali/data-working-papers.
Notes: Gray bars indicate the financial crisis, the outbreak of the COVID-19 pandemic, and the 2023 regional bank crisis. Data include only commercial and savings banks that are FHLBank members at the time of estimation.

One of the advantages of our analysis is access to monthly advance data. Because Kanas and Zervopoulos (2022) used data on quarterly advances, which are publicly available, they matched the monthly CATFIN index with quarterly advance data using a mixed-frequency VAR model. We have obtained the daily advance data from the 11 FHLBanks and aggregated these data monthly to match the frequency with the CATFIN index.

The sample period is from January 2016,[25] when all 11 banks began to report daily advances, through December 2024, the period for which we received advance data for all 11 FHLBanks, providing 108 observations across a period that includes both normal market conditions and significant stress episodes, including the pandemic and the 2023 banking turmoil.

In addition to the CATFIN index and total FHLBank advances, we include the one-year Treasury rate (capturing interest rate environment effects) and the industrial production index (controlling for aggregate economic activity). Using these variables, we first conduct VAR analysis and select two months of lag based on the Akaike information criterion and the Schwarz information criterion to include in the final model and estimate an impulse response function to identify how the CATFIN index responds to a positive shock to FHLBank advances over the long run. The industrial production index and one-year Treasury rate are downloaded from Federal Reserve data.[26]

Results

Table 6 presents the results of the VAR model. We order the variables from most to least exogenous: industrial production (most exogenous to banking sector conditions), one-year Treasury rate (reflecting broader monetary policy), CATFIN index (banking sector risk measure), and FHLBank advances (most endogenous, as advance usage responds to banking conditions). For robustness, we have also shifted the four variables in multiple orders, as VAR models can be sensitive to ordering, but found that our results remain largely unchanged.

As we are interested only in the response of CATFIN to the FHLBank advance shock, we assume that the FHLBank advance is the most endogenous in the VAR by assigning it as the last variable. We selected two months of lag based on the Akaike information criterion and the Schwarz information criterion. The third column presents the relationship between the CATFIN index and FHLBank advances. The VAR result in column 3 shows a significantly negative relationship between the CATFIN index at time t and the log value of FHLBank advances two months prior (t-2).

TABLE 6

Vector Autoregression Results

	(1)	(2)	(3)	(4)
	Industrial production$_t$	**1-year Treasury rate$_t$**	**CATFIN index$_t$**	**Log (total advances)$_t$**
Industrial production$_{t-1}$	0.807***	0.018	-0.007	0.009***
	(0.092)	(0.013)	(0.008)	(0.003)
Industrial production$_{t-2}$	-0.115	-0.009	-0.004	-0.004
	(0.087)	(0.013)	(0.007)	(0.003)
1-year Treasury rate$_{t-1}$	4.003***	1.464	0.037	0.030
	(0.603)	(0.088)	(0.050)	(0.020)
1-year Treasury rate$_{t-2}$	-3.386***	-0.522***	0.043	-0.031
	(0.608)	(0.089)	(0.050)	(0.020)
CATFIN$_{t-1}$	-4.716***	0.284**	-0.013	0.063
	(1.298)	(0.189)	(0.107)	(0.044)
CATFIN$_{t-2}$	-0.408**	0.411**	-0.017	-0.049
	(1.327)	(0.194)	(0.109)	(0.044)
Log(total advances)$_{t-1}$	-6.598**	0.737*	0.308	1.374***
	(2.996)	(0.437)	(0.247)	(0.100)
Log(total advances)$_{t-2}$	4.983	-0.596	-0.649***	-0.401***
	(3.180)	(0.464)	(0.262)	(0.107)
Constant	74.837	-4.789	10.554***	0.269
	(26.255)	(3.831)	(2.165)	(0.880)
R^2	0.880	0.990	0.460	0.980

Sources: See the CATFIN data at "Data and Working Papers," Turan G. Bali, accessed September 5, 2025, https://sites.google.com/a/georgetown.edu/turan-bali/data-working-papers. The FHLBank advance data come from the Federal Reserve Bank of St. Louis FRED (Federal Reserve Economic Data): https://fred.stlouisfed.org/.
Notes: CATFIN = Conditional Tail Financial Risk Indicator. Standard errors in parentheses.
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Based on the VAR results, we estimate the impulse response function to identify how the CATFIN index reacts to a positive shock to FHLBank advances over 16 months.[27] We normalize the log value of the FHLBank advances, so the impulse response function in figure 10 indicates the estimated change of CATFIN after a 1 percent increase in FHLBank advances. We present only the impulse response of CATFIN to FHLBank advance shocks, as this is the primary relationship of interest for our analysis.

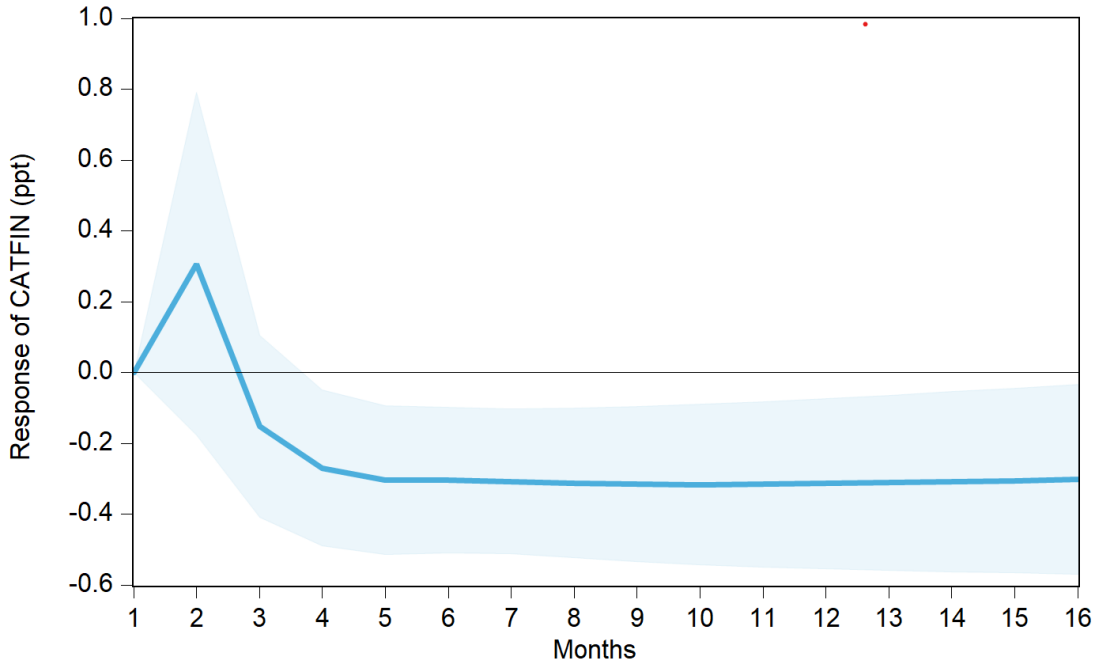
The CATFIN index shows an initial positive response to increased FHLBank advances. Though this estimated response is not statistically significant in the first two months, the initial increase might reflect the market's recognition that higher advance usage signals underlying stress in the banking system. The response quickly turns negative, crossing zero in month 3. This transition illustrates the stabilizing effect of FHLBank advances taking hold as the liquidity support begins to alleviate banking sector stress. From month 4 onward, the response stabilizes at approximately −0.25 to −0.30 percentage points, indicating a permanent reduction in systemic risk. This persistent negative effect demonstrates that FHLBank advances provide lasting stability benefits to the banking system. The

upper bound of the confidence intervals (shaded area) is negative from month 4, indicating the negative effect on systemic risk is statistically significant.

FIGURE 10

Impulse Response Function

Response to a 1 percent increase in FHLBank advances on the CATFIN index



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Sources: See the CATFIN data at "Data and Working Papers," Turan G. Bali, accessed September 5, 2025, https://sites.google.com/a/georgetown.edu/turan-bali/data-working-papers. The FHLBank advance data come from the Federal Reserve Bank of St. Louis FRED (Federal Reserve Economic Data): https://fred.stlouisfed.org/.
Notes: CATFIN = Conditional Tail Financial Risk Indicator; ppt = percentage point. Shaded areas are 95 percent confidence intervals.

Over the long run, we find that a 1 percent positive shock in FHLBank advances persistently reduced the CATFIN index by 0.30 percentage points. For robustness, we also estimate a VAR model that includes Federal Reserve discount window lending to banks as an additional variable. The results from the VAR model and impulse response function show that the impact of FHLBank advances on the CATFIN index remains statistically significant and is of similar magnitude.[28] The size of this impact is economically more significant during the crisis period, as the changes in advances are larger. For example, between January 2023 and May 2023, the period covering the 2023 regional bank crisis, our estimated shocks to monthly advances increased by around 20 percent, which translates to a 6 percent reduction in the CATFIN index. These findings demonstrate that FHLBank advances are associated with

meaningful systemic risk reduction. The persistent negative relationship with the CATFIN index indicates that the liquidity support from the FHLBank System corresponds with lasting stability benefits that extend beyond individual member institutions to the broader financial system.

In general, our impulse response function shows that although markets might initially interpret increased advanced usage as a stress signal, the long-term effect is a substantial and persistent reduction in system-wide financial risk.

Quantifying the Costs of Bank Failures

To further assess the economic value of the FHLBank System's role in preventing bank failures, we estimate both the direct costs to the deposit insurance system and the broader economic costs of banking sector disruption. Our estimates focus on the savings from preventing bank failures, both directly and indirectly. The estimates do not extend to the broader counterfactual: absent FHLBank advances, what alternative sources of countercyclical liquidity support might banks rely on, and at what cost? If such support were less available, banks and other depository institutions could adjust their portfolios, perhaps by holding fewer long-duration assets such as mortgages. This could in turn affect the scale and composition of bank lending and, ultimately, economic growth. The next paper in this series will examine the influence of FHLBank advances on members' lending activities. Still, the broader macroeconomic implications cannot be fully assessed, as the world without FHLBanks cannot be tested with existing data.

BOX 1

Historical Perspective on Bank Failure Costs

Martin Gruenberg, former chairman of the FDIC, gave a thumbnail history of bank failures in a recent Brookings Institution speech outlining distinct periods of banking sector stability and distress.[a] From the end of World War II to 1979, only 160 banks failed, fewer than 5 per year. This was largely because of laws that heavily restricted competition in banking, including a cap on deposit rates, restrictions on branching and interstate banking, and restrictions on product offerings.

The deregulation era began in 1980, with the passage of the Depository Institutions Deregulation and Monetary Control Act. In 1982, the Garn–St. Germain Act removed many of the product limitations on thrifts to allow them to improve their profitability in the wake of higher interest rates. Between 1980 and 1994, in response to high interest rates and challenges in the commercial real estate and energy sectors, approximately 1,300 thrifts failed, one-third of the industry. These failures cost taxpayers an estimated $132 billion from 1980 to 1994.[b] Over this same period, more than 1,600 banks failed,

including Continental Illinois National Bank and Trust Company, the first "too big to fail" bank. In response to these failures, the regulatory environment was strengthened, and there were very few bank failures until the financial crisis.

Nearly 500 banks failed between 2008 and 2013, which cost the FDIC approximately $69 billion. Many of these failed institutions were community banks, often in parts of the country where the subprime mortgage crisis and recession made real estate problems severe, but the failures also included Washington Mutual, the largest failure in the FDIC's history, with $300 billion in assets. In the wake of the Great Recession, regulations were again tightened, capital standards were strengthened, and there were few bank failures until 2023.

In March 2023, Silicon Valley Bank, the 16th-largest US bank, with over $200 billion in assets, experienced a bank run. The bank was funded mostly by uninsured deposits invested in long-term government securities, and the value of these securities fell as interest rates rose, leading to a classic duration mismatch that forced the bank to sell its portfolio of securities at a large loss. Uninsured depositors immediately began to withdraw their deposits. The fact that uninsured depositors would experience losses alarmed depositors at other institutions, and they also fled. Signature Bank in New York and First Republic Bank in California both failed. These failures, the second-, third-, and fourth-largest banks to fail in US history, plus two smaller failures, cost the FDIC $20 billion in 2023.[c] Cipriani, Eisenach, and Kovner found that 22 other banks experienced bank runs, and most relied on FHLBank advances to survive.[d] Absent this safety net, FDIC losses would have been much larger.

[a] Martin J. Gruenberg, "Three Financial Crises and Lessons for the Future," speech at the Brookings Institution, Washington, DC, January 14, 2025.
[b] Government Accountability Office (GAO), *Financial Audit: Resolution Trust Corporation's 1995 and 1994 Financial Statements* (Washington, DC: GAO, 1996); and Gruenberg, "Three Financial Crises."
[c] Federal Depository Insurance Corporation (FDIC), *Annual Report 2023* (Washington, DC: FDIC, 2024), part III.
[d] Marco Cipriani, Thomas M. Eisenbach, and Anna Kovner, *Tracing Bank Runs in Real Time* (New York: Federal Reserve Bank of New York, 2024).

Direct and Indirect Costs to the System

Focusing on the recent crisis period, the combined $69 billion (from 2008 to 2013) and $20 billion (in 2023) in FDIC costs total $89 billion. But these costs were concentrated almost entirely in the crisis years, with minimal FDIC losses during normal periods. The question is how much higher these crisis-period costs would have been without the FHLBank System's liquidity support to stem contagion and prevent additional bank failures.

Based on our CATFIN analysis showing that FHLBank advances reduce systemic banking sector risk, we conservatively estimate that FDIC losses during these crisis periods would have been 20 to 33 percent higher without the FHLBank System. Using the midpoint of this range (26.5 percent), the additional losses would have totaled approximately $23.75 billion from 2000 to 2024. This represents annual savings of $0.95 billion to the federal deposit insurance system.

Moreover, focusing on direct losses to the FDIC ignores losses to uninsured depositors (when the FDIC does not arrange for the deposits to be taken over by another institution), investors, and other bank customers, plus the economic costs of job losses and other spillover costs to the economic activities, all of which are substantial, particularly when bank failures become contagious, potentially triggering broader economic contraction, reduced credit availability, and attendant job losses.

How do we estimate these broader indirect costs? Bräuning and Sheremirov (2023) provide crucial insights into the macroeconomic costs of banking sector distress. They looked at data from 16 advanced economies from 1960 to 2014, with the output and unemployment effects tracked through 2019. They classify episodes of widespread banking system distress into two categories: financial distress and systemic banking crisis.[29] They showed that periods of financial distress are typically followed by a sizable and persistent economic decline. There are two effects calculated:

1. Financial distress effects
    - » real gross domestic product (GDP) per capita declines by 1.3 percent within one year, and full recovery does not occur over the subsequent decade
    - » unemployment rises by 1 percent over two years and stays above trend for approximately seven years
2. Systemic banking crisis effects
    - » GDP and employment effects are two to four times larger than financial distress; a midpoint of three times larger would translate to a 3.9 percent decline in real GDP per capita

Quantifying the Value of the FHLBank System

To estimate the FHLBank System's value, we analyze the economic benefit of crisis prevention based on our empirical results. This analysis builds on our empirical findings that FHLBank advances reduce individual bank failure rates and lower system-wide risk measures.

Start with the financial distress effect estimation. Our analysis under question 3—Does FHLBank membership reduce the likelihood of bank failure?—demonstrates that FHLBank membership reduces the likelihood of individual bank failure by 10 percent. That is, the historical average quarterly bank failure rate is 0.1 percent, and our analysis showed that it reduced this failure rate by 0.01 percentage points (10 percent).

Assuming three to five periods of financial distress per century (e.g., the savings and loan crisis or the 2023 midsize-bank runs) and extrapolating the FHLBanks' 10 percent risk reduction capacity over a century, we conservatively estimate that the FHLBank System prevents approximately 0.3 to 0.5 minor financial distress crises every 100 years.

For the systemic risk effect estimation, we use the analysis under question 4. We show that a 1 percent increase in FHLBank advances reduces the CATFIN index by 0.3 percentage points. Using a 20 percent average increase in advances during crises, we calculate that FHLBank intervention produces a 6 percent reduction in the CATFIN index (20 percent × 0.3). This calculation is supported by our robustness analysis of the 2023 regional banking crisis, where we observed approximately a 20 percent increase in advances and a corresponding 6 percent reduction in the CATFIN index. Assuming crisis prevention thresholds from 20 percent (one in five) to 33 percent (one in three), and assuming there are three major crises per century, FHLBank advances could prevent between 0.6 and 1.0 systemic crises per century, with the conservative estimate at 20 percent prevention preventing 0.6 crises and the more optimistic (but still conservative) 33 percent prevention preventing 1.0 crisis per century.

Below is the cost calculation based on the current US GDP of $30 trillion using the optimistic prevention scenario for both minor and major systemic crises. We account for the persistent economic effects over a decade by adding 50 percent of the first-year impact to capture years 2 through 10. Because this is a point-in-time estimate, we are using GDP, rather than real GDP per capita; the numbers will be the same.

1. Financial distress prevention: $2.925 billion per year
    - » GDP impact year 1: 1.3% × $30 trillion = $390 billion one-time cost
    - » GDP impact years 2 through 10: 1.3% x $30 trillion x 50% = $195 billion
    - » Total cost per crisis: $585 billion
    - » Annualized over a century: 0.5 x $585 billion ÷ 100 = $2.925 billion per year
2. Systemic banking crisis prevention: $17.550 billion per year
    - » GDP impact year 1: 3.9% × $30 trillion = $1.17 trillion one-time cost
    - » GDP impact years 2 through 10: $1.17 x 50% = $585 billion
    - » Total cost per crisis: $1.755 trillion
    - » Annualized over a century: 1 x $1.755 trillion ÷ 100 = $17.55 billion per year
3. Total annual economic value: $21.425 billion per year
    - » Crisis prevention benefits: (1) + (2) = $20.475 billion per year

» Direct FDIC cost savings: $0.95 billion per year

Table 7 presents the annual economic value across different scenarios, based on the current US GDP of $30 trillion.

TABLE 7

Annual Economic Value of Crisis Prevention under Different Scenarios

Crisis prevention scenario	Financial distress (3 crises per century)	Financial distress (5 crises per century)
Major systemic crisis: 1 in 5 preventions	**$13.235 billion per year** Financial distress: $1.755 billion Systemic: $10.53 billion FDIC savings: $0.95 billion	**$14.405 billion per year** Financial distress: $2.925 billion Systemic: $10.53 billion FDIC savings: $0.95 billion
Major systemic crisis: 1 in 3 preventions	**$20.255 billion per year** Financial distress: $1.755 billion Systemic: $17.55 billion FDIC savings: $0.95 billion	**$21.425 billion per year** Financial distress: $2.925 billion Systemic: $17.55 billion FDIC savings: $0.95 billion

Source: Authors' calculations from estimates above.
Note: FDIC = Federal Deposit Insurance Corporation.

Across all scenarios, the total estimated annual economic value ranges from $13.235 billion to $21.425 billion, substantially exceeding the FHLBank System's $6.9 billion benefit from its GSE status.[30] This provides benefit-cost ratios ranging from 1.9:1 to 3.1:1. Even our most conservative estimate demonstrates that the FHLBank System's role in preventing bank failures and reducing systemic risk generates substantial economic value that justifies the implicit government support provided to the system.

Even under more conservative assumptions about crisis prevention—such as reducing crisis probability by only 25 percent rather than 50 percent—the economic benefits would still exceed the value of the implied government support. These calculations demonstrate that the FHLBank System's role in preventing bank failures and reducing systemic risk generates substantial economic value that justifies government support to the system. We are looking solely at the benefits that come from the liquidity provisions. We have not incorporated the value of the lending activities, affordable housing programs, and other community development programs.

BOX 2

The Benefits of Increased Mortgage Lending and Lower Debt Costs to Borrowers

A good deal of the FHLBank System's benefits from its GSE status derives from the lower borrowing rates the system can access on its consolidated debt. Some of these costs are passed on to member institutions and, in turn, to borrowers. Hence, borrowers can benefit from the lower debt costs accessed by the FHLBank System, by both increased access to credit and by lower mortgage rates.

Using a quasi-experimental approach of institutions that have experienced bank mergers, Zhang shows that FHLBank funding increases mortgage originations by 16.3 percent and reduces mortgage rates by 18 basis points.[a] FHLBank member banks hold approximately $2.5 trillion in one-to-four-family mortgages.

If we assume volume would be 16.3 percent lower absent the FHLBanks and assume that rates would be 18 basis points higher, we can calculate that the net savings to consumers each year are around $3.8 billion ($2.5 trillion in one-to-four-family mortgages / 1.163 x 18 basis points per annum). And this ignores any benefit from other FHLBank members that provide mortgage finance (e.g., savings banks, credit unions, and community development financial institutions). That is, $3.8 billion of the $6.9 billion in implied government support to the FHLBanks attributable to GSE status is ultimately transferred to borrowers, as lower borrowing costs and increased credit access. If we were to net this $3.8 billion out, we would be left with a remaining net cost to the government of $3.1 billion. This number would be compared with our estimated $13.2 to $21.4 billion in annual benefits from reduced systemic risk and avoided failures, resulting in a benefit-cost ratio ranging from 4.2:1 to 6.9:1.

[a] Dayin Zhang, *Government-Sponsored Wholesale Funding and the Industrial Organization of Bank Lending* (New York: SSRN, 2020).

Conclusion

This study illustrates the pathway through which the FHLBank System enhances financial stability. Banks increase their use of FHLBank advances during periods in which they are liquidity constrained, and those advances are associated with higher z-scores, indicating reduced default risk. FHLBank membership is linked to significantly lower failure rates, and aggregate use of advances correlates with reduced systemic risk in the banking sector. Our estimates suggest that the FHLBank System helps prevent costly bank failures and reduces the likelihood of macroeconomic downturns.

Although our findings are consistent with a stabilizing role for the FHLBank System, they do not definitively establish causal relationships, given the difficulty of quantifying the counterfactual (i.e., what would occur absent the FHLBanks). Our analysis provides valuable empirical evidence on the associations between FHLBank membership, advance usage, and various measures of financial stability.

This work contributes to the understanding of the FHLBank System's role in the financial system and establishes a framework for evaluating its economic value. Given that the FHLBank System has been relatively understudied despite its nearly century-long role in the financial system, there is room for further research that could attract additional scholarly attention to this important institution. Ongoing exploration of the mechanisms and conditions under which the FHLBank System enhances financial resilience will be critical for informing policy and improving the system.

Notes

[1] "Statement about Signing the Federal Home Loan Bank Act," The American Presidency Project, accessed July 28, 2025, https://www.presidency.ucsb.edu/documents/statement-about-signing-the-federal-home-loan-bank-act.

[2] The 11 regional banks are located in Atlanta, Boston, Chicago, Cincinnati, Dallas, Des Moines, Indianapolis, New York City, Pittsburgh, San Francisco, and Topeka. See "About FHLBank System," Federal Housing Finance Agency, accessed July 28, 2025, https://www.fhfa.gov/supervision/federal-home-loan-bank-system/about.

[3] Urban Institute calculations using the call report data from the third quarter of 2024.

[4] These include exemptions from most Securities and Exchange Commission registration requirements related to their debt and capital stock, as their debt is considered government securities for securities law purposes. Furthermore, FHLBanks have a $4 billion line of credit with the US Treasury. FHLBank debt is eligible for purchase by the Federal Reserve in its open market operations and for investment by commercial banks and thrifts, as well as for collateralizing public deposits. Finally, FHLBanks are allowed to use Federal Reserve banks as their fiscal agents.

[5] In addition to advances, the FHLBanks provide other products to their members, including Acquired Member Assets purchases and standby letters of credit.

[6] David Torregrosa and Mitchell Remy, "The Role of Federal Home Loan Banks in the Financial System," Congressional Budget Office, accessed July 28, 2025, https://www.cbo.gov/publication/60064.

[7] Some argue that the number has been overestimated because the funding cost is not a direct cost to the government or its taxpayers. Others argue that the number has been underestimated because there might be additional social costs.

[8] In this report, we focus exclusively on the banking system, both because of its large footprint with the FHLBank System and because bank runs can trigger systemic instability.

[9] One exception is American Express National Bank, a multinational financial corporation.

[10] The amount of advances an individual bank can take is tied in part to the amount of FHLBank regulatory capital stock. If we instead look at the percentage of regulatory capital stock held by member category and compare it with the dollar amount of outstanding advances by member category, the numbers correspond closely. For example, commercial banks hold 51.5 percent of the regulatory capital and account for 51.3 percent of the dollar amount of outstanding advances. Insurance companies hold 19.8 percent of the regulatory capital and compose 21.8 percent of the dollar volume of outstanding advances.

[11] These affected banks were almost all public companies, and there was a concerted effort among some investors to short the stock, further shaking depository confidence in these institutions and exacerbating the rate of withdrawals.

[12] "Seasonal Credit Program," Federal Reserve Bank of New York, accessed July 28, 2025, https://www.newyorkfed.org/banking/seasonalcredit.html.

[13] Susan McLaughlin, "Lessons for the Discount Window from the March 2023 Bank Failures," Yale School of Management, Program on Financial Stability, September 19, 2023, https://som.yale.edu/story/2023/lessons-discount-window-march-2023-bank-failures.

[14] Federal Reserve discount window borrowing is limited to 60 days in any 120-day period. Once banks reach that limit, they cannot borrow further until the clock is reset. For severely undercapitalized institutions, borrowing is

limited to 5 days, inclusive of weekends and holidays. The borrowing line is turned off after that, and no new exposure is allowed until recapitalization.

[15] We recognize that the sign on the 90-day delinquency variable is not in line with expectations, and this might be the result of multicollinearity with the credit loss provision variable. Adding or dropping these variables does not change our main result. We also recognize that there is multicollinearity between some of the independent variables. But we have conducted multiple robustness checks by dropping control variables or adding additional variables and found that our main results remain similar.

[16] Aaron Klein and Kathryn Judge, "Re: Request for Information in Federal Home Loan Bank Mission," letter to Sandra L. Thompson, July 14, 2024, https://www.brookings.edu/wp-content/uploads/2024/07/Klein-Judge-FHLB-mission-statement-comment-FINALpdf.pdf; and Nicholas Thielman, "America's 'Other' GSE Problem: The Federal Home Loan Banks, Part I," R Street, June 9, 2025, https://www.rstreet.org/commentary/americas-other-gse-problem-the-federal-home-loan-banks-part-i/.

[17] "Global Financial Development Report Background: Financial Stability," World Bank Group, accessed July 28, 2025, https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-stability.

[18] We also run the models by replacing the lag of FHLBank advance and total assets with the value in the same quarter. This change led to similar results from our findings in table 3.

[19] Because FHLBank advances are secured by mortgage collateral, part of this relationship might reflect the characteristics of the underlying mortgage assets, though the bank fixed effects would capture the unobserved variation of characteristics of mortgage assets across banks.

[20] Negative coefficient on the log of liquid assets over total assets can be puzzling. Although liquid assets reduce volatility, they also reduce profitability, leaving the expected sign ambiguous.

[21] We use column 2, which controls for macroeconomic time shock.

[22] For robustness, we also calculate the marginal effect from logit regression and find that the results do not change.

[23] Nonmembers are more concentrated among smaller banks, which tend to have higher failure rates.

[24] We have run the same regression in table 4 with a z-score added. The sample size is smaller because the z-score is available only from 2006 onward. We find that the z-score has a significantly negative correlation with the likelihood of bank failure. The results can be shared upon request.

[25] Kanas and Zervopoulos (2022) cover the period of the Great Recession. Although we cannot cover the pre-2016 period because of data limitations (using monthly advance data instead of quarterly data), our results lead to a similar conclusion as Kanas and Zervopoulos: advances lowers banks systemic risk.

[26] See the website for Federal Reserve Economic Data at https://fred.stlouisfed.org/.

[27] Other figures from impulse response functions (total or 16 including figure 9) are available upon request.

[28] Results can be provided upon request.

[29] We adopt the authors' framework but use slightly different terminology for clarity: we refer to their "non-systemic financial distress" category as "financial distress" to represent episodes of banking sector stress that do not involve widespread institutional failures, while retaining "systemic banking crisis" for more severe episodes with significant institutional closures.

[30] Torregrosa and Remy, "The Role of Federal Home Loan Banks."

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