

Liquidity Analysis: Decades of Change

FDIC Training Center: 1992

The year is 1992, and the FDIC is holding one of its first Financial Institution Analysis Schools in the newly constructed FDIC Seidman Center in Arlington, Virginia. The instructors have covered all other CAMELS component ratings,¹ and now a presumably unlucky instructor must rush through the final topic: *liquidity*. The instructor opens with “Liquidity should really be rated a 1 or a 5...you either have liquidity or you don’t.” While this definition perhaps possesses a kernel of truth in the extreme, many of the examiners and other specialists attending this session would come to find this feast-or-famine view of liquidity decidedly unhelpful as they began assessing widely divergent liquidity practices in the field.

After his opening statement, the instructor walked the class through several static balance sheet ratios commonly used by bankers and regulators to assess liquidity risk—ratios that implicitly assumed loans were illiquid, securities were liquid, and insured deposits were stable. Over the past 15 years, changes in funding have fundamentally altered these assumptions, making liquidity analysis and risk assessment more complex. This article will look at the most significant liquidity management advances over the past 15 years, including forward-looking cash flow metrics, more robust scenario analysis, and improved contingency funding planning. The importance of these tools is highlighted by recent events, which illustrate how rapidly liquidity conditions can change.

Regulatory Importance of Liquidity

During booming economic environments it is easy to take for granted the

availability of abundant liquidity. During periods of economic downturn, however, liquidity can quickly be elevated to the most important CAMELS component, as it is critical to the continued solvency of a distressed financial institution. A bank may have good asset quality, strong earnings, and adequate capital, but if it is unable to maintain sufficient liquidity, it runs the risk of failure. And the speed at which liquidity can evaporate makes effective risk analysis particularly relevant to bank regulators.

Analysis Framework

The level of a bank’s liquidity is analogous to the amount of water in a bathtub. There are multiple faucets that pour liquidity (cash inflows) into the tub and multiple drains where liquidity leaks out (cash outflows) of the tub. No bank has enough liquidity if we turn off all faucets and open all drains for an extended period. In fact, most banks could not long withstand an extended period when the pace of cash outflows rapidly exceeds the pace of cash inflows. By contrast, in an increasingly competitive environment, few banks can be profitable when drowning in liquidity by pursuing a liquidity maximization strategy. Liquidity management fundamentally involves optimizing the level of liquidity by identifying a variety of faucets to add cash flow when liquidity gets tight and developing strategies to reduce the liquidity drains during times of rapid outflow.

Bank managers can choose to emphasize liquidity sources from either the asset or the liability side of the balance sheet. Fifteen years ago, liquidity at most (nonmoney center) banks was biased toward asset liquidity, and analysis was less complex. Most often, large liquid investment portfolios provided for

¹ There are six regulatory component ratings: capital, asset quality, management, earnings, liquidity, and sensitivity to market risk, collectively known as CAMELS. Each individual component is rated on a scale from 1 to 5, with 1 being the best and 5 being the worst rating.

contingent liquidity needs and complemented operating cash flows as primary sources of liquidity. Over the past decade, liability sources of liquidity have become more centralized and liquidity analysis has become far more complex. Even the smallest banks have had to adjust to a decline in core deposits, and most banks have sought to improve profitability by reducing the size and liquidity of investment portfolios. Thus, most banks use wholesale funding sources and off-balance-sheet sources of liquidity regularly.

Role of Low-Probability Stress Scenarios in Liquidity Management

Bank managers must focus on adequate liquidity during both normal times and times of stress. Liquidity managers are rightly concerned with profitable, efficient operations in normal economic environments. The best managers use scenario analysis to balance the inverse relationship between liquidity and earnings during good times, but will also spend time evaluating the impact of stressful, low-probability liquidity events. When evaluating liquidity risk and isolating the liquidity component rating, examiners are primarily concerned with the risk management information derived from management's evaluation of more extreme liquidity scenarios.

These low-probability scenarios typically come in two broad categories: bank-specific and systemic. Bank-specific crisis scenarios are often the most useful and may include scenarios with deteriorating asset quality or operational fraud. For example, as credit quality for a specific bank deteriorates, the Federal Home Loan Bank (FHLB) or Federal Reserve Bank might restrict the availability of the funding that would otherwise be available by imposing larger haircuts, higher rates, or limits on eligible collateral. Most banks would benefit from considering the effect of these and other adverse scenarios on their operations. Systemic events may

involve disruptions to the broader capital markets or the payment system. Events in the summer of 2007 highlighted the possibility of a systemic shock wherein an entire class of securities (mortgage-backed securities containing subprime collateral) becomes illiquid and an entire class of wholesale funding sources (asset-backed commercial paper) becomes unattractive. These events have illustrated how complex and interlinked financial markets have become: liquidity events affecting one sector can be correlated in unexpected ways to liquidity of other sectors.

Events affecting banks' liquidity are, almost by their nature, unexpected. Unexpected changes in credit risk, operational disruptions, regulatory or policy changes can all affect the liquidity profile of specific asset classes, individual banks, or the financial system. Market participants experiencing these events tend to view them at the time as unprecedented. This perception is correct in the limited sense that each event is caused by unique circumstances. Nevertheless, a broader view of such events over time suggests that unexpected and unprecedented events happen relatively often. This observation suggests a lesson for liquidity risk management: Expect the unexpected. (See Table 1.)

Liquidity Risk Management— Balance Sheet Trends Diversify Liquidity Sources

Against the backdrop of uncertainty around potential liquidity events, bank managers have restructured their balance sheets and sought additional liquidity sources. Starting in the 1990s, loan growth has been outpacing traditional deposit growth, requiring banks to adjust their balance sheets to meet borrowers' demands. The level of core deposits began to erode, in part, because bank deposit accounts lost significant ground to higher-yielding mutual funds and the euphoria of the stock market, particularly during the late 1990s. Thus, as shown in Charts 1 and 2, financial institutions increasingly have

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Table 1

Expect the Unexpected	
1987	U.S. Stock Market Crash
1990	Collapse of U.S. high-yield bond market
1991	Oil price surge
1992	Britain removes pound from the European Exchange Rate Mechanism
1994	U.S. bond market crash
1995	Mexican crisis
1997	Asian crisis
1998	Russian default, ruble collapse, Long-Term Capital Management bailout
2000	Technology, media, and telecom sectors collapse
2001	September 11 payment system disruption
2002	Argentine crisis
2002	German banking crisis
2007	U.S. subprime mortgage turmoil
Next	?

Source: Freely adapted from a presentation by Leonard Matz, International Director, BancWare Academy for SunGard BancWare, at FFIEC Capital Markets Specialist Conference in June 2007.

funded loan growth not only by reducing their level of highly liquid investments, but also by seeking alternative funding sources. Now, most banks fund a portion of their balance sheet with wholesale funding such as federal funds, FHLB advances, repurchase agreements, and brokered deposits.

Reliance on FHLB Advances and Brokered Deposits Increases

Congress established the FHLB system in 1932 to facilitate the extension of mortgage credit to individuals by offering funding primarily to thrift institutions that were collateralized by loans on one- to four-family residential properties. As illustrated in Table 2, over the

past ten years, FHLB borrowings have increased significantly as legislation² expanded the role of the FHLB and as collateral requirements eased.

Brokered deposits have been used since the early 1950s and for much of that time have exemplified potential risks associated with banks' reliance on volatile funding sources. In 1959, for example, the FHLB Board limited brokered deposits to five percent of total deposits. In 1981, this limit was repealed, a decision that some observers subsequently viewed as an important contributor to the savings and loan crisis of the 1980s. As a result, in 1989, Congress began restricting insured institutions' access to brokered deposits, and by 1991, only well-capitalized institutions could accept brokered deposits without restriction.³ Banks' and thrifts' overall use of brokered deposits is comparable now in dollar volume to their use of FHLB advances (compare Tables 2 and 3).

Many interest rate sensitive deposits, such as Internet deposits, may not fall within the technical definition of brokered deposit (see 12 CFR 337.6), but their inherent risk characteristics are similar—premium rates, no relationship with the bank, and less stable sources of funding. While neither Call nor Thrift Financial Reports gather data on such deposits, there is little doubt that the level of rate-sensitive deposits held by banks and thrifts is significantly greater than that shown by the brokered deposits in Table 3.

Liquid Securities Decline

Investment securities are often used as a secondary source of liquidity through maturing securities, the sale of securities for cash, or pledging securities as collateral in a repurchase agreement or other borrowing arrangement. In this manner,

² Financial Institutions Reform, Recovery and Enforcement Act of 1989 and the Gramm-Leach-Bliley Act of 1999.

³ Institutions that are "adequately capitalized" may apply to the FDIC for a waiver in accordance with FDIC Rules and Regulations, 12 CFR 337—Unsafe and Unsound Banking Practices, section 337.6 Brokered Deposits, (www.fdic.gov/regulations/laws/rules/2000-5900.html). Capital categories are defined in FDIC Rules and Regulations, 12 CFR 325—Capital Maintenance, Subpart B – Prompt Corrective Action (www.fdic.gov/regulations/laws/rules/2000-4400.html).

Nondeposit Funding Sources Increase

Chart 1

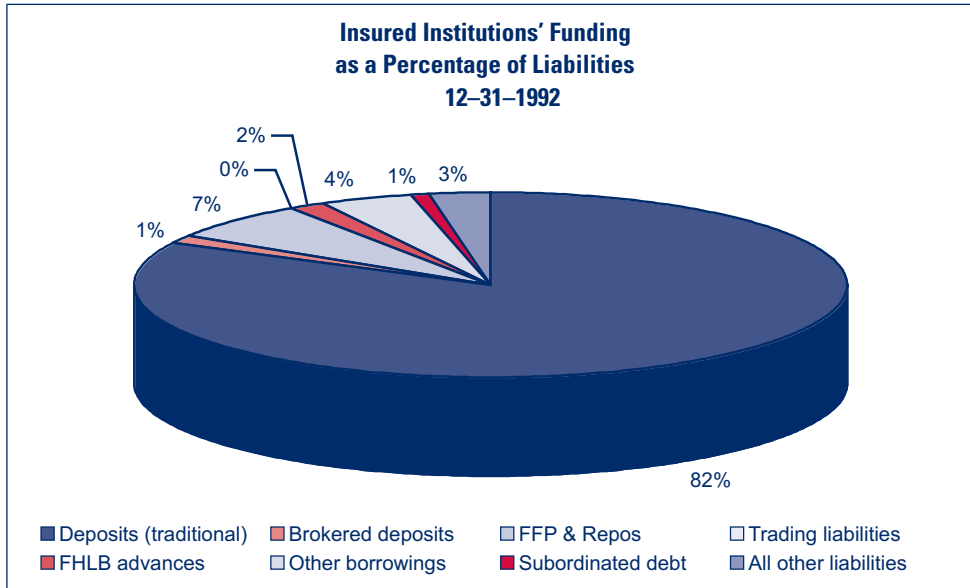


Chart 2

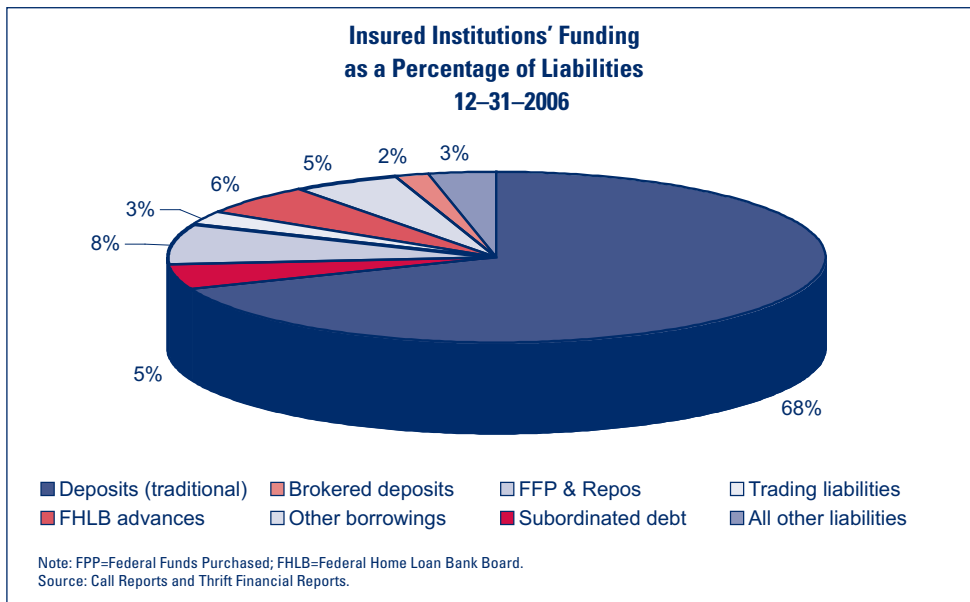


Table 2

	Total Membership	Total Borrowing Commercial Banks	Total Borrowing Thrifts	Total Advances
12/31/96	6,146	2,165	1,225	\$161 billion
12/31/06	8,125	4,245	954	\$641 billion

Source: Federal Home Loan Banks 1996 and 2006 combined financial reports.

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Table 3

Brokered Deposits Near FHLB Advance Levels		
Wholesale Funding Held by Financial Institutions (in millions)		
	Brokered Deposits	FHLB Advances
12/31/2006	\$523,014	\$640,681
12/31/2005	\$481,870	\$598,341
12/31/2004	\$422,626	\$541,857
12/31/2003	\$329,224	\$479,736
12/31/2002	\$284,613	\$450,587
12/31/2001	\$261,166	\$452,527

Source: Call Reports and Thrift Financial Reports

the securities portfolio serves as a reserve to help balance potential funding mismatches and provides a cushion for unanticipated funding needs.

The level of securities portfolios has declined slightly as a percentage of total assets—from 18.9 percent in 1996 to 16.7 percent by 2006.⁴ While the level of securities has declined only modestly, the liquidity of investment portfolios has declined more materially as banks have pledged more of their securities and as the composition of securities portfolios has changed.

Often, banks pledge investment securities as collateral for borrowing arrangements, such as secured FHLB borrowings and repurchase agreements, or to secure public deposits. Many times, the best or most liquid assets are those pledged. In each of the past five years, approximately 88 percent of FDIC-insured institutions reported that at least a portion of their securities portfolio was pledged. Furthermore, a larger volume of securities are being pledged today than ever before, primarily due to the expansion of FHLB advance funding to commercial banks. For example, the volume of pledged securities to total securities for FDIC-insured institutions averaged 44 percent in 2001;

in 2006, the average volume increased to 50 percent. The median percentage in 2006 also equaled 50 percent, which means that half of all banks in the United States have encumbered more than half of their securities portfolio through pledging, making those securities unavailable as a source of liquidity.⁵

Over time, perhaps due to intense pressure from shareholders to enhance earnings, the composition of banks' investment portfolios has shifted in a way that appears to reflect a preference for yield at the expense of liquidity. For example, at year-end 1992, U.S. Treasury securities comprised 27 percent of insured banks' investment portfolios; at year-end 2006, treasuries comprised only 2 percent of investment portfolios. During the same period, investment portfolios markedly increased their reliance on a variety of mortgage-related securities. Some of these nonagency securities have recently seen a marked decline in liquidity.

Liquidity Risk Management—Moving beyond Traditional Liquidity Ratios

The best liquidity managers have moved beyond static balance sheet ratios in favor of forward-looking metrics, including cash flow projections and multiple scenario modeling. These managers also have developed contingency funding plans that consider the level and severity of various potential liquidity events.

Quantifying liquidity risk today is not as straightforward as it has been historically owing to the growth of wholesale borrowings, asset securitization, and Internet banking. In the past, financial institutions often relied on the assumption that any needed liquidity would come from the liquidation of their investment portfolios, preferably from short-term, highly

⁴ FDIC Statistics on Banking. See <https://banks.data.fdic.gov/bankfind-suite/>.

⁵ FDIC Uniform Bank Performance Reports. See <https://www.fdic.gov/resources/bankers/call-reports/call-data-ubpr.html>.

marketable securities. It was also fairly safe to assume that most liquidity pressure would come from deposit runoff. Given these assumptions, one could easily measure liquidity from a handful of static balance sheet ratios. Today, however, these assumptions no longer hold true, and banks have several more liquidity management options available to them, which also complicates how banks monitor—and examiners evaluate—liquidity.

Today, monitoring liquidity in many institutions requires careful consideration of potential adverse scenarios rather than just the quick calculation of a few ratios. Generally, banks should estimate likely future cash flows, stress those cash flow estimates under various scenarios, and develop detailed plans for coping with potential shortfalls.

Pro Forma Cash Flows

Pro forma cash flow statements are often a critical tool for managing liquidity risk. In the normal course of measuring and managing liquidity risk and analyzing an institution's sources and uses of funds, effective liquidity managers project cash flows under various liquidity scenarios. Cash flow projection statements may range from simple spreadsheets to very detailed reports, depending on the complexity and sophistication of the institution and its liquidity risk profile. While many banks are effectively using asset-liability management (ALM) software to monitor interest rate risk, fewer are using ALM software packages to measure liquidity, although much of the data captured in these models could be useful to liquidity management.

Given the critical importance of assumptions in constructing measures of liquidity risk and cash flow projections, institutions should ensure that assumptions used are reasonable and appropriate. Assumptions used in assessing the

liquidity risk of complex instruments, assets, liabilities, and off-balance-sheet positions with uncertain cash flows, market value, or maturities should be subject to documentation and review. Assumptions regarding the stability of retail deposits, brokered deposits, and secondary market borrowings should also be subject to scrutiny. Institutions with complex liquidity profiles should perform sensitivity tests measuring the effects of changes to material assumptions.

Contingency Funding Plans

Unforeseen liquidity events can negatively affect all institutions, regardless of their size and complexity. Such risks could arise from the inability to fund asset growth, difficulty renewing or replacing funding as it matures, the exercise of options by customers to withdraw deposits or use off-balance-sheet commitments, and other events. Both high-probability/low-impact events and low-probability/high-impact events can cause liquidity pressure—immediate and short-term or longer-term, sustained situations—that may escalate over time.

Institutions that rely on liability-based liquidity management benefit from having a contingency funding plan (CFP) that addresses when it is prudent to access alternative funding sources. Incorporating a CFP into an overall liquidity policy helps management monitor liquidity risk, ensure that an appropriate amount of liquid assets are maintained, measure and project funding requirements during various scenarios, and manage access to funding sources.⁶ In a crisis situation, management often has limited time to form a strategy, so it is important to have a well-developed contingency liquidity plan before a crisis occurs.

A robust CFP should identify relevant bank-specific and systemic stress events for which an institution should prepare.

⁶ From the FDIC's *Risk Management Manual of Examination Policies, Section 6.1—Liquidity*. See <https://www.fdic.gov/regulations/safety/manual/section6-1.pdf>.

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Stress events may include changes in credit ratings, deterioration in asset quality, Prompt Corrective Action (PCA) downgrade,⁷ unplanned asset growth, operating losses, negative media coverage, or other events that may cause market participants to question an institution's ability to meet its obligations.

A liquidity stress event often progresses through various stages and levels of severity. Institutions can use the different stages or levels of severity identified to design early warning indicators, assess potential funding needs at various points in a developing crisis, and specify comprehensive action plans. They should also conduct periodic testing of borrowing lines to assess the timing and logistical concerns involved with borrowing.

Managing Risks of More Complex Funding Strategies

An institution's financial performance and its market perception could have significant implications for the adequacy of its liquidity and cash flow projections, especially in institutions that rely significantly on credit-sensitive funds such as FHLB borrowings and federal funds. The FHLB scrutinizes an institution's credit risk profile on an ongoing basis. If asset quality deteriorates, the FHLB may refuse to renew advances upon maturity, accelerate repayment of advances due to a covenant breach, raise collateral requirements, or reduce funding lines. Additionally, many community banks' cash flow projections involve the use of back-up correspondent bank federal funds lines and securities sold under repurchase

agreement lines with securities brokers/dealers. These back-up lines may be a viable option under normal business conditions; however, many federal fund credit agreements contain a material adverse change clause, which allows the correspondent banks to terminate or reduce the lines at the first sign of trouble. Similarly, securities brokers/dealers may require the institution to pledge more collateral on repurchase transactions if the institution's financial condition deteriorates or the market value of the securities pledged declines. Management should understand the ramifications of having federal funds lines and FHLB advances curtailed if the institution's financial strength deteriorates, and the bank's CFP should identify alternative sources of funding.

Banks that use brokered deposits should monitor their capital levels closely, be familiar with the regulation governing brokered deposits, and understand the requirements for requesting a waiver from the FDIC.⁸ Deposits attracted over the Internet, through CD listing services, or through special advertising programs offering premium rates (to customers without another banking relationship) also require special monitoring. In May 2001, the federal bank regulatory agencies issued a joint agency advisory statement on brokered and rate-sensitive deposits, warning institutions that rely on a significant amount of these deposits to have proper risk management practices in place.⁹ For example, these institutions should have cash flow projections that address the risk that these

⁷ Capital categories are defined in FDIC Rules and Regulations, 12 CFR 325, Capital Maintenance, Subpart B—Prompt Corrective Action. See www.fdic.gov/regulations/laws/rules/2000-4400.html.

⁸ Banks that are considered only "adequately capitalized" under the Prompt Corrective Action (PCA) standard must receive a waiver from the FDIC before they can accept, renew, or roll over any brokered deposit. They also are restricted in the rates they may offer on such deposits. Banks falling below the adequately capitalized range may not accept, renew, or roll over any brokered deposit nor solicit deposits with an effective yield more than 75 basis points above the prevailing market rate. These restrictions will reduce the availability of funding alternatives as a bank's condition deteriorates.

⁹ FDIC PR-37-2001, Joint Agency Advisory on Brokered and Rate-Sensitive Deposits, May 11, 2001, at www.fdic.gov/news/news/press/2001/pr3701.html. The federal banking regulators include FDIC, Federal Reserve Board, Office of the Comptroller of the Currency, and Office of Thrift Supervision.

deposits may not roll over and provide a reasonable alternative funding strategy.

Banks that engage in asset securitization should be aware of the liquidity challenges associated with this activity. One significant liquidity danger relates to the early amortization clauses in the contracts/agreements. Such clauses are typically triggered by an indicator of deterioration in the performance of the underlying portfolio of securitized loans/receivables. The purpose of the early amortization is to protect investors from prolonged credit exposure in a pool of receivables by accelerating the repayment of principal of the securities. Investors may also lose confidence in the stability of the institution's asset-backed securities, limiting the institution's ability to raise new funds through securitization. Moreover, banks may be explicitly or implicitly obligated to repurchase loans previously sold. At the same time, the institution is continuing to book new receivables that need to be funded. In 2002, the federal banking agencies issued an advisory statement on asset securitization that stated, in part, that "any banking organization that uses securitization as a funding source should have a viable contingency funding plan in the event it can no longer access the securitization market."¹⁰

New Liquidity Metrics Provide Foundation for Next Big Stress Event

The banking industry has moved from asset-based liquidity management to a more complex world of liability and off-balance-sheet funding. Consistent with this movement, liquidity measurements have migrated from simplistic ratios that give an idea of the static level of liquidity toward forward-looking measures. These forward-looking measures should help bankers identify

alternative cash flow sources and strategies to reduce the magnitude of cash flow drains during times of stress. The knowledge gained by funding managers contemplating different liquidity situations that could arise through scenario analysis and planning a response to a liquidity situation further demonstrates the benefits of adequate contingency funding plans and ongoing scenario analyses.

Recently, investor confidence in the subprime loan market and commercial paper market has dropped. The marketability of subprime loans and mortgage-backed securities containing subprime collateral changed significantly in a short period. Spreads widened on higher-quality mortgage-backed securities, and institutions that focused on the subprime (and alt-A) market have seen a decline in market value.

Regardless of the outcome of this recent market turmoil, we can be certain there will be other unexpected liquidity events. For this reason, bankers and examiners alike need to consider a range of stressful liquidity environments to ensure adequate liquidity tomorrow.

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¹⁰ FIL 53-2002, *Interagency Advisory on the Unsafe and Unsound Use of Covenants Tied to Supervisory Actions in Securitization Documents*, May 23, 2002, at www.fdic.gov/news/news/financial/2002/fil0253.html.