



Liquidity Measurement and Management

by: George K. Darling
Chief Executive Officer
Darling Consulting Group

Introduction

An important area of balance sheet management that does not receive enough attention in many banks is the measurement and management of liquidity.

A focused liquidity management process can significantly enhance profitability as a result of improved loan strategies and pricing, higher yields on investments and reduced funding costs.

See Page 2 for complete article

Introduction

An important area of balance sheet management that does not receive enough attention in many banks is the measurement and management of liquidity.

A focused liquidity management process can significantly enhance profitability as a result of improved loan strategies and pricing, higher yields on investments and reduced funding costs.

Reliance on traditional liquidity measures such as the loan to deposit ratio, volatile liability dependence, longer-term cashflow forecasts or non-core funding dependency analysis will not provide a bank with the proactive process required in today's environment. The following is a discussion of a more proactive approach that has been successfully utilized by a number of banks of varied asset sizes and mix.

Liquidity Defined

Preceding any discussion of liquidity measurement, it is necessary to have agreement on the definition of liquidity. For any financial institution, liquidity is defined as "having money when you need it to meet loan commitments and funding replacements." Further enhancing this definition: *"liquidity for a financial institution is its ability to raise cash quickly (within 30 days), without principal loss and at a reasonable cost."*

Traditional approaches are no longer valid

With the definition of liquidity described above, financial managers should ask themselves if traditional measures are still valid:

- Loan to Deposit Ratio – This ratio has long been used as a measurement of liquidity. However, when this ratio was first introduced, investment alternatives were typically limited to U.S. Governments. At the same time, the only source of funding for community banks was local deposits. Therefore, if a bank had a 60% loan to deposit ratio, by definition, it had 40% of its assets in highly liquid assets (i.e. U.S. Governments or cash equivalents). Today, that same bank could be invested in below market corporates, municipals or collateralized mortgage obligations. How liquid are these investments and what is the bank's ability to convert them to cash quickly without principal loss? In most situations, the loan to deposit

ratio will not provide a bank with a measurement of liquidity within the definition outlined above.

- Twelve Month Cashflow Analysis - If a bank needs to raise cash quickly (e.g. within thirty days) what good is knowing its twelve month cashflow? In the event of an abnormal funding requirement or a “run” on the bank’s deposits, this analysis is useless and does not meet the measurement requirement outlined above.
- Volatile Liability Dependence/Non-Core Funding Dependency - The Volatile Liability Dependency measurement has recently been replaced in most regulatory agencies by the Non-Core Funding Dependency ratio (NCFDR). The NCFDR is defined as all borrowings plus certificates of deposit and open account deposits over \$100,000 plus brokered deposits, less short-term investments, divided by long-term assets. The objective is to determine the percentage of longer-term assets supported by non-core funding.

Unfortunately, this ratio considers some very reliable funding sources as volatile while ignoring the fact that many deposits considered “core” in the NCFDR are actually more prone to run-off than implied. For example, all advances from the Federal Home Loan Bank (FHLB) are considered as volatile while all retail CDs (CDs under \$100,000) are considered as non-volatile. FHLB advances are fully collateralized and offer no risk of loss to the FHLB. As a result, it is very unlikely that FHLB borrowings will not be renewed at maturity so long as the collateral is still intact. History has proven that retail certificates of deposit are often not renewed at maturity if the depositor is concerned about the financial viability or reputation of the bank or is attracted by a competitor’s above-market “special”.

Finally, as with the other liquidity measures discussed above, the NCFDR does not measure a bank’s liquidity as defined above.

Basic Surplus (Deficit)

In today's environment, managers of financial institutions need a liquidity measurement process that provides answers to the following questions:

1. How much liquidity does the bank have? (How much cash can the bank raise quickly without principal loss and at a reasonable cost?)
2. How much liquidity does the bank need to cover expected volatility of its funding base?
3. How is the bank's liquidity carried/invested? Can the yield on the liquidity portfolio be improved?
4. What sources of reliable, cost effective funding does the bank have available to provide a "just in time" inventory of funding?
5. How does the current liquidity position relate to the funding needs of the bank?
6. What are the implications of the current liquidity position and expected funding requirements for deposit pricing, loan pricing and investments?

Any approach utilized for liquidity measurement and management should enable financial managers to answer these questions. One approach that most banks would find effective for this purpose is the Basic Surplus (Deficit) measurement combined with short-term cashflow forecasting of funding requirements.

The Basic Surplus (Deficit) is a measure of the cash a financial institution can cost-effectively raise within a thirty-day timeframe, without principal loss, adjusted for the estimated volatility of liabilities.

The first step is to measure the cash that can be raised quickly without principal loss (Liquid Assets). This requires an inventory of assets that can be converted to cash quickly through maturity or use as collateral for borrowings. Items considered to be Liquid Assets might include:

1. Fed Funds Sold that converts to cash daily.
2. Cash and Due net of float and reserves (cash that could be used to fund outflows in the event of a deposit run).
3. The market value of unpledged securities that can be used as collateral in the financial marketplace for repurchase agreements or may be used as collateral at the Federal Home Loan Bank. These items include U.S. Governments and

Agencies; mortgage-backed securities guaranteed by GNMA, FHLMC, or FNMA; and, collateralized mortgage obligations (CMOs) that are eligible for use as collateral. If securities that are currently used for collateral will be freed up over the next thirty days, they should be included in this calculation. Collateral pledged beyond 30 days is excluded from consideration.

4. Loans that could be sold within 30 days, without loss, such as a mortgage loan warehouse, student or SBA loans.
5. Cashflow maturities under thirty days from items such as municipals, corporates, bankers acceptances, Eurodollar CDs, term fed funds, etc.
6. Other assets that might be converted to cash quickly without principal loss. These might include equities with market value above book value, mutual fund holdings, etc.
7. Residential 1-4 family homes that could be used to secure borrowings from the Federal Home Loan Bank.

The next step is to estimate the liabilities that might leave the bank in the thirty-day period following a loss of confidence in the financial institution (Short Term Liabilities). For purposes of this exercise, the bank should attempt to estimate which liabilities might leave after three quarters of reported losses and a negative article in the local paper. These short-term liabilities would usually include:

1. Federal funds purchased.
2. 0-100% of Jumbo CDs maturing in the next thirty days. Usually the expected run-off for planning purposes is 20-40%.
3. Repurchase agreements that mature in the next thirty days that might not be renewed (Note: the collateral will be freed up in the Liquid Assets calculation outlined above).
4. Municipal deposits collateralized by municipal securities that are expected to run off over the next thirty days. (Municipal securities don't readily qualify as collateral elsewhere.)
5. 0-50% of Consumer CDs that are maturing in the next thirty days (Note: the attrition of these deposits may be mitigated by federal insurance.)
6. Other volatile liabilities, which might include some estimate of core deposit run-off, Treasury tax and loan (TT & L) run-off, etc.

The third step in measuring liquidity is to calculate the coverage of Liquid Assets to Short-Term Liabilities. The difference between the two is referred to as the Basic Surplus/Deficit as shown in Exhibit I.

Exhibit 1

Liquid Assets

- Fed Funds Sold _____
- Cash and Due (net of float and reserves) _____
- Market Value of U.S. Governments and Agencies not pledged beyond thirty days (@ 100%) _____
- Market Value of GNMA, FNMA and FHLMC* securities not pledged beyond thirty days (@ 95%) _____
- Market Value of eligible CMOs not pledged* beyond thirty days (@ 90%) _____
- Loans held for immediate sale (or that could be sold within thirty days) _____
- Cashflow maturities < 30 days _____
- Other marketable assets _____

- Total Liquid Assets _____

Short Term Liabilities

- Fed Funds Purchased @ 100% _____
- Repurchase Agreements < 30 days _____
- 0-100% of Jumbo CDs < 30 days _____
- 0-50% of Consumer CDs < 30 days _____

- Total Short-Term Liabilities _____

Liquid Assets – Short-Term Liabilities = Basic Surplus/Deficit

*NOTE: Borrowings using mortgage-backed securities are usually limited to between 90-95% of current market value to protect against principal paydowns.

Exhibit II shows a Basic Surplus calculation for a \$468 million dollar bank as of December 31, 1998. Outlined below are some of the implications of this bank's current liquidity position.

1. This bank's liquidity position is very strong. The ability of this bank to raise cash quickly without principal loss amounts to \$308,986,000 made up of:

• Liquid Assets	\$192,371,000
• FHLB Advances (using 1-4 family residential loans)*	37,410,000
• Corporate Securities (market value > bank value)*	30,862,000
• Municipal Securities (market value > bank value)*	<u>48,343,000</u>
	\$308,986,000

* See "Other Items" at bottom of Exhibit II

2. The bank has little dependency on volatile funding sources. Short-term liabilities only amount to \$35.9 million.
3. The Basic Surplus position is significantly above the bank's policy limit of 5% which means there is significant capacity to fund additional loan or asset growth without the need for additional deposit growth.
4. Much of the liquidity held on the balance sheet is in cash or cash equivalents that could be invested in higher yielding investments. This short-term liquidity position could expose this bank to significant exposure to falling rates if rates fall and results in reduced current income if there is any slope to the yield curve.
5. Secondary sources of liquidity are strong with large portfolios of corporate and municipal securities that could be sold if necessary. This should be the last source of liquidity accessed since a portfolio where market value exceeds bank value cannot be replaced in the current environment without reducing income, extending maturities or increasing liquidity or credit risk.
6. It would seem that this bank should be pricing the majority of its deposits in the middle of the market since it does not need to attract more funding for the balance sheet.

7. Aggressive loan pricing might be appropriate for this bank to absorb the excess liquidity so long as the loans emphasized meet the bank's credit standards.

Overall, the Basic Surplus/Deficit allows managers of financial institutions to better understand how much liquidity they have and how they are carrying it. However, by itself, it does not measure how much liquidity the institution may need. To answer this question one more step is required.

Exhibit II
BASIC SURPLUS
As of December 31, 1998
(000s)

LIQUID ASSETS:

Federal Funds Sold / FHLB Overnight*		\$40,124
Short Term Repurchase Agreement		\$10,000
Cash & Due (net of float & reserves) *		\$3,483
U.S. Governments & Agencies- Market Value **	\$132,286	
Less: Repos or Pledged (>30 days)	(\$4,105)	\$128,181
Mortgage Backed Securities Market Value (less 5% haircut)	\$10,583	
Less: Repos or Pledged (>30 days)	\$0	\$10,583
Student Loans (unpledged) / SBA Loans (guaranteed portions)		\$0
Non Treasury/Agency Investment Maturities (< 30 days)		\$0
Loans Held for Sale (<30 days)		\$0
Other Liquid Assets		\$0
Total Liquid Assets		\$192,371

Large cash position and opportunity to increase current yield

A lot of Treasuries, yield can be improved

SHORT TERM LIABILITIES

Federal Funds Purchased *	\$0
Liabilities secured by liquid assets (< 30 days)*	\$0
Municipal deposits secured by Municipal Securities (<30 days)	\$0
25% of CD's maturing (<30 days)***	\$1,236
30% of Jumbo CD's maturing (<30 days)***	\$1,361
Other Volatile Liabilities (10% DDA, Savings, NOW, MMDA)	\$33,305
Total Short Term Liabilities	\$35,903

Little dependence on volatile funding

BASIC SURPLUS (DEFICIT)	\$156,469
% of Total Assets	33.4%
<i>Policy Minimum</i>	5.0%
BASIC SURPLUS w/FHLB	\$193,879
% of Total Assets w/FHLB	41.4%
<i>Policy Minimum</i>	10.0%

Very strong secondary liquidity position

Other Items:

	Outstanding	Available	Market Value
- FHLB Advances****	\$0	\$37,410	
- Repurchase Agreements	\$0	\$100,000	
- Lines of Credit	\$0	\$20,000	
- Brokered CD's	N/A	N/A	
- Corporate Securities (MV>BV)			\$30,862
- Municipal Securities (MV>BV)			\$48,343
- Equities			N/A

Strong position for funding loans or future growth

* If wide fluctuations in daily volumes, use average balances
 ** Use market value of these securities. The entire "free" portfolio should be used regardless of maturities.
 *** Estimate volatile portion of each liability type.
 **** Using available 1-4 family loans as collateral

Analyzing Funding Requirements

To determine how much liquidity a financial institution needs requires management to forecast cash requirements over some horizon to determine if at the end of the horizon, the Basic Surplus/Deficit will still be adequate. This requires management to establish minimum levels beyond which liquidity should not be allowed to decline.

To forecast the Basic Surplus/Deficit necessitates that loan officers involved in the A/L process be required to provide estimates of net new loan fundings over some horizon, for example, ninety days. Additionally, executives responsible for deposit gathering should also forecast anticipated net deposit flows. A forecast of future liquidity could be accomplished as follows:

Basic Surplus/Deficit at beginning of period	_____
less: net new loan fundings*	_____
plus: net deposit flows	_____
plus: cashflow maturities 31-90 days **	_____
Equals: Basic Surplus/Deficit at Horizon	_____

* Includes loan sales

** Excluding U.S. Treasury and Agency securities already included in starting Basic Surplus/Deficit position

The forecast of funding requirements over a horizon has implications for both investment strategies and deposit pricing. If the basic surplus is materially increasing, excess cashflows should be anticipated and could even be pre-invested. An expected increase in liquidity should also ensure that the financial institution is not pricing liabilities at the top of the marketplace. Conversely, a drop in liquidity below a minimum acceptable level dictates that investments be kept relatively short or in securities that can be easily used as collateral for borrowings and that liability prices be set at the upper end of the market.

Conclusion

The use of the Basic Surplus/Deficit for measuring liquidity combined with a short-term cashflow forecast can provide management of a financial institution with an improved structure within which to develop investment strategies and liability pricing policies. The net result should be more informed balance sheet management, an improved net interest income contribution from the liquidity portfolio and more intelligent liability pricing.

George K. Darling
Chief Executive Officer
Darling Consulting Group, Inc.
gdarling@darlingconsulting.com
Tel: 978.463.0400 x118

George Darling is the Chief Executive Officer of the Darling Consulting Group (DCG), a firm that provides comprehensive business solutions to financial institutions, primarily in the areas of Balance Sheet Management and Strategic Planning.

Mr. Darling's professional experience includes: thirty years with his own company, two years as a senior executive with a \$2 billion financial institution; two years with a Big Five Accounting firm and ten years with IBM. He is a nationally recognized resource for assisting financial institutions in the areas of interest rate risk management, liquidity management and capital planning.

Mr. Darling is a contributing editor to the monthly Bank Asset/Liability Management newsletter, and a co-author of The Business of Banking for Bank Directors published by Robert Morris Associates. Mr. Darling is a graduate of the University of Massachusetts, Amherst, Massachusetts.

This article was written in March 1999.