Liquidity Risk
Overview

• Causes of liquidity risk
• Methods of measuring liquidity risk
• Consequences of extreme liquidity risk exposure
FIs and Liquidity Risk Exposure

• High exposure
  – Depository institutions
  – Loss of confidence in bank-to-bank lending during financial crisis resulted in more widespread liquidity crisis

• Moderate exposure
  – Life insurance companies

• Low exposure
  – Mutual funds, hedge funds, pension funds, and property-casualty insurance companies
Causes of Liquidity Risk

• Liability-side liquidity risk occurs when depositors or policyholders cash in claims
  – With low cash holdings, FI may be forced to liquidate assets too rapidly
    ▪ Faster sale may require fire-sale price
• Asset-side liquidity risk can result from off-balance-sheet loan commitments
  – Liquidity requirements from the borrowing of funds can be met by the FI running down cash assets, selling liquid assets, or additional borrowing
Liability-Side Liquidity Risk for DIs

• Reliance on demand deposits
  – Core deposits
  – Depository institutions need to be able to predict the probability distribution of net deposit drains
    ▪ Calculated as the difference between deposit withdrawals and deposit additions
    ▪ Seasonality effects in net withdrawal patterns (e.g., end of year and summer due to Christmas and vacations)
  – Managed drain on deposits by:
    ▪ Purchased liquidity management
    ▪ Stored liquidity management
Purchased Liquidity Management

• Sources: federal funds market and/or repurchase agreement markets
• Managing the liability side preserves asset side of balance sheet
• Borrowed funds likely at higher rates than interest paid on deposits
• Deposits are insured but borrowed funds not necessarily protected
• Regulatory concerns:
  – During financial crisis, wholesale funds were difficult and sometimes impossible to obtain
Stored Liquidity Management

• Liquidate assets to meet withdrawals
  – In addition to reserve requirements set by the Federal Reserve, DIs tend to hold excess reserves
  – Downsides:
    ▪ Contraction of asset size
    ▪ Requires holding excess low-rate assets
    ▪ Opportunity cost of holding excessive cash or other liquid assets

• DI may use some combination of purchased and stored liquidity management
Asset-Side Liquidity Risk

• Liquidity risk from loan commitments and other credit lines
  – Met either by borrowing funds and/or by using cash assets

• Current levels of loan commitments are dangerously high
  – Commercial banks in particular have been increasing commitments over the past few years, presumably believing commitments will not be used
  – In 1994, unused loan commitments to cash equaled 529%. In 2008, 1,015%. Fell back to 609% during the crisis.
Financing Gap

• Defined as difference between average loans and average (core) deposits

\[ FG = \text{Average loans} - \text{Average deposits} \]

\[ FG + \text{Liquid assets} = \text{Borrowed funds} \]

• Potential for insolvency highlights need for managers of DIs to actively manage liquidity planning
Sources and Uses of Liquidity

• Net liquidity statement:
  – Sources of liquidity: (i) Cash type assets, (ii) maximum amount of borrowed funds available, (iii) excess cash reserves
    ▪ Historical sources and uses of liquidity statements may assist manager in identification of future liquidity issues
  – Uses of liquidity
    ▪ Borrowed or purchased funds already utilized
    ▪ Any amounts of cash already borrowed from the Fed via discount window loans
Other Measures

• **Peer group comparisons**: Usual ratios include borrowed funds/total assets, loans to deposits, etc.

• **Liquidity index**:  
  - Weighted sum of “fire sale price”, $P$, to fair market price, $P^*$, where the portfolio weights are the percent of the portfolio value formed by the individual assets

\[
I = \sum w(P_i / P_i^*)
\]
Ratios

• **Liquidity coverage ratio (LCR)**
  – \( \frac{\text{(Stock of high-quality liquid assets)}}{\text{(Total net cash outflows over the next 30 calendar days)}} \geq 100\% \)

• **Net stable funding ratio (NSFR)**
  – \( \frac{\text{(Available amount of stable funding)}}{\text{(Required amount of stable funding)}} > 100\% \)
Bank Runs

• Can arise due to concern about:
  – Bank solvency
  – Failure of a related FI
  – Sudden changes in investor preferences
• Demand deposits are first come, first served
  – Depositor’s place in line matters
• Bank panic: Systemic or contagious bank run on deposits of banking industry
Alleviating Bank Runs

• Measures to reduce likelihood of bank runs:
  – Deposit insurance and discount window
  – FDIC
  – Direct actions, such as TARP (2008-2009)

• Not without economic costs
  – Protection may encourage DIs to increase liquidity risk
Liquid Asset Management

- Examples: T-bills, T-notes, T-bonds
  - Ultimate liquid asset = cash
- Benefits of holding large quantities of liquid assets
- Costs of holding liquid assets
- Requirements differ across FIs and across countries
- Regulatory requirements for minimum levels of liquid assets
  - Monetary policy implementation
  - Taxation
Composition of liquid asset portfolio

- Liquid assets ratio
  - Minimum ratio of liquid assets to total assets set by the central bank
  - Met in many countries using cash and liquid government securities
  - Similar case for U.S. life insurance companies (regulated at state level)
  - U.S. banks: cash-based, but banks view government securities as secondary, or buffer, reserves
U.S. Cash Reserve Requirements

• Incremental reserve requirements for \textit{net transaction accounts} (2016):
  – First $15.2$ million $0.0\%$
  – $15.2$ million to $110.2$ million $3.0\%$
  – Over $110.2$ million $10.0\%$
Computation Period

• Computation period runs from a Tuesday to a Monday, 14 days later. Daily average target is calculated by taking the 14-day average of net transactional accounts.
  – This means that Friday deposit figures count 3 times compared to deposits of other days of the week.

• “Weekend Game”

• Sweep accounts
Maintenance Period

• The reserve maintenance period begins 17 days after the end of the computation period (or 30 days after the start of the computation period)
  – Lagged reserve accounting (LRA) system used as of July 1998
  – Previously, contemporaneous reserve accounting (CRA) system
    ▪ 2-day window
Undershooting/Overshooting

• Allowance for up to a 4% daily average error without penalty
  – Surplus reserves required in next 2-week period
• Undershooting by more than 4% results in penalty equal to the central bank’s discount rate plus 2% markup
• Frequent undershooting likely to attract scrutiny by regulators
Undershooting

- DI has two options to build up reserves near the end of the maintenance period
  - Liquidate assets
    - Example: selling off buffer assets, like T-bills
  - Borrow reserves
    - Fed funds
    - Repurchase agreements
Discount Window

- Reserve shortfalls in the past met by using the discount window
  - Discount window borrowing at a rate lower than fed funds target
    - January 2003, cost of borrowing at discount window increased and terms eased
    - Primary credit program
Overshooting

• First 4 percent can be carried forward to next period

• Excess reserves typically low due to opportunity costs
  – Impact of Fed’s liquidity enhancement measures (late 2008) offset by introduction of interest payments on reserve holdings (no longer any opportunity cost to holding excess reserves)