



BE PREPARED!

Sound Liquidity Risk Management in a Challenging Environment

Federal Reserve Bank of San Francisco

July 29, 2008

David Erigero

Senior Examiner

david.erigero@sf.frb.org

Rick Miller

Discount Officer and

Director of Credit and Risk Management

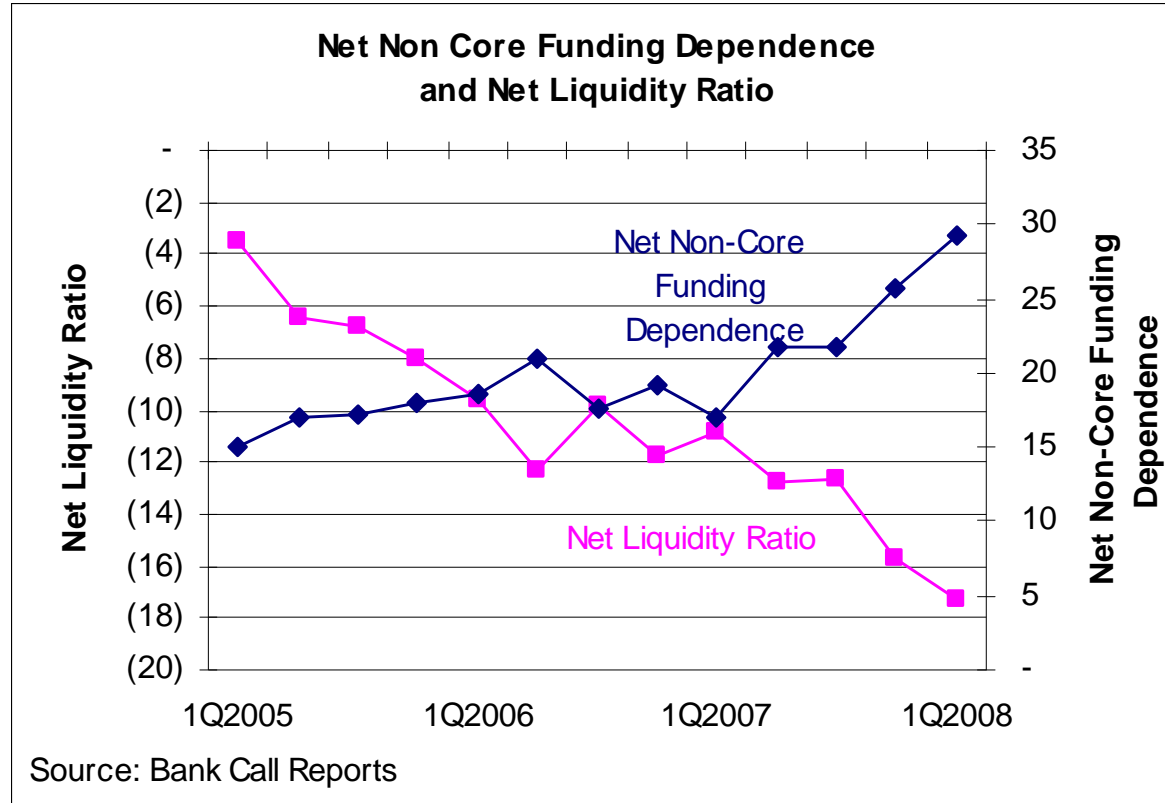
rick.miller@sf.frb.org

Agenda

- Changing Liquidity Environment
- LRM Guidance
- Recent events, Sound LRM practices & some key issues:
 - Liquidity measures
 - Stress testing/scenario analysis
 - Contingency Funding Plans
- Discount Window
- Key Points / References / Appendix

Liquidity Risk Profile

- Traditional balance sheet-based liquidity measures continue to deteriorate, as banks increasingly rely on non-core funding sources.



Implications of Evolving Environment

- Changing funding sources and uses challenge traditional LRM concepts and liquidity risk measures
- Asset liquidity has changed
 - Securities portfolios potentially less liquid
 - More options for certain loan products
 - Increasing concentrations in particular loan types
- Liability liquidity has changed
 - Challenging traditional definitions of core/non-core
 - More options for “alternative” funding
 - Ever increasing competition for retail deposits
- Market developments

Fed's Liquidity Guidance

Issued in late 2006 in the *Trading and Capital Markets Activities Manual*, it did not represent new standards but, expanded on existing guidance by providing more information to assist supervisors and banking institutions in dealing with this more challenging liquidity environment:

- Overview of LRM and Sound Practices
- Corporate Governance
- Strategies, Policies, Procedures & Limits
- Liquidity Risk Measurement & Monitoring
- Contingency Funding Plans
- Internal Controls
- BHC and FBO Considerations
- Supervisory Process for Evaluating Liquidity
- Fundamentals of Liquidity Risk Management
- Exam Objectives and Procedures

Fed's Liquidity Guidance

Renewed focus on funding mismatches, market liquidity constraints and contingent liquidity events

- Includes a comprehensive discussion of liquidity components, provides exhibits, and references, sample cash flow statements
- Emphasizes cash flow forecasting to manage day-to-day and contingent liquidity needs
- Minimizes emphasis on “static” measures and ratios
- Emphasizes the coordination of LRM with strategic planning
- Emphasizes characteristics of “stable” and “volatile” funds and minimizes discussion of “core” and “non-core” terminology
- Includes discussion on the unique issues in managing Parent Company liquidity

Fed's Liquidity Guidance

Fully consistent with:

- Commercial Bank Examination Manual
- Basel Committee on Banking Supervision
 - 2000 “Sound Practices for Managing Liquidity in Banking Organizations”
 - 2008 “Principles for Sound Liquidity Risk Management and Supervision”
(Draft for Consultation)

Sound Liquidity Risk Management Now More Important Than Ever

- Recent market events further highlight the necessity of sound liquidity risk management practices, including:
 - Improved Liquidity Measures
(Supplement traditional, static balance sheet ratios with forward-looking, dynamic measures)
 - Stress Scenarios and Stress Testing
 - Contingent Funding Plans

Market Stress: Fall 2007

- With a diminished confidence in ratings and a lack of other information, market participants assumed the worst.
 - Interbank markets were unwilling to lend for longer term or larger size
 - ABCP markets dried up as money market funds fled to safety of Treasuries
 - Investors not interested in securitized product
 - Subprime and other MBS
 - CDOs/CLOs and other Structured Products
 - Issues Credit-Enhanced with Bond Insurance

Current Situation

- What began as a RMBS disruption has spread to other asset classes.
- Most bond Insurers downgraded, yet still on negative watch, despite infusions of additional capital.
- Mounting losses in the asset pools underlying CDOs and MBS continue to dampen investor interest and depress prices.
- This has led to additional margin calls on leveraged investors, causing forced sales which put additional downward pressure on asset prices.
- “Originate to distribute” model now no longer viable.
- Banks continue to disclose large losses, while the market is assuming more losses are coming.

Liquidity Risk: Implications

- The unexpected can happen:
 - Did any institution model this scenario?
- In times of market stress, many banks are likely to look to the same contingent funding sources.
- Deposit competition to remain heightened, as many larger banks have been more actively competing for deposits.
- Expect continued reliance on “non-core” funding.
- Pricing and the stability of these funding sources may be adversely affected.
- Stability of uninsured deposit balances?
- Risk management practices may not be keeping pace with these changes in funding markets.

Liquidity Risk: Implications

- The Downward Spiral of Asset Prices could trickle down to affect community and regional banks' secondary liquidity capacity in their investment portfolios:
 - Falling value of pledged assets and/or increased haircuts means less borrowing capacity.
 - Margin Calls on collateral posted for counterparty credit risk on interest rate swaps and other derivative transactions means additional securities must be posted as collateral, reducing balance of available unencumbered securities.

Liquidity Risk Measurement

- We've seen a shift away from heavy reliance on "strict definitional" ratio analysis
- Industry changes rendered traditional ratios less insightful as they do not reflect the liquidity continuum across asset and liability categories
 - Liquid loans and illiquid securities
 - Volatile retail deposits and reliable wholesale sources
 - Additional important off-balance sheet items not incorporated into traditional measures
- We have seen how market events can affect asset liquidity and volatility of funding sources

Emphasis on forward-looking measures: as a planning tool for expected flows

- Incorporate expected growth, rollover rates, optionality, off-balance sheet items, etc.
- Identify potential shortfalls across time dimensions before they crystallize
- Necessary for day-to-day management under “business as usual” conditions
- But, not so good at measuring contingency needs caused by unforeseen events

Incorporate a variety of stress event scenarios into forward-looking measures

- Recognize how scenario-specific liquidity risk really is
- Capture how flows may be affected in different environments
- Enable management to see what might go wrong, and how badly; reveal vulnerabilities.
- Allows for funding decisions to be made in line with liquidity risk appetite
- Evaluation of results from stress scenarios can guide crisis management planning
- Tends to produce more granular and robust analysis than any other measurement framework

Why is stress testing so important?

- Measurement under benign conditions only tells us so much:
 - Interconnected effects across risk categories and products and between a bank and its parent company
 - Correlations not stable under stress
- Systemic financial shocks can cause considerable damage
- Stress testing can provide information to help lower the probability and lessen the impact
- Banks ultimately fail due to liquidity risk
- Limit on capital's ability to control liquidity risk

It Might Not Be Called a “Stress Test”

- Robust ratios can capture many aspects of comprehensive stress-testing
 - Assign “weights” to balance sheet categories
 - Run *ratios* under stress
 - Create ratios that “mimic” stress-testing vulnerabilities: e.g. unencumbered liquid asset coverage of short-term, unsecured, uninsured funds
- Knowledge of customers/counterparties, and applying sufficient analytic rigor to the process is essential
- Regardless of the framework, a system that stratifies heterogeneous pools of assets and liabilities is key to success

Examples of Institution-Specific Stress Scenarios

- Asset quality concerns
- Rapid growth
- Operational fraud
- Reputational risk
- Large loss of capital
- Credit rating downgrade (Large Banks)

Examples of Systemic Stress Scenarios

- Payment systems disruption
- Capital markets disruption
- Uncertainty in industry
- Loss of confidence in CP market
- Your worst nightmare?

Contingency Funding Plans

Sound CFPs incorporate an effective stress testing framework with robust policies, procedures and action steps to ensure that funding requirements are met with minimal costs and disruption.

- Communicate Early Warning Indicators to Board & Senior Management
- Different levels of severity for each stress event
- Identify potential funding sources and suggest appropriate action steps under each stress scenario and level of severity
- Periodic testing of operational elements.

Potential Issues in Successfully Executing CFP Strategies/Actions

- Brokered deposits (PCA-Well Capitalized)
- Blanket Lien with FHLB presents a hurdle to pledging assets elsewhere as collateral
- Asset Sales and/or Securitization
- Discount Window

Is the appropriate infrastructure in place?

Have the plans been tested?

Key Points to Remember

- Traditional Liquidity Ratios do not sufficiently provide a complete picture of risk; develop and implement forward looking measures to understand your full liquidity risk profile.
- An effective stress testing framework is the cornerstone of sound contingency funding planning.
- Be sure you have the appropriate infrastructure in place to execute the contingency funding plans.
- Test your contingency funding plans.

Federal Reserve Discount Window Considerations

Overview

- Reserve Bank Credit Programs
- Collateral Arrangements
- Pre-positioning
- Considerations for Financial Institutions Deemed “Troubled”
 - Overnight Credit
 - Intra-Day Credit

Federal Reserve Credit Programs

- Reserve Bank Credit Programs
 - Primary Credit
 - Term Auction Facility
 - Secondary Credit

Collateral Arrangements

- Securities
 - Fed Book Entry
 - DTC
- Acceptability
 - Treasury, US Agency, Municipals, Corporates
 - Investment Grade
- Margins Applied
 - Priced vs. Unpriced

Collateral Arrangements

- Borrower-In-Custody Program
 - The financial institution's loans to their customers
 - Application Process
 - Standards of Acceptability
 - Monthly Reporting
 - Periodic On-Site Reviews
 - Time Frames – Submission of Application to Receiving Value
 - Federal Home Loan Bank considerations

Pre-Positioning

- Collateral arrangements take time
- Waiting until liquidity is needed is not advisable
- All loans must be supported by collateral according to the Federal Reserve Act, i.e., “secured to our satisfaction”

Financial Institutions That Are Deemed “Troubled”

- Information Sources
 - Primary Federal Bank Regulators
 - Call Reports
 - State Banking Regulators
 - “Other” Information
- No Discreet Formula
- Do Not Share Our Criteria
- FDICIA considerations

Financial Institutions That Are Deemed Troubled

- Securities collateral
 - Decrease in margin of 10%
- Loan Collateral (e.g., BICs)
 - Loans must be delivered to the FRB
 - Regardless of lien position
 - Decrease in margin of at least 10%
- Very burdensome process for FI and FRB
 - Credit Reviews
 - Documentation Reviews
 - Monthly revaluation
- We must have a secured interest in the collateral ahead of all others.

Financial Institutions That Are Deemed Troubled

- Intra-day Credit
 - Intraday credit capacity brought to zero
 - Fedwire
 - ACH Credit Originations
 - Non Fedwire Activity

Information Resources

Trading and Capital Markets Activities Manual

<http://www.federalreserve.gov/boarddocs/supmanual/trading/200704/0704trading.pdf>

SR Letter 01-14 “Joint Advisory on Rate-Sensitive Deposits”

<http://fedweb.frb.gov/fedweb/bsr/srltrs/sr0114.htm>

Basel Committee on Banking Supervision: “Principles for Sound Liquidity Risk Management and Supervision (June 2008 – Draft for Consultation)”

<http://www.bis.org/publ/bcbs138.pdf>

Discount Window

- Contains all guidelines and forms necessary
- Borrower-In-Custody information under “Select Your FRB” tab

<http://www.frbdiscountwindow.org/>

C&RM toll free number 1.866.974.7475

Contacts

David Erigero

Senior Examiner / 12th District Market and Liquidity Risk Coordinator
Banking Supervision & Regulation

(415) 974-2705

david.erigero@sf.frb.org

Rick Miller

Discount Officer and Director of Credit and Risk Management
Credit and Risk Management

(415) 974-2974

rick.miller@sf.frb.org

Javier Jerez

C&RM Manager
Credit and Risk Management

(415) 974-2500

javier.jerez@sf.frb.org

Questions?
Comments?

Appendix

Additional discussion on implementing an effective stress testing framework

Establishing asset/liability liquidity profiles for stress-scenario analysis

- Break out assets, liabilities, and OBS (get granular)
- Establish key attributes affecting liquidity of each category
- Create a hierarchy: which liabilities are generally most sensitive and which assets are most liquid
- Assign liability sensitivities and asset haircuts (%)
- Calculate corresponding runoff and fundraising estimates under different scenarios
- Divide into time buckets
- Calculate coverage ratio (key questions to answer: are we covered? for how long? how severe until we aren't?)
- Establish limit structure, reporting schedule, documentation, internal audit, etc.

Quantifying exposure: Where do we find the data?

- Most banks have not lived through a high impact liquidity stress situation (good for banks, but bad for modeling)
- Firm-specific historic volatilities under benign conditions tell us little about the nature of volatilities under stress
- Unlikely to find a comparable peer with recent enough relevant experience
- Becomes a very subjective process (thus documentation is important)

A starting point: changes observed by other banks in crisis

As a crisis approached and the banks dropped below investment grade, what happened to:

- Unsecured funding as it matured
- Spreads, and ability to issue new debt (and at what tenor)
- Insured/uninsured deposit runoff
- Loan commitment drawdowns
- Ability to sell/securitize loans
- Collateral posting requirements
- Incorporate the response of analysts, depositors, counterparties, repo market, FHLB, Fed Discount Window, etc. into the numbers

A starting point: changes observed during systemic crisis

As crisis worsened and spread, what happened to:

- Haircuts on related and unrelated asset classes
- Ability to sell and securitize loans
- Ability for ABCP conduits to roll their CP
- Payment system requirements

Utilize benign condition funds flow framework as springboard

- Targeting high probability – low impact events
- Often part of ALM-IRR software capabilities
- Project inflows and outflows in time buckets, identifying surplus/deficits in specific time periods
- Behavioral liquidity gap
 - Assumptions to build on :
 - CD withdrawal/renewal rates
 - Asset default/prepays, commitment draw rates
 - Tiered pricing required to attract funds

Involve business line managers

- Tap their market/customer knowledge
- Research historic analysis and adjust for idiosyncratic factors
- Line should identify their vulnerabilities under given enterprise-wide stress events
- Should identify their “Achilles' heel” and quantify the potential affect
- Leverage existing analysis
 - Trading book's VaR, IRR-ALM modeling
 - Potential future exposure for derivatives
 - Collateral management analysis, debt issuance forecast
 - Conduits' CP/asset maturity gap measures, etc.

For each business line/product

- For firm-specific scenarios: is vulnerability to the downgrade itself or depend upon the cause?
- For systemic scenarios: which types of stress in which markets would cause most impact?
 - e.g. general economic downturn, specific asset class, currency collapse, payments system issue, terrorist attack, Freddie/Fannie issue, CP market disruption, etc, etc.

Challenging Stress Testing Assumptions since the 2007 Market Disruption

Common theme: making stress tests a little more stressful. Questioning:

- Ability to utilize a variety of funding sources
 - Extendible CP & CDs, Trust Preferred, MTNs, brokered CDs, escrows, backup facilities, etc.
- Ability to increase rates to attract liabilities
 - Basis points aren't the only cost!
- Even collateralized funding
 - e.g. term repo, covered bonds
- Revisiting static asset haircuts

Challenging Stress Testing Assumptions since the 2007 Market Disruption

Questioning:

- Ramifications of bringing off-balance sheet items (commitments, sponsored vehicles) onto the balance sheet (capital, extendible CP, etc.)
- Duration of crisis
- Assumptions for retail runoff rates
- Reversing the spread between secured/unsecured
- FHLB's ability to fund unscrutinized in future crisis

Making stress-testing an ongoing key risk indicator

- Take stress-testing out of the contingency funding plan and into the board room
- Calculate results with sufficient frequency
- Track the results over time
- Summarize assumptions and results
- Establish a monitoring system/limit structure
- Ultimate goal for large complex institutions: incorporate into an integrated enterprise-wide stress testing framework, across multiple risk categories

Key elements of an effective stress testing framework

Scenarios

- Well-defined
- Tailored to the institution
- Of type that reveals vulnerabilities
- Aware of, but not overly reliant upon history
- Multiple levels of severity (rating downgrades; capital levels)
- Focus on bank-specific, systemic brought in for certain businesses

Key elements of an effective stress testing framework

- Centralized management of process
- Truly enterprise-wide
- Sufficiently granular
- Accounts for timing (sufficiently narrow buckets)
- Draws on business line manager knowledge for detailed assumptions
- Leverage existing analytics

Key elements of an effective stress testing framework

- Measures the maximum availability in any given period
- Keeps cost analysis separate
- Discount window takeout strategy
- Creates a metric easily tracked, reported frequently, etc.
- Includes a check on data integrity
- Well documented process and assumptions

Alternatives available for companies with lower inherent risk profiles?

- Regulators are not prescribing a specific methodology; invite creativity
- Tailored to the size, complexity and sophistication of the institution
- We'll evaluate attempts to capture same insights with less data and some simplifying assumptions
- For some, their liquidity risk profile may be adequately captured despite some “shortcuts”
 - Robust ratios can capture many aspects of comprehensive stress-testing
- Striking a balance: robust enough to encapsulate key risks, simple enough to enable frequent production