RISK MANAGEMENT IN AN INTEGRATED TREASURY: BALANCING RISK, LIQUIDITY AND RETURNS

Abstract

Commercial Banks operate in an environment where several risks can emerge simultaneously and affect profitability, capital and financial stability. Therefore, Treasury Department has a role that goes well beyond managing day-to-day cash flows. This paper examines how an integrated treasury can manage interest-rate, market and foreign-exchange risk using practical quantitative tools such as gap analysis, duration, PV01, NII sensitivity, VaR, NOOP and AGL. LCR and NSFR are also considered because market and liquidity risks are closely connected. The central argument is that no single measure tells the whole story. A combination of earnings sensitivity, economic-value measures, liquidity indicators and stress testing gives treasury a more realistic view of risk and supports better decisions on limits, hedging and returns.



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Introduction

Traditionally, treasury functions focused on managing cash flows, arranging short-term funds, maintaining liquidity, and investing surplus funds to minimise negative carry. Increasing financial-market complexity, regulatory reforms,real-time credit, UPI, and repeated episodes of financial instability have transformed treasury into a strategic function responsible for managing the balance sheet and major financial risks.

Today, treasury operates as an integrated framework linking Asset-Liability Management (ALM), investments, foreign exchange, liquidity, capital management, and market-risk activities. Risks no longer arise in isolation. A change in interest rates, for example, can affect funding costs, investment valuations, deposits, liquidity, NII (Net Interest Income)/NIMs (Net Interest Margin), and capital simultaneously. The growth of technology, artificial intelligence, and deep-tech solutions has further increased the need for an integrated approach because financial information and transactions move rapidly across markets.

The objective of this study is to examine the role of integrated treasury in managing financial

risks, analyse key quantitative and regulatory tools, and highlight how effective risk management can strengthen banking resilience while supporting profitability.

Integrated Treasury and the Risk Management Architecture

Financial markets and fund flows have become highly interconnected. The current West Asia War has resulted in the regulator managing the systemic liquidity more dynamically by increasing the minimum daily Cash Reserve Ratio (CRR) required from 90% to 99% and imposing 20% Foreign Exchange Rate Reserve (FERR) on specific currency transactions to reduce the currency volatility. All these have increased the requirement of an integrated treasury to manage the dynamic fund flows, which increasingly occur on a 24-by-7 basis, operate within different market windows, and global interest-rate movements can affect banks in a significant way.

An integrated treasury supports 3 important objectives:

- Liquidity management which requires continuous monitoring of cash flows, funding requirements, liquid assets, maturity mismatches, customer deposit behaviour and market conditions.
- Balance-sheet management seeks an appropriate balance between assets, liabilities, capital, profitability, liquidity, risk and regulatory compliance.
- ALM manages asset-liability mismatches to control liquidity, interest-rate, funding and balance-sheet risk.

Integration also allows allocation of funds proactively between domestic and forex markets, managing the underlying mismatches through borrowing or lending, use of derivatives for hedging interest-rate and foreign exchange exposures.

Effective risk management follows four broad stages:

a. Risk Identification: Identify the potential business risk that could affect the organisation.
b. Risk Measurement: Quantifying the impact of risks under normal, moderate-stress, and severe-stress scenarios.
c. Risk Control: Establishing appropriate limits based on the institution's risk appetite.
d. Risk Monitoring and Review: In this stage there is continuous track of identified risks and the effectiveness of control measures.

Managing the Interest Rate Risk

Interest-rate risk arises when changes in market rates adversely affect earnings or the economic value of the balance sheet. Major sources include repricing risk, yield-curve risk, duration mismatch, fixed-versus-floating mismatches and asset-liability maturity differences.

1. Gap and Repricing Analysis

Repricing analysis compares Rate-Sensitive Assets (RSA) and Rate Sensitive Liabilities (RSL) across maturity or repricing buckets. Repricing gap is:

Gap = RSA − RSL

Approximate Net Interest Income (NII)= Repricing Gap x Change in Interest Rate

For example, assume a bank has assets worth ₹2,000 Cr and and liabilities worth ₹1,500 Cr, the gap is calculated as below:

Gap = ₹2,000 Cr (minus) ₹1,500 Cr which is ₹ 500 Cr

If the expected rate of change in the interest rate is 1% in a year the Gap will be 1% of ₹ 500 Cr which works out to ₹ 5 Cr

A positive gap will benefit Net Interest Income (NII) when rates rise, while a negative gap may benefit when rates fall. Gap analysis is useful for earnings sensitivity but does not adequately capture market-value sensitivity.

2. Duration

Duration measures the sensitivity of the price or economic value of a fixed-income portfolio to interest-rate changes. The approximate relationship is:

Approximate % Change in Price (ΔP/P) ≈ Modified Duration × Change in Yield

Let's assume a bank holds a government-securities portfolio worth ₹100 Cr with a modified duration

of 4.5 years. If market yields rise by 0.75% (75 bps), the estimated price change (Increase or decrease) is 4.5 × 0.0075 = 3.375%. The approximate mark-to-market loss or profit will be ₹3.375 Cr, impacting the portfolio value to about ₹96.625 Cr. Treasury therefore uses duration to align the interest-rate sensitivity of assets and liabilities and control economic-value exposure.

> Beyond profits and losses: Building a resilient treasury through smarter risk management

3. Price Value of a Basis Point (PV0

PV01, or Present Value of a Basis Point, converts interest-rate sensitivity into a monetary measure. Approximately:

PV01 = Portfolio Value × Modified Duration × 0.0001

For the same ₹100 Cr portfolio with modified duration of 4.5 years, PV01 will be approximately ₹4.5 lakh per basis point change. Therefore, a 20-bp adverse movement implies an approximate ₹90 lakh change in value. Duration provides relative sensitivity, while PV01 provides a monetary estimate useful for limits and hedge sizing.

4. VaR and Stress Testing

Value at Risk (VaR estimates potential loss over a specified holding period and confidence level. A simplified parametric expression is:

$$VaR \approx z \times \sigma \times V \times \sqrt{t}$$

Where, z is the confidence-level factor, σ is volatility, V is portfolio value and t is the holding period.

VaR provides an aggregated view but does not adequately describe extreme losses beyond the confidence threshold. Treasury should therefore supplement it with parallel yield-curve shocks, steepening or flattening, widening credit spreads, sharp currency depreciation and liquidity stress.

Let's assume that a bank has a trading portfolio of ₹100 Cr and the market has a volatility of 0.80%, the confidence level factor for a 99% one tailed confidence under normal distribution is 2.33. In this case the VaR for a holding period on 1 day (t) will be 2.33 x 0.008 x ₹100 Cr which works out ₹1.864 Cr.

5. LCR (Liquidity Coverage Ratio) and NSFR (Net Stable Funding Ratio) as Supporting Risk Controls

Interest-rate risk cannot be managed independently of liquidity risk. In India Banks are mandated to keep 100% of their 30-Day net cash outflow as LCR (liquidity Coverage Ratio). Longer-duration investments may improve returns but can reduce liquidity hence, banks will invest in short-duration assets with high liquidity for managing LCR.

LCR is expressed as:

LCR = HQLA / Net 30 Day- Cash Outflows × 100

Let's assume a bank has HQLA (High Quality Liquid Asset) of ₹900 Cr and 30-day net cash outflows are ₹750 Cr, LCR is 120%. NSFR promotes stable funding for longer-term assets:

NSFR = Available Stable Funding / Required Stable Funding × 100

Thus, LCR and NSFR act as important constraints on investment, funding and balance-sheet decisions. They ensure that return optimisation does not weaken liquidity resilience.

6. Assumption and limitations of duration, Value at Risk and Gap Analysis

There is inherent limitation to any measure, the assumptions and limitation to above risk measures are:

- Certain measures assume markets have a normal behaviour.
- No Single measure will help in predicting the risk at irrational moves.
- In practice, assets and liabilities reprice different dates; deposit rates may not move one-for-one with market rates; different benchmark rates may move different amounts (basis risk).

- The duration formula is a first-order approximation and assumes a small, parallel change in yields. It does not fully capture convexity, non-parallel yield-curve movements, credit-spread changes, basis of risk or embedded options.

Managing the Market Risk

Market risk is the possibility of loss from adverse movements in market prices and rates. Treasury exposures can arise from government securities, bonds, equities, credit spreads, foreign exchange, commodities and derivatives.

Investment decisions should be assessed on a risk-adjusted basis rather than solely on nominal yield. A higher-yielding security may carry greater duration, credit-spread, concentration or liquidity risk. The objective is therefore to maximise sustainable risk-adjusted return rather than nominal return.

Managing Exchange Rate Risk

Foreign-exchange risk arises from fluctuations in exchange rates affecting foreign-currency assets, liabilities, trading positions and off-balance-sheet exposures. Treasury must identify net exposure and keep it within approved limits. Key measures include Net Overnight Open Position (NOOP), Aggregate Gap Limits (AGL), Intraday Gaps (IGL) and FX VaR.

1. Net Overnight Open Position (NOOP)

NOOP provides a consolidated view of overnight currency-wise open positions. In simplified form NOOP is calculated as below:

a. Calculate Net Open Position (NOP) for each currency

b. Calculate NOP for Gold

c. Convert the NOP into rupee as per FEDAI Rate

d. Arrive at sum of all net short position

e. Arrive at sum of all net long position

f. NOOP = higher of (d) or (e).

Let's understand with the following ***example***:

Table No – 1: Calculation of Net Overnight Open Position

Currency	Net position	Assumed INR Rates against FCY**	INR equivalent
USD	USD 10 Mio long (Buy)	₹95.83	95.8254
EUR	EUR 3 Mio short (Sell)	₹108.85	32.6558
GBP	GBP 2Mio long (Buy)	₹127.26	25.4520
JPY	JPY 50 Mio short (Sell)	₹0.61	3.0505

** rates as on 30.09.2026

- Aggregate Long Position (Buy Side) is ₹ 121.27 Cr
- Aggregate Short Position (Sell Side) is ₹ 35.70 Cr
- Net Overnight Open Position will be ₹ 121.27 Cr as the bank is larger on net long side.

2. Aggregate Gap Limit (AGL)

AGL controls cumulative foreign-exchange exposure across time buckets. Unlike NOOP, which focuses mainly on the net open position, FX gap analysis adds a time dimension. If expected USD inflow a month is $ 50 million and the outflow is $35 million, the one-month gap is +$15 million. Treasury can then decide whether the exposure should be retained or hedged.

3. FX VaR (Value at Risk) and Stress Testing

NOOP and AGL should be supplemented by FX VaR and stress testing. For the $20 million position above, a 3% adverse movement at USD/INR 80 would imply an approximate loss of ($20 million × 80 × 3%) ₹48 Cr. Such scenarios should be assessed against earnings, capital, liquidity and approved risk limits.

4. Assessing the Interest Rate, Currency, Market and Interest Rate Risks

Taking variables from the examples cited in each of above below mentioned table illustrates the assessment of interest rate, currency and liquidity risk together:

Table 2 : Assessment of Risks

Type of Risk	Risk Measure	Result	Assessment
Liquidity Risk	Gap Repricing	Gap ₹500 Cr	Positive Gap which is good
Interest Rate Risk	Gap Repricing	Gap ₹500 Cr	A positive gap will benefit Net Interest Income (NII) when rates rise, while a negative gap may benefit when rates fall.
Market Risk	Duration	Valuation Loss is ₹3.375 Cr	Negative; as there is valuation loss in case of yields moving higher.
Market Risk	PV01	Change in the valuation of the portfolio is ₹ 90 Lakh on portfolio of ₹100 Cr	Acceptable as the expected loss is below 1% of the portfolio
Market Risk	Value at Risk (VaR)	VaR for a portfolio of ₹100 Cr is ₹1.864 Cr	Acceptable as the expected loss is below 1% of the portfolio
Liquidity Risk	Liquidity Coverage Ratio	The LCR for 30 day time frame on a HQLA of ₹900 Cr is 120%	Acceptable as its above the 100% limit as mandated by RBI
Currency Risk	Fx VaR	A $20 million, 3% adverse movement in USD/INR at 80 would imply an approximate loss of ($20 million × 80 × 3%) ₹48 Cr.	Not Acceptable as 3% move in INR is above average normal movement

As mentioned in conclusion, risk assessment cannot be done by a single measure, a proper risk assessment is a combination of all these risk measures considering the size of the bank and the type of the market movements.

Hedging Strategy and Risk Monitoring through Early Warning Systems

Once risks have been identified and measured, treasury must develop appropriate hedging strategies. Interest-rate risk may be hedged using:

- Interest Rate Swaps
- Forward Rate Agreements (FRAs)
- Interest Rate Futures (IRF)

Forex Exchange Risk may be hedged using

- FX Forwards
- Futures and Options
- Swaps

The choice of hedge should also consider the counterparty risk, liquidity requirements, collateral requirements, and funding costs. Integrated treasury should also have a consolidated risk dashboard covering:

Table 3: Integrated Treasury Dashboard

Risk Parameter	Key Measurement tool
Interest Rate Risk	Gap, Duration, PV01, MTM
Market Risk	VaR, PV01, MTM
FX Risk	NOOP, AGL, VaR
Liqudity Risk	SLR, CRR, LCR, NSFR, and Liquidity Ratios

Early-warning indicators should highlight unusual movements in liquidity, market prices, interest rates, exchange rates, funding costs, and limit utilisation. Technology can strengthen this process by enabling real-time monitoring, automated alerts, scenario analysis, and consolidated risk reporting.

> The art of balancing risk and reward while keeping liquidity at the heart of treasury strategy

Conclusion

Effective risk management requires more than a single technique. Gap analysis and NII sensitivity assess earnings exposure; duration and PV01 measure economic-value sensitivity; VaR provides an aggregated market-risk view; LCR and NSFR provide liquidity constraints; and NOOP, AGL and FX gap analysis control foreign-exchange exposure. Stress testing complements these measures by examining extreme but plausible scenarios.

The objective of treasury is not to eliminate risk, but to understand the risk, measure it properly, set appropriate limits, hedge where necessary and continuously monitor whether the exposure remains within the institution's risk appetite. When all these elements work together, an integrated treasury can protect capital and liquidity while supporting sustainable, risk-adjusted returns. MA

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Congratulations!!!



Heartiest Congratulations to CMA Asim Kumar Mukhopadhyay on receiving the prestigious *"Transformational Leader of the Year 2026 – A Marvel in Leadership"* at the Global Leadership Conclave 2026, held at the House of Lords, UK Parliament, London, on 22–23 September 2026. The recognition, in the presence of distinguished global leaders, parliamentarians and dignitaries, acknowledges his exemplary leadership and transformational contributions. With extensive experience across the Steel, Automobile and Consulting sectors, he has demonstrated strategic vision, cost leadership and a commitment to sustainable business transformation. As CEO & Managing Director of NAVTOM Consulting, he continues to drive organisational excellence and create lasting value. Adding to his achievements, he has also been featured among "10 Exceptional Authors and the Books That Captivate Readers" for his book, *Clarity Competes: Why the Future Belongs to Leaders Who Align Cost, Culture, and Innovation,* which was reviewed in the June 2026 issue of *The Management Accountant.*

We extend our warmest congratulations to CMA Asim Kumar Mukhopadhyay and wish him continued success in inspiring leaders and shaping the future of business.