

Bank Deposit Portfolio Management



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Background

One of the functions of traditional banking in the economy is to provide “maturity transformation” where savers in the economy supply funds, often callable on demand, to banks who lend it to borrowers with long time horizons of repayment. For a traditional bank, the ability to fund loans with low-cost deposits is a key driver of profitability. Therefore, banks focus on attracting and retaining low-cost deposits throughout the interest rate cycle.

However, many banks are complacent about attracting deposit account balances and are over-reliant on the contribution of their existing branch networks. Banks need to actively manage deposit accounts as a portfolio, by ensuring adherence to regulatory capital and liquidity rules, assessing the stability of deposit balances by maturity, and optimizing their pricing strategy to retain and grow deposit balances to maximize profitability.



Managing liquidity positions: Regulatory capital and liquidity rules

Large U.S. bank holding companies (Global Systemically Important Banks) are subject to a Liquidity Coverage Ratio (LCR) rule that is intended to enhance the short-term resilience of the banking system through better measurement and management of liquidity risk. The LCR rule was adopted by the Board of Governors of the Federal Reserve System, the Office of the Comptroller of the Currency, and the Federal Deposit Insurance Corporation in 2014. At the highest level, the LCR rule seeks to ensure that banks have sufficient high-quality liquid assets (HQLA) to meet their cash needs over a 30-day period of stress; the rule requires that the ratio of HQLA relative to trailing 30-day net cash outflows exceed 100%.¹

Banks must manage their liquidity positions in adherence with regulatory requirements. A key consideration for banks in managing their liquidity is the extent to which deposit account balances are “hot money” and are very sensitive to information about the status of the bank. Banks which depend heavily on wholesale deposits from large businesses are especially vulnerable. The sudden demise of Silicon Valley Bank and later First Republic Bank in March 2023 was due to contagion, when the information of accelerated deposit withdrawal activity becomes public information leading to a “run on the bank.” In March 2023, S&P Global downgraded the credit rating of First Republic, citing a “high proportion of uninsured deposits from wealthy customers,” who are more likely to move their money elsewhere; the bank subsequently reported a loss of over \$100 billion in deposits in one month alone.²

While only GSIBs are subject to a formal Liquidity Coverage Ratio (LCR) regulation, all banks need to manage their liquidity position and develop a strategy to minimize the “hair cut” from selling investment securities to raise the cash required for unanticipated deposit withdrawals. When long term interest rates increase, bond prices fall, exactly at the same time some depositors may seek higher interest rates elsewhere thereby creating a perfect storm where accelerated deposit withdrawals engender the sale of investment securities at a loss. Banks require a more sophisticated methodology to manage liquidity as the accelerated dissemination of information can lead to a “herd effect” where institutional depositors exit the bank all at once to seek a higher rate.



Valuation: Deposits and transfer pricing

The salient activity of traditional banks is to provide credit in the form of term loans, and these loans require funding sources on the balance sheet. While alternatives such as security repurchase agreements, commercial paper and term debt securities are available, these all carry considerable interest rate risk. The largest and least expensive source of funds for bank loans are deposits, notably retail checking account deposits. The demise of administered deposit interest rates via the elimination of the New Deal-era Regulation Q, motivated banks to adopt a robust methodology to identify the economic value of deposit accounts.

The interest rates that banks pay on liabilities, including deposits, are heavily influenced by the yield on risk-free treasury securities arrayed by maturity, or the “yield curve.” Normally, the yield curve is upward sloping as investors demand a premium for lending at longer maturities; an “inverted yield” curve arises when short rates are higher than longer term rates.

Banks actively manage the composition of their assets and liabilities, as well as the interest rate received and paid out, respectively, to maximize profitability. Demand deposit accounts generally do not pay interest, so they are the least costly source of funding for banks and, therefore, highly prized.

Net interest margin is the interest earned on assets less the interest paid on liabilities, relative to the total amount of interest earning assets. Lending long and borrowing short is the classic model of banking; Net interest margin typically accounts for the majority of a traditional bank's total profits.

Acquiring, cultivating, and retaining demand deposit accounts and, more critically, accumulating balances in these accounts is strategically important for banks. Competitive pressures, both from traditional insured depository banks and from neo-banks, are compelling banks to focus more attention on demand deposit accounts.

To understand the performance of each line of business, banks employ a transfer pricing scheme known as “matched maturity cost of funds” to apportion the bank's net interest margin between earning assets, such as loans, and funding sources, such as deposits. This approach allows banks to identify interest rate premiums and the economic benefits of low or zero cost funding sources like demand deposit accounts.

First, the treasurer of the bank establishes the yield curve by plotting treasury market interest rates by tenor, or maturity. The next step is to identify the bank's marginal borrowing cost by maturity in the marketplace. The bank's treasury will then decompose the bank's overall performance into a net interest margin for lending and for deposit gathering, as reflected in Exhibit I.

Implemented correctly, the matched maturity cost of funds transfer pricing model appropriately rewards the accumulation of low volatility balances in deposit accounts that pay interest below the market rate. For most banks, the ability to attract non-interest-bearing deposit account balances is the critical factor in sustaining profitability over the interest rate and credit cycles.

Exhibit I: Net interest margin

Matched Maturity of Funds Transfer Pricing Methodology

Customer	Borrower borrows \$100k for 3 years paying 4.55% interest				Depositor deposits \$100k for 1 year earning 1.15% interest	
Funding	Consumer Credit	<\$100k for 3 years	Treasury	<100K for 1 year	Retail Deposits	Bank
Net Interest Margin	4.55% - 3.30% = 1.25%	< charges 3.30% for 3 year money	3.30% - 2.10% = 1.20%	> credits 2.10% for 1 year money	2.10% - 1.15% = 0.95%	1.25% + 1.20% + 0.95% = 3.40%

Pricing: Quantify customer deposit rate betas to optimize pricing strategy

Banks have a pressing need to accurately forecast funds inflows, outflows, and monthly average balances within each deposit product type. It is critically important for banks to model the sensitivity of these aggregate deposit balance amounts to changes in the yield curve. Banks also need to determine the elasticity of deposit balances with respect to the deposit rate they offer by balance tier and by maturity in the marketplace; the extent to which a bank modifies its offer rate in response to changes in the yield curve is called the “deposit rate beta.”



Deposit rate beta and bank funding

Deposit rate betas are a measure of the pass-through of monetary policy to the deposit market. Deposit rate beta is measured as the change in the bank's offer deposit rate divided by change in the market benchmark rate, expressed as percentage. In the U.S., the market benchmark rate is the Fed Funds rate, where banks lend to one another via their accounts held at the Federal Reserve banks.

More specifically, the deposit rate beta is the portion of a change in the Fed Funds rate that is passed on to the deposit rate. Deposit rate betas can be calculated for individual changes in the fed funds rate or as a cumulative measure over a tightening interest rate cycle.

Deposit rate betas are not uniform and vary across deposit product type, the market position of the bank, and the interest rate cycle. Non-interest-bearing checking products have a zero deposit rate beta by definition, as they pay no interest regardless of market interest rates. Savings accounts have low deposit rate betas, often 15% to 25%.

Deposit rate betas for money market accounts run higher, typically 40% to 60%. Time deposits, often called CDs, have the highest deposit rate betas, frequently 70% to 90%, because they reprice entirely at maturity and customers actively shop rates. Jumbo CDs are time deposits where the dollar amount exceeds the limit for individual account FDIC insurance coverage.

Banks with a strong retail franchise and a loyal customer base enjoy lower overall deposit rate betas than banks competing primarily on interest rates. For example, a community bank in a small town with limited competition may maintain a 30% cumulative Beta through an entire market interest rate tightening cycle. A bank in a competitive metropolitan market or one reliant on online deposit gathering might see very high deposit rate betas.³

The ability of individual banks to cultivate lower Deposit Rate Betas through competitive dynamics is a motivating factor for banks to consolidate and innovate. "The deposit franchise gives banks substantial market power over deposits, allowing them to pay deposit rates that are low and insensitive to market interest rates. Maintaining this power requires banks to incur large, interest-insensitive operating costs, so that the total costs of deposits are like fixed-rate, long-term debt."⁴

When the Fed Funds rate rises faster than bank deposit rates, the gap between the Fed Funds rate and the bank deposit rate increases. This deposit gap is indicative of the opportunity cost for depositors relative to other investment vehicles. Banks face significant competition for the savings of households from other vehicles that offer rates closer to the Fed Funds rate, such as money market mutual funds, which are not FDIC insured.

Exhibit II: Deposit Product Types

Type	Pays Interest?	Variable or Fixed Rate?	Access to Funds?	FDIC Insured?
Checking	No		Unlimited	Yes
Savings	Yes	Administered	Restricted	Yes
Money Market	Yes	Variable	Restricted	Yes
Time Deposits	Yes	Fixed for term	Penalty for early withdrawal	Yes
Jumbo CD	Yes	Fixed for term	Penalty for early withdrawal	No

Deposit rate betas are related to the ratio of lending (either loans or loans and held-to-maturity securities) to deposits. Lending-to-deposit ratios are measures of how much banks might need deposits. If the supply of deposits is high, then the lending-to-deposit ratio will be low, and banks are more easily able to fund all their desired loans and have no incentive to attract additional deposits. If deposit supply is low, then the lending-to-deposit ratio will be high, and banks might need to seek additional funding; deposit rate beta varies over time depending on the funding needs of banks.⁵

A detailed analysis of deposit rate betas by the New York Fed quantifies the impact on banks funding strategies relative to market interest rates. It is critical to explore the variation of deposit rate betas across deposit product categories to understand banks' funding strategies as well as depositors' investment opportunities. The study showed that when regular deposit funding declines, banks substitute towards more rate-sensitive forms of funding such as time deposits and other forms of borrowing such as advances from the Federal Home Loan Banks (FHLBs).⁵

Fees associated with deposit accounts and customer retention

The provision of the full set of payments and cash management services can be costly for banks. Accounts that carry small balances will not generate sufficient income to offset the direct cost of supporting the checking account. Therefore, an important consideration is the deposit account fee strategy of the bank. Historically, most checking accounts available to consumers charge a monthly account fee; this fee is often waived if consumers maintain a sufficient monthly average balance and this fee is often waived for a period after the account is first opened. Competitive pressure, coincident with the ability to deliver most banking services digitally, has made the monthly account fee less prevalent. However, banks should take note that investors value non-interest income over interest income, as the latter is more volatile and directly influenced by market conditions.

In addition to the monthly account fee, banks itemize a schedule of fees that they can charge. While less prevalent due to the displacement of paper checks with digital payments and same-day settlement, banks still wish to prevent deposit accounts from having a negative balance and therefore charge an overdraft fee whenever a pending debit exceeds the collected balance on a checking account. While overdraft fees are an appropriate charge to discourage uncollateralized loans, banks should carefully evaluate the impact of overdraft fees on customer satisfaction and the health of the overall customer relationship.

The emergence of fintechs as direct consumer banks provides consumers with readily available alternatives and consumers are more sensitive than ever to “penalty” fees, such as overdraft and insufficient funds. For example, Chime offers members access to “SpotMe,” an overdraft protection product that allows enrolled members to overdraw their account up to a predetermined limit, without an explicit fee. The credits generated by overdraft protection can be held by Chime as a receivable or, more often, are held as a consumer loan by a Chime partner bank.⁶



Modeling deposit balances and flows: The importance of customer relationships

Given the critical importance of funding sources on the bank's ability to underwrite loans, as well as the impact of the funding source on the bank's net interest margin, banks need a robust methodology to accurately forecast deposit balances and flows with deposit product types. There are two, largely complementary, approaches to modeling deposit portfolio balances: a top-down product-focused and a bottom-up customer-centric approach.

The top-down approach focuses on forecasting aggregate deposit balances within deposit product type, differentiating between core deposits, comprised of demand deposit accounts and savings accounts, and time deposits, that have fixed rates and terms. The crux of the forecasting effort is to assess the impact of seasonality of deposit balances flows and the elasticity of deposit balances within deposit product type, with respect to the bank's posted deposit pricing. It is critically important to assess the focal bank's deposit rate beta versus that of key competitors in the same geography.⁷

The bottom-up methodology focuses on the fundamental drivers of customer retention, customer acquisition and product usage. The forecast of balances within deposit product type is built up from modeling the portfolio dynamics of customer relationships. At the heart of this effort is the deployment of a robust model of customer attrition, as the features that impact retention also impact deposit balance augmentation and diminishment. Banks that focus on modeling customer attrition understand the importance of facilitating routine deposit activity in maintaining the overall customer relationship, with the key finding that the greater the breadth and depth of payment instrument usage, the greater the likelihood of customer retention. The greater the likelihood of customer retention, as identified by the model, the lower the elasticity of deposit balance changes with respect to changes in the bank's offered deposit rate.⁸

The customer attrition risk model score is a summary indicator of customer loyalty and can be used to augment analysis of the sensitivity of deposit balances to changes in the yield curve, or deposit rate beta, as well as the likely customer responses to changes in deposit account fee policies and pricing. The optimal strategy to accurately forecast deposit balances and flows is a thoughtful combination of both the top-down and bottom-approaches.

A related activity is to develop and deploy a model to quantify the likelihood that a customer will materially increase their deposit account balance in the forthcoming months. The root mechanism for a sustainable increase in average deposit balances is when customers make the focal bank their "primary bank" as the destination for recurring paychecks or other income. The goal of the bank is to promote accounts services, such as online bill payment, that encourage deposit account customers to migrate cash inflows and payments to the focal bank, as the customers build balances in the anticipation of future cash outflows.



Deposit product convenience and customer engagement

While the focus is on maximizing the volume of deposits in accounts that are interest rate insensitive, it is a necessary competitive condition for banks to make the deposit account itself as convenient to use as possible. As consumers want to access the funds from their paycheck as soon as permitted, banks work with employers to provide automated deposits of regular paychecks. A new wrinkle is for banks to respond to the competitive pressure from fintechs and offer “earned wage access,” or a short-term on-demand loan in anticipation of a forthcoming paycheck.

It is also important for customers to deposit funds seamlessly, notably paper checks. With over 5,000 banks in the U.S., paper checks linger on as the default method to “pay anyone” from a bank account. Processing paper check deposits is expensive, and banks have developed alternatives to teller or ATM deposits. The “Check 21” legislation passed by the U.S. Congress in 2004 made the image of a check a legal substitute for the paper check. Soon thereafter, ATMs deployed image processing technology to identify the issuer bank from the deposited paper check and to determine the handwritten dollar amount of the check.

Predicated upon the popularity of banking on a mobile phone, USAA in 2009 launched a mobile application for Mobile Remote Deposit Capture, or MRDC, where customers use their phone’s camera to take pictures of the front and back of the endorsed check and electronically send it to the bank. MRDC was an early deployment of intelligent document processing as it uses AI to correct the photographic image for creases and folds in the paper check before reading the handwritten dollar amount.⁹



Cash management and corporate deposit accounts

Treasury services, also known as cash management, help business entities efficiently manage cash flow, payments, collections, and financial risk while maintaining visibility and control over accounts. These services act as a central hub for managing money movement, integrating accounts receivable, accounts payable, liquidity management, and fraud prevention.

Businesses rely on banks to facilitate the core cash management functions:¹⁰

Cash monitoring and liquidity management

Track incoming and outgoing funds and manage liquidity to prevent cash shortages and optimize financial decision-making. Cash pooling consolidates multiple accounts into a single position to reduce borrowing costs while real-time cash visibility facilitates automated cash flow forecasting.

Payments processing and collections

Leverage banking relationships for ACH payments, wire transfers, merchant services, automating payroll, vendor payments, and international transactions. Centralized processing hubs streamline payments and collections across subsidiaries or business units.

Collections and receivables

Utilize remote deposit capture and electronic payment solutions to accelerate collections, improve cash flow and reduce outstanding balances. Virtual accounts allow the segregation of funds for different counterparties while enjoying the efficiency and visibility of a central account.

Fraud prevention and security

Deploy multi-layered protection including dual approval processes, real-time alerts, and multi-factor authentication to safeguard transactions. Focus on secure bank connectivity and payments automation.

Real-time cash flow forecasting

Real-time data integration from sources of cash inflow and outflow is a significant advantage in cash flow forecasting. Forecasts leveraging AI models outperform traditional statistical methods by analyzing vast amounts of financial data and spotting subtle patterns human analysts might miss. Machine learning algorithms aggregate sales trends, economic indicators, and seasonal variations to predict cash flow. Unstructured data, such as news reports and market sentiment that can impact cash flow are evaluated by natural language processing (NLP) models. Simulations assess how events like currency devaluations, customer defaults or supply chain disruptions can impact a company's cash position and Treasury teams use these scenarios to build contingency plans and risk mitigation strategies.¹¹

Summary

For a traditional bank, the ability to fund loans with low-cost deposits is a key driver of profitability. Therefore, banks must focus on attracting and retaining low-cost deposits throughout the interest rate cycle. Banks must manage their liquidity positions in adherence with regulatory requirements.

To understand the performance of each line of business, banks apportion the bank's net interest margin between earning assets, such as loans, and funding sources, such as deposits. This approach allows banks to identify interest rate premiums and the economic benefits of low or zero cost funding sources like checking accounts.

The deposit rate beta identifies the portion of a change in the Fed Funds rate that is passed on to deposit rates. Banks with strong retail franchises and loyal customer base show lower overall deposit rate betas than banks competing primarily on rate.

The emergence of fintechs as direct consumer banks provides consumers with readily available alternatives and consumers are more sensitive than ever to penalty fees, such as overdraft and insufficient funds.

Treasury services, also known as cash management, help businesses efficiently manage cash flow, payments, collections, and financial risk while maintaining visibility and control over accounts. Advanced machine learning, real-time analysis and sophisticated simulations enable organizations to achieve levels of accuracy in cash flow forecasts that were previously unimaginable.

Footnotes

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