Liquidity Cash Flow Planning and Stress Testing Model

User's Guide

Table of Contents

Young & Associates, Inc. designed the *Liquidity Cash Flow Model* to assist community banks in their quantitative liquidity assessments. All institutions are expected to demonstrate an ability to maintain access to funds in both normal and stress environments. By using a dynamic cash flow model and "what if" analyses, management can significantly reduce the risk that sizable fund deficits or other potential vulnerabilities go unnoticed, giving the institution time to strengthen its liquidity position before a major stress situation occurs.

Consistent with the regulatory guidance, the model has the following capabilities:

- **Forecasting funding needs, funding sources, and cash flow gaps**
- **Monitoring the availability of contingent/back-up liquidity**
- **Stress testing and what-if analyses**
- **Contingency planning, including a base case and multiple stress scenarios**
- **Monitoring funding concentrations and dynamic cash flow ratios**

The key questions that can be answered through the cash flow analysis are:

Are we covered? Are the ratios and the risk levels within the policy limits?
To what degree is the bank reliant on volatile or credit-sensitive funding sources?
Are the bank's primary and contingent liquidity reserves adequate?

The *Liquidity Cash Flow Model* will enable you to monitor all key items that are likely to affect liquidity and to manage the institution's cash flows and its liquidity positions in a timely and efficient manner.
If you have any questions regarding the model, please contact us at:
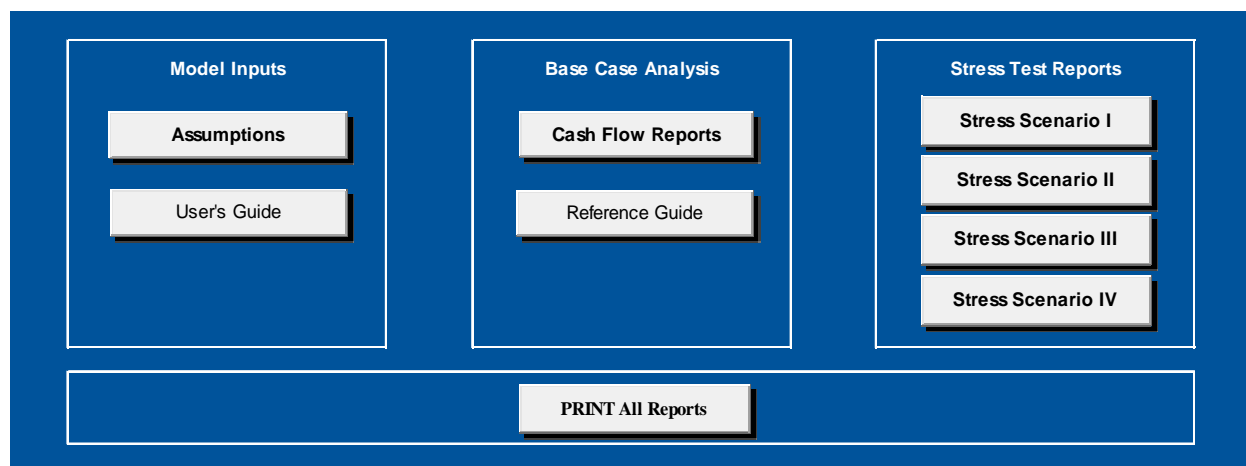
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Assumptions

Outline monthly increases and decreases in the key balance sheet items anticipated over a 12-month period; input current collateral status and borrowing capacity, estimate the amount of unencumbered assets that are saleable or pledgeable, and identify any policy limits applicable to the usage of brokered and other wholesale funding alternatives.

Cash Flow Reports

Review monthly and cumulative changes in operating funding sources and funding needs, operating gaps, cash flow from financing activities, primary liquidity position, and contingent liquidity. Dynamic cash flow ratios, funding concentrations and other balance sheet ratios, as well as reference guide are also provided.

Stress Test Reports

Modify key base case assumptions to stress the potential funding demand and the available contingent liquidity. The reports highlight changes in the institution's liquidity position under stress during various time horizons.

Note: Depending on your Excel macro security settings, you may receive a message prompting for enabling macros upon opening the spreadsheet. Please enable macros to ensure full functionality of the model.

KEY LIQUIDITY VARIABLES

The Assumptions worksheet outlines the key liquidity variables affecting the cash flows and the liquidity reserves over a twelve-month period, considering the following:

- **Beginning balance sheet composition**
- **Estimated increases and decreases in the key balance sheet and off-balance sheet items**
- **Collateral status**
- **Wholesale funding capacity / policy limits**
- **Saleable / pledgeable assets**

ALL INPUT CELLS IN THE WORKSHEET ARE HIGHLIGHTED IN GRAY

Additional guidance regarding the input format is built in the worksheet and activated when an input cell is selected. Fields containing formulas are protected and should not be changed. *Note: It is not necessary to provide inputs for every single balance sheet item, only items that are likely to have a material impact on a bank's liquidity need to be considered.*

The model automatically balances the balance sheet projections on a monthly basis and assumes that monthly cash surplus will be rolled into Fed Funds Sold, while the cash deficit will be funded by Fed Funds Purchased. If the Fed Funds Purchased balance exceeds the available limit, it is necessary to adjust the projections (consider alternative funding strategies or reduction in asset growth). The remaining balances for contingent funds are automatically recalculated based on the projected balance sheet inputs.

WORKSHEET MAINTENANCE

PRINT	Prints the liquidity cash flow assumptions, including the balance sheet, wholesale funding, and asset liquidity assumptions.
ROLL FORWARD 1 Month	Clears actual balances with first month projections and rolls the projection period one month forward, reusing the remaining monthly inputs. The assumptions regarding the collateral status, wholesale funding capacity, and asset liquidity are not affected.
CLEAR Inputs	Clears actual balances, monthly projections, and all other base case assumptions.

PREPARING BASE CASE ASSUMPTIONS

The following section describes the steps needed for the preparation of a cash flow plan and the liquidity analysis.

Step 1: Input initial actual balances and policy limits

- **Input the bank name and the date of the initial balances, if not yet included.**

- **Input the initial balance sheet amounts (Column "Actual"). If you are updating the model from the previous period, use the *Roll Forward* button to clear the outdated actual balances and to add cash flow projections for only those months that were not covered previously.**

- **Input the actual balances and limits in the Collateral Capacity table, Wholesale Funding Capacity table, and Asset Liquidity table as follows:**

    Pledged / Pledgeable Loans or Investments: Reflects the total amount of collateral that would be needed to secure the available borrowing capacity (both operating and contingent), including the value of loans / investments that you have currently pledged or that you would have to pledge to access the available secured borrowing lines. If you do not have any specific arrangements for secured borrowings, you can include your pledgeable/saleable assets as part of the asset liquidity (see Saleable/Pledgeable Securities or Saleable/Pledgeable Loans in the Asset Liquidity table). Please note that if the available borrowing capacity exceeds the Bank's internal wholesale fund limit, the amount of collateral needed for borrowings is capped based on the internal limit, with any excess collateral added to the amount of unencumbered loans or investments (model versions 3.0+ only).

    Borrowing Capacity Secured by Loans/Investment/Other Assets: Reflects the total collateral-based borrowing capacity, i.e. the amount that you are eligible to borrow based on the available loan, investment, or other asset collateral.

    Collateral Haircut: Percent difference between the available borrowing capacity and the value of collateral securing the credit.

    Secured Off-Balance Sheet Items: Reflects the book value of all secured off-balance sheet items (such as standby letters of credit).

    Internal Limit on Secured Borrowings: Maximum limit for secured borrowings reflected as a percentage of the total assets (typically reflects the policy limit). Input the maximum % limit, if available, or leave blank (model versions 3.0+ only).

    Maximum Unsecured Credit Capacity: Input the maximum $ amount of all approved unsecured credit lines. If you are anticipating changes in the availability of unsecured credit lines over the next 12 months, input your information in the appropriate month column. The default assumption is no change in the amount.

Maximum Brokered Deposit Capacity: Maximum limit for brokered deposits, if available (typically reflects the policy limit). Input the maximum % limit and select the maximum limit type (% of assets or % of deposits), or leave blank.

Maximum Other Wholesale Deposit Capacity: Maximum limit for other wholesale deposits (such as Internet deposits), if available (typically reflects the policy limit). Input the maximum % limit and select the maximum limit type (% of assets or % of deposits), or leave blank.

Max. All Wholesale Funds: Maximum limit for all wholesale funds, if available (typically reflects the policy limit). Input the maximum % limit.

Saleable / Pledgeable Assets: input the estimated amount of unencumbered investments, loans, and other assets that are liquid and could be sold or pledged if needed.

- **Input the actual tier 1 capital, total risk-based capital, average assets, and risk-weighted asset balances in the Capital Ratio Inputs table.**

  The purpose of the table is to estimate the amount of capital erosion for stress-testing purposes in any scenarios simulating the loss of well-capitalized status.

Step 2: Input base case projections

- **Input monthly projections for the anticipated asset and liability outflows (maturities and runoff/withdrawals) and inflows (rollovers and new growth).**

  The model automatically balances the balance sheet on a monthly basis and assumes that monthly cash surplus will be rolled into Fed Funds Sold, while the cash deficit will be funded by Fed Funds Purchased. If the Fed Funds Purchased figure exceeds the maximum approved limit, it is necessary to adjust the projections (either reduce assets or consider alternative funding). The remaining balances for contingent funds are automatically recalculated based on the projected balance sheet inputs.

  For monthly updates, you have the option to use the *ROLL FORWARD 1 Month* button on the top of the worksheet. This function will allow you to reuse the existing monthly inputs and add projections for only those months that were not covered previously. The previous projections for the first month will be deleted and replaced with the remaining monthly projections, leaving the month 12 blank and ready for the new inputs. By clicking the roll forward button multiple times, you can roll the data forward by more than one month.

- **If you are anticipating changes in the amount of pledged assets or the collateral haircut over the next 12 months, input your information in the appropriate month column. The default assumption is no change in the amount.**

Step 3: Review cash flow reports

If the projected liquidity reserves fall below the established risk tolerances, the bank should consider adjustments to the existing primary liquidity position or additions to the contingent liquidity. The results of the liquidity cash flow planning process should be integrated into the bank's strategic planning process (for example, adjusting the planned asset-liability composition) and the bank's day-to-day risk practices (for example, monitoring sensitive cash flows or reducing the concentration limits). See the next section for more information regarding the cash flow reports.

FORECAST COMPONENTS

The liquidity cash flow forecast provides estimates regarding the bank's anticipated funding needs and the available funding sources over time, including the following:

- **Operating gaps (net operating funding requirement/surplus)**
- **Cash flow from financing activities**
- **Primary liquidity position**
- **Contingent liquidity**
- **Dynamic cash flow ratios**
- **Funding concentrations and other balance sheet ratios**

The information is based on the Assumptions worksheet and is displayed on a monthly basis and on the cumulative basis for 30, 60, 90, 180, 365 days. **No inputs are needed on this sheet.**

LIQUIDITY CASH FLOW ANALYSIS

Every bank needs to have sufficient liquidity reserves and maintain access to funds in both normal and stressed environments. The adequacy of liquidity reserves varies based on the bank's balance sheet composition, asset quality, earnings capacity, anticipated funding needs, options for obtaining additional funding, as well as the anticipated economic conditions.

The key questions that should be answered through the cash flow analysis are:

Are we covered? The trends in the bank's cumulative gap position should be examined to spot any large or growing mismatches between funding needs and funding sources over time. Large mismatches may place liquidity strains on the bank. If the bank repeatedly shows a net need for funds with a growing trend in cumulative gap shortfalls, this may be an indication that the bank is becoming less liquid.

To what degree is the bank reliant on volatile or credit-sensitive funding sources? High reliance on brokered funds, unsecured credit, or other credit-sensitive funding may increase the bank's liquidity risk, as these sources may not be available to the bank if its capital position or financial condition deteriorates. High concentrations of wholesale deposit funding or potentially volatile retail deposits may also increase the bank's exposure to liquidity risk. The funding concentrations should be monitored for compliance with the established policy limits.

Is the liquidity reserve adequate? The bank's funding sources must be sufficient to cover the bank's funding needs under both normal and stressed conditions. The results should be evaluated considering the bank's level of risk exposures and any threshold limits included in the bank's policies.

The assumptions in the cash flow analysis should be regularly stress-tested for events that have a potential to trigger liquidity disruptions. The stress testing focuses on stress events that, while relatively infrequent, may have a significant impact on the bank's liquidity given its balance sheet composition and other characteristics. An adequate liquidity reserve should be able to compensate for the additional funding demand without any operating disruptions. The results of the stress testing process should be integrated in the bank's strategic planning process (for example, adjusting the planned asset-liability composition) and the bank's day-to-day risk practices (for example, monitoring sensitive cash flows or reducing the concentration limits). If the projected liquidity reserves fall below the established risk tolerances, the bank should consider the adjustments to the existing liquidity position or additions to the contingent liquidity.

LIQUIDITY CASH FLOW REFERENCE GUIDE

Cash & Equivalents include the total amount of cash, balances due, federal funds sold, and securities purchased under agreements to resell. Cash & Equivalents in excess of the minimum amount needed for daily operations represent the institution's primary liquidity.

Primary Liquidity Position represents the amount of excess cash & equivalents (total cash & equivalents less the minimum needed for daily operations). The primary liquidity position is calculated as the beginning balance + the net change during the period (including net operating cash flow gap and net cash flow from financing activities).

> ***Operating Cash Flow Gap*** represents the difference between the operating funding needs and the operating funding sources. A positive gap indicates that funding sources exceed the anticipated funding needs during the period, while a negative gap suggests that operating funding sources are being supplemented with cash flow from financing activities or existing primary liquidity reserves to satisfy the funding needs.

> ***Operating Funding Sources*** represent all cash inflows from daily operations, including cash receipt from local market deposits (rollovers and new deposits), net income, cash receipts from loans and investments (maturities and sales), and cash receipts from other assets.

> ***Operating Funding Needs*** represent all anticipated cash outflows from operations, including local market deposit outflows (maturities and withdrawals), growth in loans and investments (rollovers and new growth), as well as growth in other assets.

> ***Cash Flow From Financing Activities*** represents all cash inflows and outflows related to unsecured and secured borrowings, brokered deposits and other wholesale deposits, subordinated debt, dividend payments, or additional capital generation.

Contingent / Standby Liquidity represents alternative funding sources that are not currently used but are available to be accessed in case of an additional funding demand. These typically include any remaining unsecured credit capacity, secured borrowing capacity, brokered deposit capacity, other wholesale fund capacity, and saleable/pledgeable assets.

Total Liquidity combines the primary and the contingent liquidity, including all liquid assets (see below) and the standby wholesale funding capacity. It also represents the difference between the total funding sources (primary and contingent) and the total funding needs.

Liquid Assets include excess cash & equivalents (total cash & balance due less the minimum needed for daily operations + federal funds sold and securities purchased under agreements to resell) and other liquid assets (unencumbered loans, securities, and other assets that are saleable or pledgeable).

Liquidity Coverage represents a ratio of total funding sources (primary and contingent) to total funding needs. As an example, a ratio of 150% indicates that the institution's liquidity reserves exceed the anticipated funding needs in the analyzed time horizon by 50%. The ratio should be at least 100% under both base case and stress scenarios.

STRESS TEST COMPONENTS

Liquidity stress tests provide estimates regarding the following:

- **Potential funding erosion in a stress situation**
- **Impact of stress on the availability of contingent funding**
- **Primary and contingent liquidity under stress**
- **Liquidity coverage under stress**

Liquidity stress testing typically includes multiple stress scenarios for a short-term and a protracted period, considering not only the impact on the projected cash flows, but also the potential legal, financial, and logistical constraints that might influence the availability of contingent liquidity. The stress testing should focus on stress events that, while relatively infrequent, may have a significant impact on the bank's liquidity given its balance sheet composition and other characteristics. An adequate liquidity reserve should be able to compensate for the additional funding demand without any operating disruptions.

The stress tests use the base case estimates for the selected time horizon as a basis and recalculate the bank's liquidity position based on the various stress constraints. The impact of the considered stress changes is distributed equally within the selected stress time horizon.

STRESS TESTING PROCESS

Step 1: Select stress test scenarios and general constraints

- **Input the scenario name in the highlighted cell.**

- **Select a desired horizon for the stress event, using the pull-down menu (30, 60, 90, 180, or 365 days). The base case scenario column will automatically display the base case balances and cash flows for the selected horizon.**

- **Select relevant stress constraints, including the potential restrictions on unsecured credit or brokered funds (yes or no), limitations on accessing the remaining other wholesale deposit capacity (% reduction from base case), increased collateral requirements (% increase), or reduction in value of marketable assets (% estimate). These inputs will be automatically reflected in both the primary liquidity and the contingent liquidity data.**

Step 2: Input estimates regarding the potential funding erosion

- **Use the highlighted cells to input stress estimates. The estimates can be made either as a percentage of the base amount or as a dollar amount. The dollar amount estimate overrides the percentage input if both are included simultaneously. The stress change column will calculate the total change based on the percentage or the dollar stress inputs.**

  The stress changes include potential declines in funding and unplanned increases in assets. Examples of the potential cash flow stress changes include:

  > *Reduction in planned deposit growth and rollovers*
  > *Increase in deposit run-off, loss of a large depositor*
  > *Loss of unsecured credit*
  > *Operating losses*
  > *Reduction in cash receipts from loans*
  > *Unplanned increases in loan commitment drawdowns*

  The resulting total potential funding erosion for the selected time horizon is displayed at the bottom of the table as a total dollar amount and a percentage of assets. The remaining balances of the contingent funds will be automatically recalculated to reflect the stress changes and constraints defined above.

- **If needed, consider possibilities of generating additional retail deposit growth, reducing planned asset growth, or raising additional capital. Inputs can be made in the highlighted cells.**

  The right side of the table shows the impact of the selected stress event on the liquidity position of the bank over a 30-day, 60-day, 90-day, 180-day, and a 365-day period. The stress change is distributed equally within the selected stress time horizon. As an example, a $9.0 million reduction in planned deposit growth over a 90-day period would translate into a $3.0 million stress in 30 days, $6.0 million stress in 60 days, and $9.0 million stress in 90 days. (Note: If the planned deposit growth projection was lower than $3.0 million in 30 days, the stress change would equal to the actual planned deposit balance).

STRESS TEST RESULTS

The total potential funding erosion should be evaluated in relation to the total funding sources available in a stressed situation. A liquidity surplus (positive total liquidity position) is shown if the primary liquidity and the contingent liquidity under stress exceed the total potential funding erosion. If the available liquidity is not sufficient to cover the potential additional funding demand, a deficit is shown. The coverage ratio of the total funding sources in relation to the total funding needs is also included. The coverage ratio should remain above 100 percent not only in the base case, but also in the stress scenarios.

If the projected liquidity reserves fall below the established risk tolerances, the bank should consider adjustments to the existing liquidity position or additions to the contingent liquidity. The results of the stress testing process should be integrated into the bank's strategic planning process (for example, adjusting the planned asset-liability composition) and the bank's day-to-day risk practices (for example, monitoring sensitive cash flows or reducing the concentration limits).