Liquidity risk management

International framework for liquidity risk measurement, standards and monitoring

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Foreword

The financial crisis exposed the lack of depth in existing liquidity risk measurement and management practices of banks and financial institutions across the globe. As the global financial system emerges from the crisis with unprecedented levels of liquidity support from central banks, it has become imperative to strengthen liquidity management practices. To further this end, the Basel Committee for Banking Supervision (BCBS) has issued a consultative document on the "International framework for liquidity risk measurement, standards and monitoring." The recommendations contained in the consultative document are expected to be finalized by the end of 2010 and implemented by 2012.

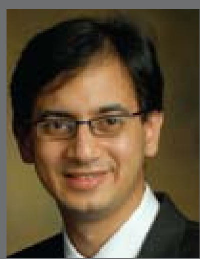
The key recommendations in the consultative document include:

- Increased use of severe stress scenarios to evaluate the balance sheet strength
- Incorporating liquidity risks, costs and benefits in product pricing and performance measurement
- Introduction of standard ratios and monitoring tools
- Increased focus on the asset-liability structure and availability of high-quality liquid assets to cushion against stressed market conditions
- Comprehensive framework for measuring off-balance sheet and contingent liquidity risks
- Increased focus on regulatory supervision, monitoring market indicators and information sharing between regulators
- Enhanced public disclosures about liquidity information

To help Indian Banks understand the key recommendations of the BCBS consultative document and its potential impact of existing liquidity management practices in India, Ernst & Young has compiled a brief document which is enclosed herewith for your kind perusal. The document provides a perspective on:

- Evolution of liquidity risk management
- Key features of the proposed framework
- Current state of liquidity risk management in India
- Bridging the gap with the proposed framework
- Key challenges for Indian Banks and the approach towards implementing the framework

We sincerely hope that you find the enclosed document resourceful. In case you need further information and insights, please feel free to reach out to us.



Hemal H Shah

Partner – Financial Services,

Risk Advisory,

Ernst & Young Pvt. Ltd.

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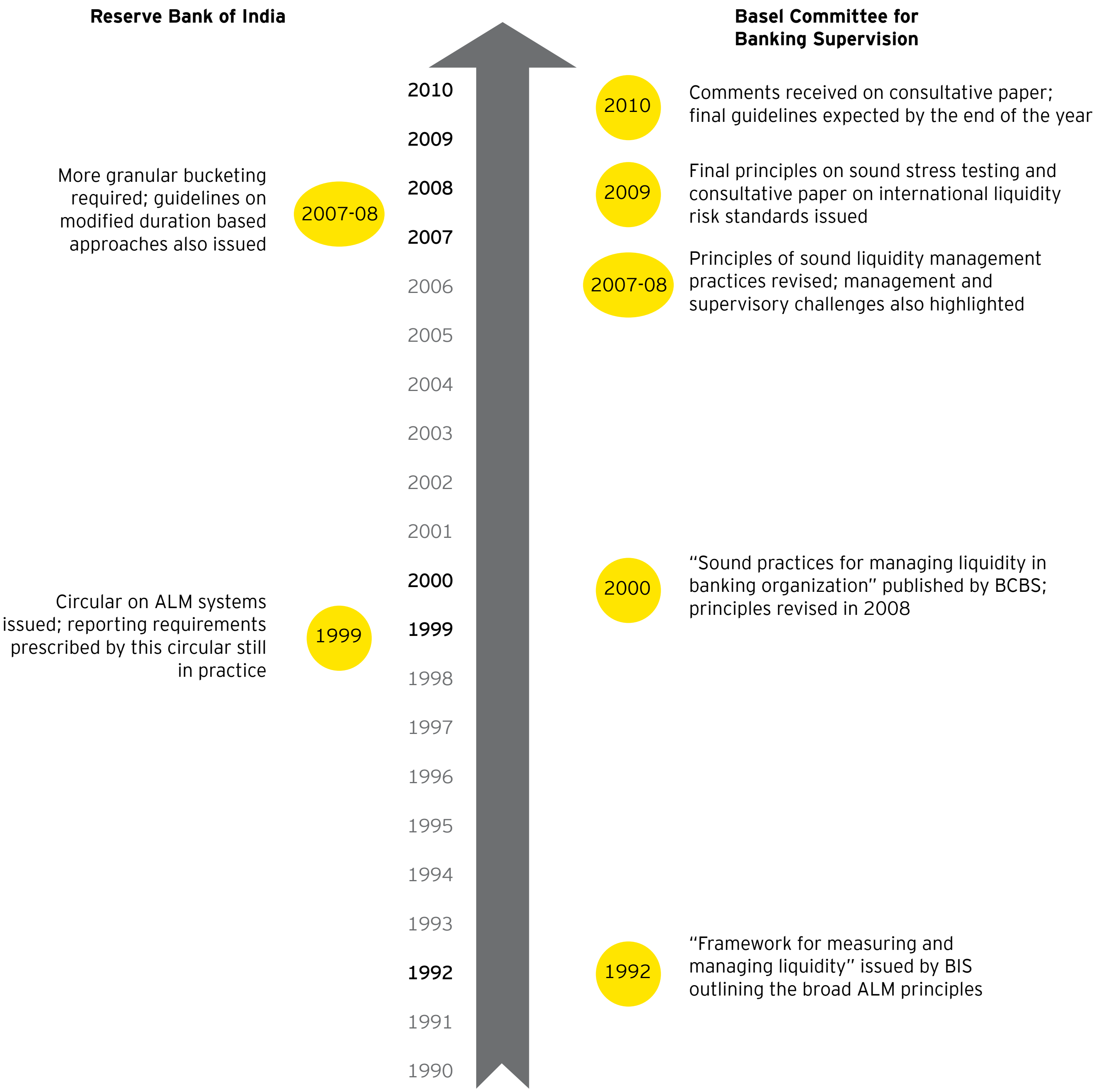
Abbreviations

BIS	Bank of International Settlements	ASF	Available amount of stable funding
BCBS	Basel Committee for Banking Supervision	**RSF**	Required amount of stable funding
ALM	Asset liability management	CRR	Cash reserve ratio
OMO	Open market operations	**RBI**	Reserve Bank of India
SLR	Statutory liquidity ratio	CBLO	Collateralized borrowing and lending obligation
MTM	Mark-to-market	**CDS**	Credit default swap
DGA	Duration gap analysis	CCIL	Clearing Corporation of India Limited
LCR	Liquidity coverage ratio	**FTP**	Fund transfer pricing
NSFR	Net stable funding ratio	NII	Net interest income
SDA	Standardized duration approach	**ALCO**	Asset Liability Management Committee
PSE	Public sector enterprises		

Evolution of liquidity risk management



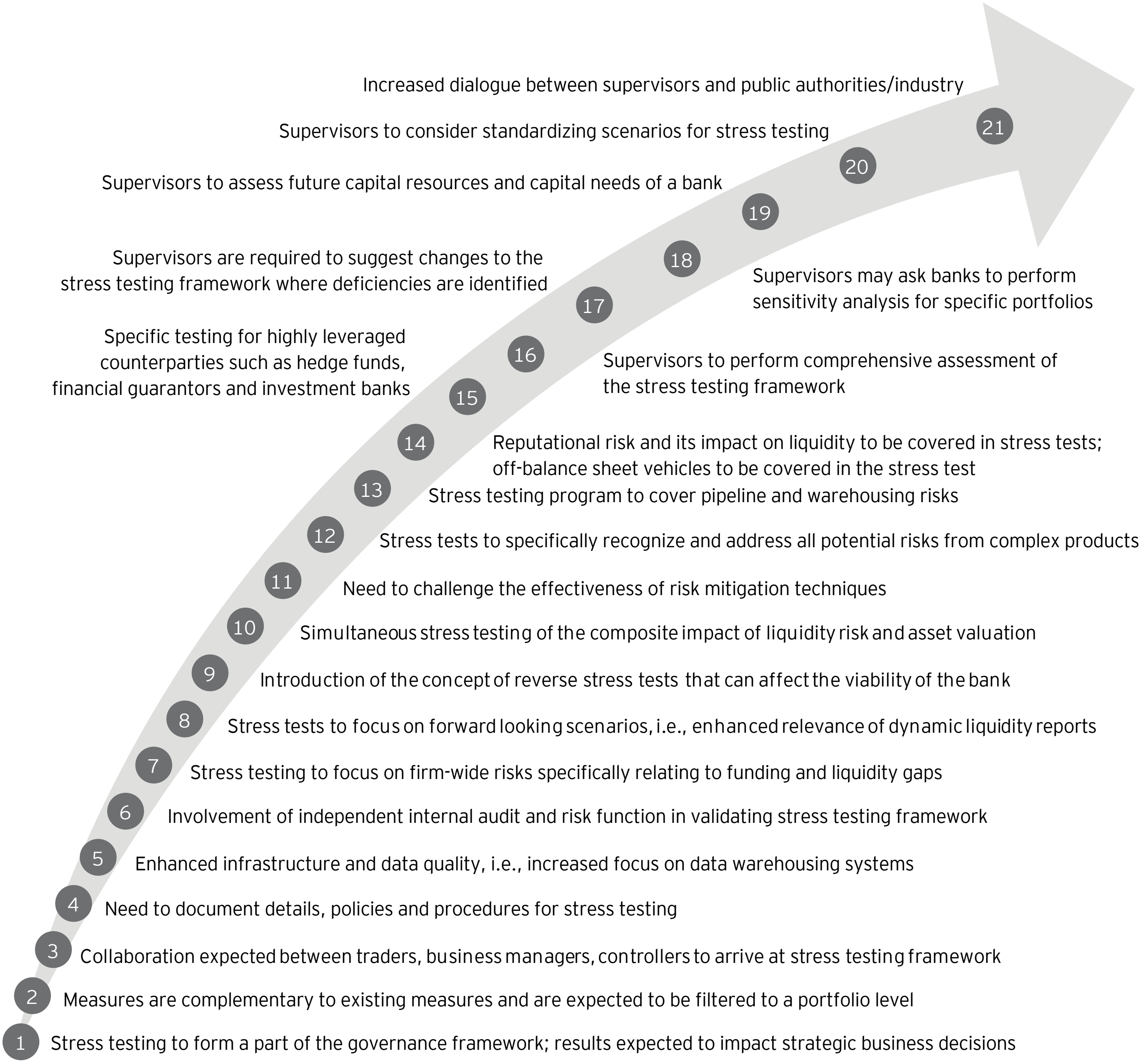
According to the Declaration on Strengthening the Financial System at the London Summit, the BCBS and national authorities should develop and agree by 2010 a global framework for promoting stronger liquidity buffers at financial institutions, including cross-border institutions.

Liquidity risk framework: key enhancements

Principles for sound liquidity risk management and supervision

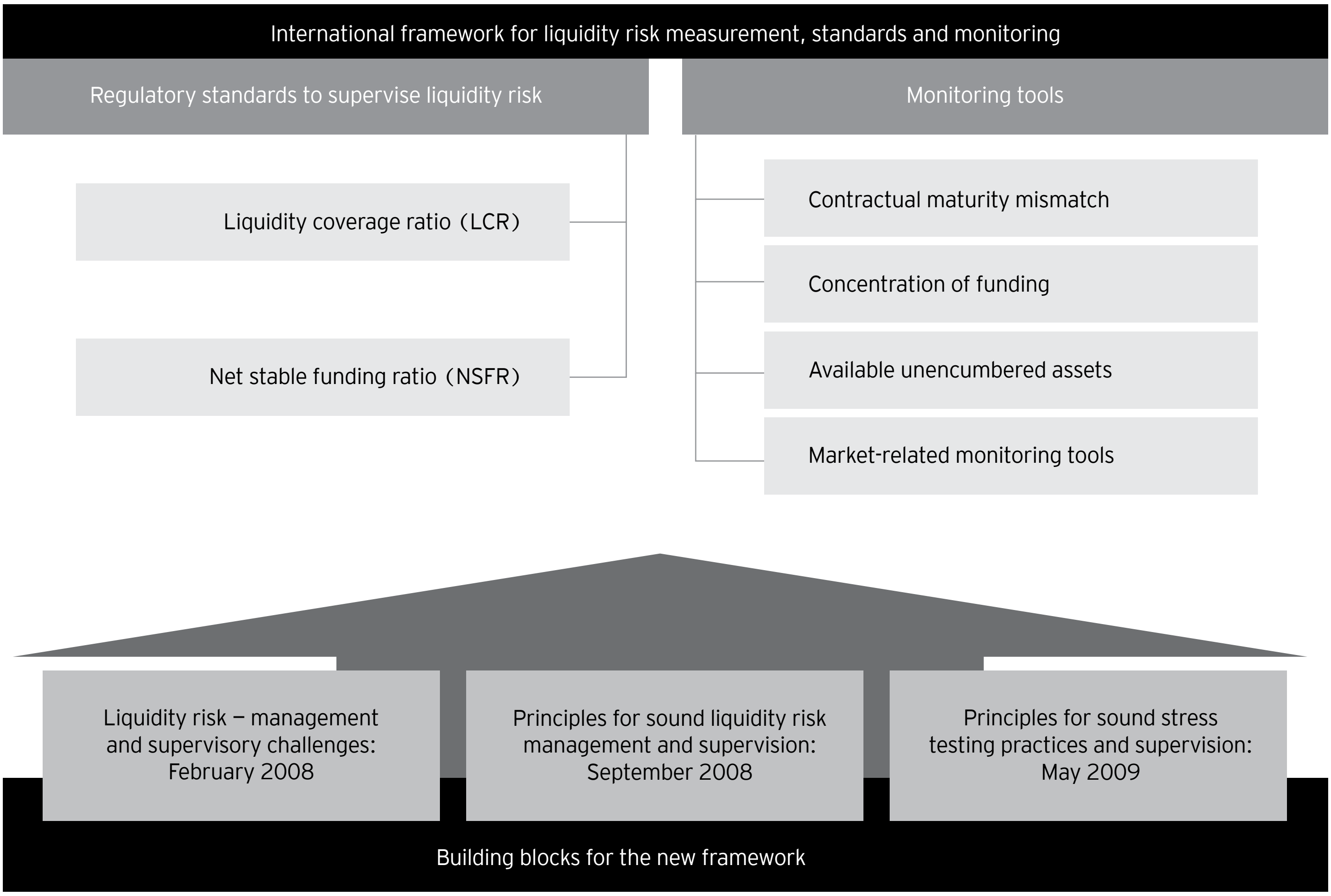
The BIS principles issued in 2000 focused on the overall structure of liquidity management and propagated an approach that focused on assessing funding gaps. The focus of the new principles is mainly on stress testing, standardizing liquidity measures across banks and most importantly integration of product pricing and performance measurement with the liquidity risk framework.

Principles for sound stress testing practices and supervision



With the increased focus on stress testing, the revised framework has prescribed detailed principles that are aimed at reducing differences in methodologies followed to conduct stress testing.

Convergence of the enhancements into a standard framework



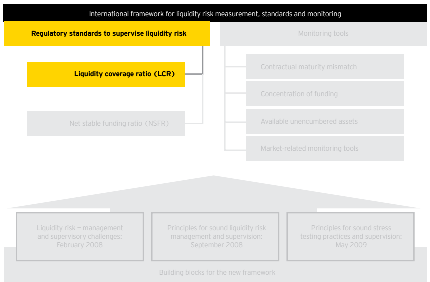
The various principles prescribed by BIS between 2007 and 2009 form the basis for the new framework. The framework stresses on convergence in the following areas:

- Two standard ratios to measure and monitor the health of a bank's liquidity. The method for computation of ratios has been standardized to facilitate comparative analysis between institutions.
- The standard ratios are based on stress scenarios and assess the ability to meet liquidity requirements over a 30 day horizon and a 1 year horizon
- The new framework also prescribes monitoring tools. These monitoring tools are expected to replace current balance sheet ratios and maturity gap analysis conducted by banks to assess funding mismatches.

Key features of the proposed framework

Regulatory framework to supervise liquidity risk

Liquidity coverage ratio: an overview



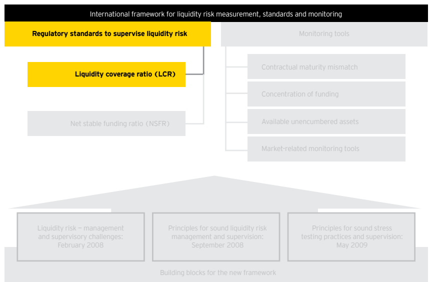
$$\frac{\text{Stock of high quality liquid assets}}{\text{Net cash outflow over a 30-day time period}} > 100\%$$

- Banks are required to assess this ratio continuously over a 30-day horizon
- Definition of stock of high quality assets restricted to those with low credit and market risk, ease of valuation, listed on recognized exchange markets, presence of active market and committed market makers, and low market concentration
- Definition of liquid assets restricted to cash, central bank reserves, government/central bank issued debt and corporate bonds with low credit risk and haircuts

- Cash outflows to be assessed based on the run-off on deposits in stressed market conditions; minimum run-off ratios by category prescribed
- Cash outflows to include potential draw on committed lines and contingent funding liabilities
- Cash inflows to include only contractual flows from completely performing assets; absolute freeze on lines of credit expected in case of stress

The ratio focuses on the ability of a bank to meet its liquidity requirements in extreme stress scenarios over a 30 day horizon.

Liquidity coverage ratio: key computations



$$\frac{\text{Stock of high quality liquid assets}}{\text{Net cash outflow over a 30-day time period}} > 100\%$$

High quality liquid assets

- Cash
- Central bank reserves that can be drawn in stress scenarios
- Corporate bonds with AA & A- rating with a haircut of 20% and 40%, respectively
- Government/central bank issued debt
- Marketable securities issues by sovereigns, para-sovereigns with a 0% risk-weight under the standardized duration approach (SDA), with deep repo markets and being non-financial services

Cash outflow

- Retail deposit run-off at a minimum of 7.5% or 15%
- Unsecured wholesale funding run-off by non-financial corporates at 75%
- Unsecured wholesale deposit run-off by small business at a minimum of 7.5% or 15%
- Unsecured wholesale funding run-off provided by other legal entity customers at 100%
- Unsecured wholesale funding run-off by non-financial customers, sovereigns, central banks and public sector enterprises (PSEs) at a minimum of 25%

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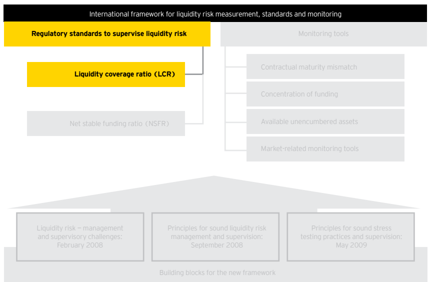
Cash inflow

- 100% of retail contractual inflows from fully performing assets
- 100% of wholesale contractual inflows from fully performing assets
- 0% cash flows from reverse repos and 100% cash flows from reverse repos of illiquid securities
- 0% cash inflow from committed lines of credit
- 100% contractual inflows from derivatives

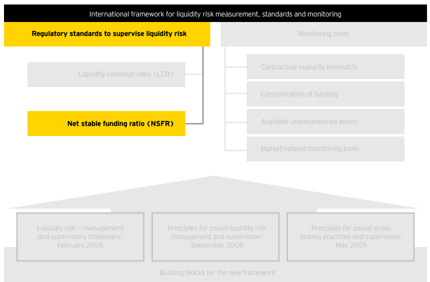
Inclusion of additional components of cash outflow

- Increased liquidity needs related to downgrade triggers in short-term financing transactions, derivatives and other contracts
- Increased liquidity needs related to valuation changes on derivative transactions
- Increased liquidity needs related to potential for valuation changes on posted collateral securing derivative transactions - 20%
- Loss of funding on asset-backed commercial paper and investment vehicles
- Loss of funding on term asset-backed securities, covered bonds and other structured financing instruments
- Draw on committed credit and liquidity facilities
- Contingent funding liabilities

Liquidity coverage ratio: key impact areas (Indian perspective)



Net stable funding ratio: an overview



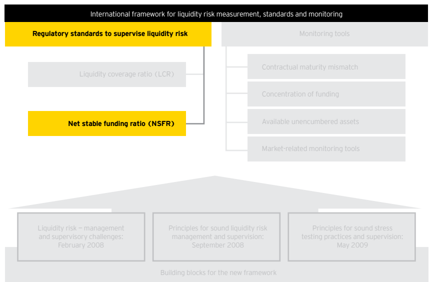
$$\frac{\text{Available amount of stable funding (ASF)}}{\text{Required amount of stable funding (RSF)}} > 100\%$$

- Banks required to assess this ratio continuously over a 1 year horizon
- Available amount of stable funding arrived at by applying ASF factors to liabilities on the balance sheet
- Required stable funding arrived at by applying RSF factors to assets in the balance sheet
- Required stable funding to also cover off-balance sheet items; certain degree of discretion available to local country supervisors on RSF factor to be applied

- Net stable funding ratio (NSFR) is similar to maturity mismatches currently performed for structural liquidity reports; however, the focus is only on a 1-year time bucket in aggregate and is based on stress scenarios
- Facilities from central banks except under open market operations (OMO) are not to be considered in this ratio to avoid dependence on central bank funding

The ratio focuses on the ability of a bank to meet its liquidity requirements in continued stress conditions over a 1 year period.

Net stable funding ratio: key computations



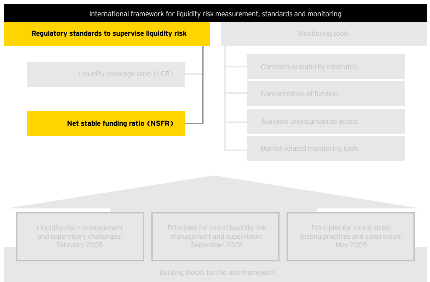
$$\frac{\text{Available amount of stable funding (ASF)}}{\text{Required amount of stable funding (RSF)}} > 100\%$$

Component	ASF
Tier 1 and Tier 2 capital	100%
Preference capital not included in Tier 2	100%
Long-term liabilities exceeding 1 year	100%
Stable non-maturing retail deposits	85%
Stable unsecured wholesale funding	85%
Less stable non-maturing retail deposits	70%
Less stable unsecured wholesale funding	70%
Unsecured wholesale funding provided by non-financial corporate customers	50%
Other liabilities and equity categories	0%

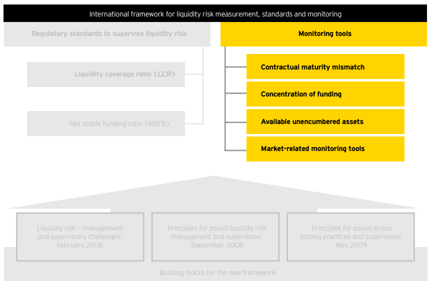
Component	RSF
Cash/money market instruments	0%
Securities with effective maturity <1 year	0%
O/S loans to FS entities maturity <1year	0%
Marketable securities of sovereign/ para-sovereign	5%
Unencumbered corporate bonds with AA rating and effective maturity > 1 year	20%
Gold	50%
Unencumbered corporate bonds with AA- to A- rating and effective maturity > 1 year	50%
Loans to non-financial corporate entities with less than 1 year maturity	50%
Loans to retail clients with residual maturity < 1 year	85%
All other assets	100%

Increased emphasis on asset-liability composition and CRR/SLR ratios

Net stable funding ratio: key impact areas (Indian perspective)



Liquidity risk monitoring tools



Tool	**Contractual maturity mismatch**	**Concentration of funding**	**Available unencumbered assets**	**Market-related monitoring tools**
Definition	Contractual cash and security inflows and outflows from all on and off-balance sheet items mapped to defined time bands on their respective maturities	▸ Funding liabilities sourced from each significant counterparty and instrument/ bank's total balance sheet ▸ List of assets and liabilities by significant currency	Available unencumbered assets that are marketable as collateral in secondary markets and/ or eligible for central bank's standing facilities	▸ Market-wide information ▸ Information on the financial sector ▸ Bank-specific information
Key considerations	▸ Similar to existing structural liquidity report ▸ Assets to be reported based on latest possible maturity and liabilities based on earliest possible maturity ▸ Behavioral assumptions to play a large part in determining contractual maturity mismatch	▸ Significant defined as more than 1% of the bank's total liabilities ▸ Categorization of counter-parties/ group companies becomes a significant consideration ▸ Stress on instrument diversification ▸ Rising importance of instrument classification guidelines ▸ Separate reporting of the metrics across time buckets	▸ Lack of deep repo markets may reduce the amount of encumbered assets ▸ Securities pledged as collateral for CBLO/with CCIL may not qualify for this requirement ▸ Potential increase in cost of funding by retaining the larger value of unencumbered assets ▸ Valuation may play a key role in this metric in case of corporate bonds	▸ Need for supervisors to enhance monitoring tools ▸ Potential need for supervisors to enhance monitoring tools and seek reports from banks in electronic formats ▸ Need to standardize market-based triggers in the absence of deep CDS and corporate bond markets

Current state of liquidity risk management in India

Maturity ladder in the liquidity risk management process

Components of the asset liability management process

Maturity level 1

Traditional gap analysis

- Central warehousing of data
- Forecasting of cash flows
- Segregating rate sensitive items
- Cash flow bucketing
- Identifying structural gaps
- Identifying dynamic gaps
- Setting gap limits
- Determining liquidity ratios
- Managing high level liquidity and interest rate risk

Maturity level 2

Duration gap analysis

- Linking asset-liability positions with market-based pricing curves
- Modified duration analysis for assets and liabilities
- Assessing impact on economic value of equity
- Setting duration-based limits
- Balance sheet stress testing

Maturity level 3

Balance sheet management

- Funding transfer pricing mechanism
- Market-based product pricing
- Centralized NII management
- Hedging balance sheet mismatches – forex, interest rate benchmarks and timing
- Integrating funding and ALM policies

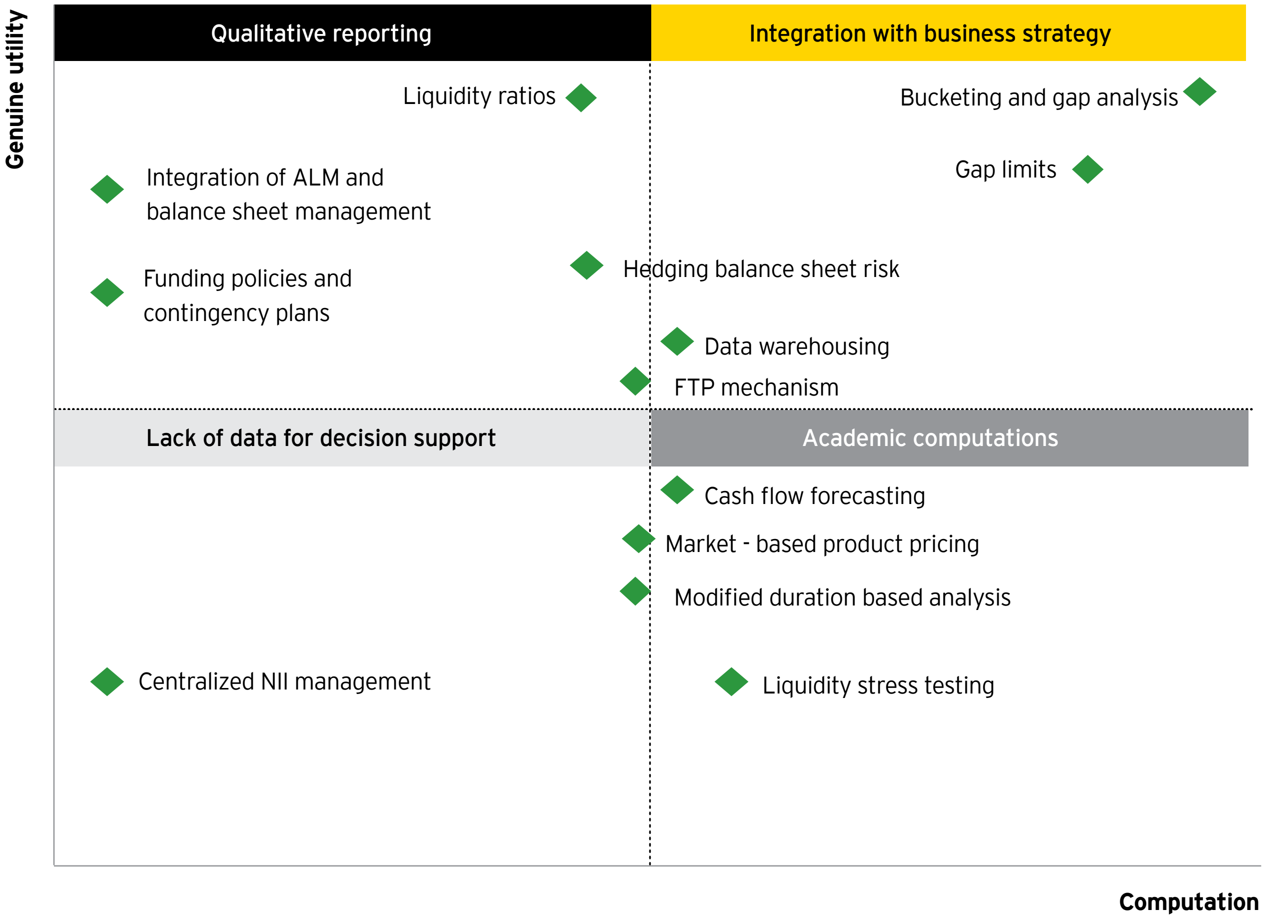
Focus of the asset liability management exercise

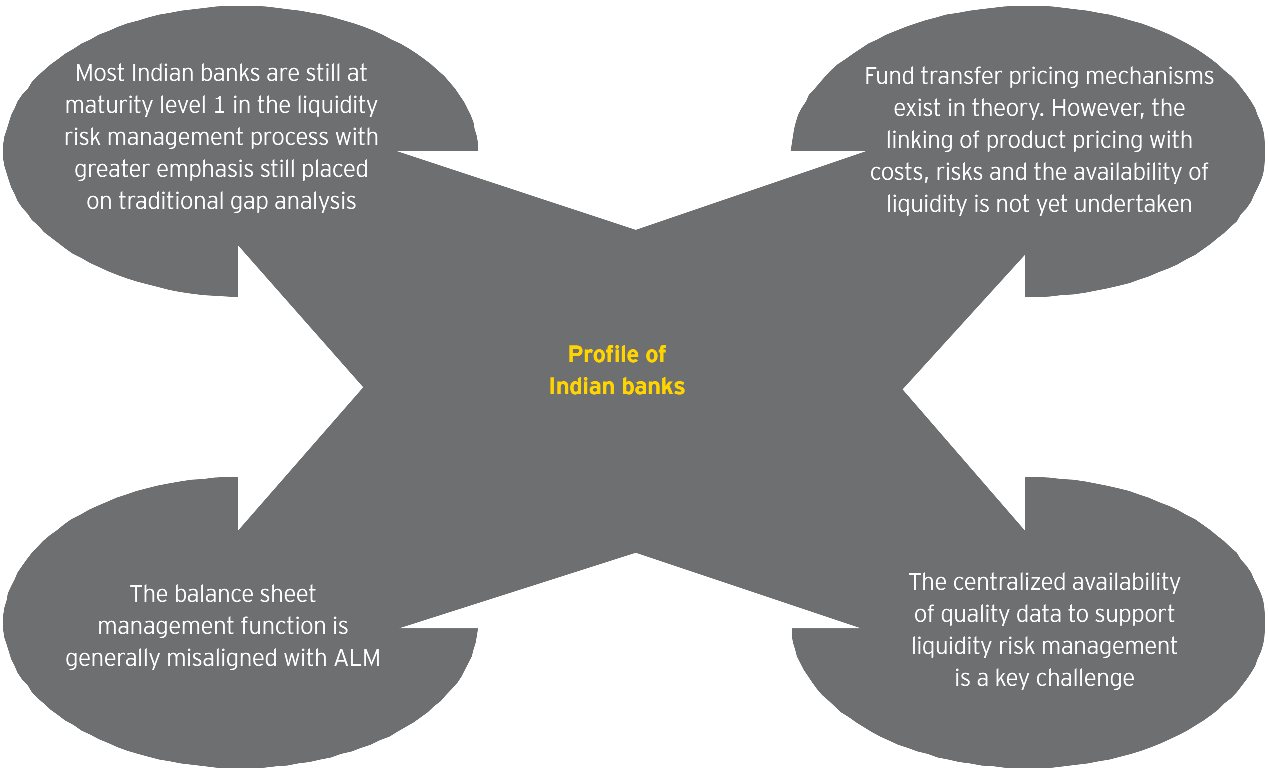
- Identify liquidity mismatches
- Align funding strategy to address liquidity mismatches
- Identify directional risk of interest rate movements

- Quantify impact of interest rate movements on the overall balance sheet
- Align balance sheet/off-balance sheet items with market pricing benchmarks

- Profitability management
- Predictability and smoothening of net interest income
- Objective assessment of product pricing

Profile of Indian banks relating to liquidity risk





Bridging the gap with the proposed framework

System support

Data collation

Data source identification

Data warehousing

Incorporating assumptions defined in the standard

- Liquidity mismatches
- Data inputs for LCR and NSFR
- Cash flow forecasts
- Data inputs for monitoring tools

Data analytics

Mismatch assessment

Gap assessment

Behavioral analysis

Stress testing

- Time bucket-wise gap analysis
- Impact of historical patterns on cash flows
- LCR and NSFR computation
- Contractual maturity mismatch

Policy level control

ALM policy

Gap limits and ratios

Stress testing documentation

Contingency funding plans

- Aligning the asset-liability mix
- Operationalizing contingency plans
- Stress testing assumptions and validation

Migrating seamlessly to the proposed framework will require Indian banks to enhance the following aspects of the asset liability management framework:

- **Data gap analysis:** The current framework of preparing ALM statements as prescribed by RBI is based on pre-defined assumptions for each field of data extracted from core banking and treasury systems. The new framework will require a re-mapping of all data sources, re-validation and re-computation of all assumptions.
- **Data centric mismatch assessment:** While the current ALM framework is heavily focused gap analysis, the new framework will require increased use of behavioural studies and stress testing. The need to collate historical data and make realistic assumptions is a critical requirement to put in place an effective stress testing framework.
- **Updation of the ALM policy:** The current policy framework of most Banks focuses on gap limits and balance sheet ratios. The gap limits and ratios will be required to be re-computed in line with the revised framework. Most importantly, the new framework puts increased focus on sharpening the stress testing documentation and contingency funding plans.

Balance sheet impact assessment

Pricing analysis	Modified duration gap	Modified duration of equity
Identify pricing curves	Compute modified duration of each balance sheet item	Assess impact on NII
Link balance sheet items with market pricing curves	Compute modified duration of gap for the balance sheet	Assess impact on value of equity based on leverage
Generate the bucket-wise cash flows	Set the duration gap analysis (DGA) limits	Stress test economic value of equity

Pricing analysis

- Market based pricing for all assets and liabilities
- Quantification of interest rate risk for each balance sheet item

Modified duration gap

- Quantification of interest rate risk for the entire balance sheet
- Quantification at different points on the interest rate curve

Modified duration of equity

- Overall profitability impact assessment
- Assess impact on theoretical value of equity
- Balance sheet stress testing

In the current liquidity management scenario in India, asset liability management and balance sheet management are generally treated as separate functions. The new framework requires closer integration between the two functions. It also requires integration of product pricing and assessment of cost-benefit from liquidity risks. With the introduction of new framework, fund transfer pricing will become an integral part of the ALM framework.

Market-based pricing

Fund transfer pricing

- Align product pricing policies
- Review profitability at a product level
- Mechanism to raise funds and allocate between units

- Market-based product pricing
- Fund transfer pricing process between treasury and business units
- Allocation of funds based on risk-return analysis

Profitability management

NII assessment

- Centralized monitoring of NII for all products
- NII risk due to current mismatch
- NII risk due to interest rate mismatch

- Control over NII
- Strategic alignment of NII management based on product risk-return profile

Long-term sustainability

Balance sheet hedging

- Hedging program to address mismatches
- Integration with funding policies
- Profitability forecasts

- Stable hedging program to lock in long-term NII
- Funding program aligned with mismatches in structural cash flows

Once Bank's have adopted the principles of the new framework, it is likely to smoothen the transition to centralized NII management. The new framework will also facilitate improved liquidity risk-return analysis.

Key challenges and way forward

Challenge area | Potential issues | Way forward

Challenge area	Potential issues	Way forward
Systems	▸ Warehousing of data across banking systems ▸ Redefining assumptions related to bucketing and stress scenarios ▸ Collating market information with systems ▸ Integrating the fund transfer pricing (FTP) mechanism ▸ Integrating pricing framework	▸ Redefining system requirements ▸ Need to manually test assumptions until systems are ready ▸ Need for a strong data warehouse and integration with market information systems, core banking systems, valuation systems and treasury systems
Policies	▸ Bucketing and stress testing assumptions in existing policies not aligned with the revised framework ▸ Existing policies do not adequately address contingency funding ▸ Lack of integration between ALM and funding policies	▸ Need to re-write ALM policies ▸ Need to draw up contingency funding plans after considering all possible resources ▸ Integrated approach between balance sheet management and asset liability management ▸ Enhanced role of senior management and integration between functions
Processes and procedures	▸ Lack of clear role definition between functions ▸ Existence of overlapping functions between departments ▸ Methodologies not documented in sufficient detail ▸ Stress testing assumptions not in line with principles defined by BCBS	▸ Need to re-write ALM process manual ▸ Need for a separate operating procedure manual on stress testing ▸ Roles and responsibilities of departments, especially relating to data interfaces to be clarified in greater detail
Knowledge management	▸ Lack of adequate training to operational staff on revised guidelines ▸ Need to apprise the board of directors and senior management on importance of setting risk tolerance limits ▸ Knowledge transfer on product pricing and integration with market-based pricing tools	▸ Training to operational staff on revised guidelines and policies ▸ Greater involvement of the Board of Directors, the Asset Liability Management Committee (ALCO) and Risk Committee in updating risk policies ▸ Involvement of business managers in overall balance sheet management exercise

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Contact us

Hemal H Shah
6th Floor Express Towers
Nariman Point
Mumbai: 4000021
Tel: + 91 22 4035 6325
Tel: + 91 9820508315

Muzammil Patel
6th Floor Express Towers
Nariman Point
Mumbai: 4000021
Tel: + 91 22 4035 6446
Tel: + 91 9920028365

Dipesh Joshi
6th Floor Express Towers
Nariman Point
Mumbai: 4000021
Tel: + 91 22 4035 6345
Tel: + 91 9821261799

Our offices

Ahmedabad
2nd floor, Shivalik Ishaan
Near CN Vidhyalaya
Ambawadi
Ahmedabad - 380 015
Tel: + 91 79 6608 3800
Fax: + 91 79 6608 3900

Bengaluru
"UB City", Canberra Block
12th & 13th floor
No.24 Vittal Mallya Road
Bengaluru - 560 001
Tel: + 91 80 4027 5000
+ 91 80 6727 5000
Fax: + 91 80 2210 6000 (12th floor)
Fax: + 91 80 2224 0695 (13th floor)

Chennai
TPL House, 2nd floor
No. 3 Cenotaph Road
Teynampet
Chennai - 600 018
Tel: + 91 44 6632 8400
Fax: + 91 44 2431 1450

Gurgaon
Golf View Corporate Tower B
Near DLF Golf Course
Sector 42
Gurgaon - 122002
Tel: + 91 124 464 4000
Fax: + 91 124 464 4050

Hyderabad
205, 2nd floor
Ashoka Bhoopal Chambers
Sardar Patel Road
Secunderabad - 500 003
Tel: + 91 40 6627 4000
Fax: + 91 40 2789 8851

Oval Office, 18, iLabs Centre
Hitech City, Madhapur
Hyderabad - 500081
Tel: + 91 40 6736 2000
Fax: + 91 40 6736 2200

Kolkata
22 Camac Street
Block 'C', 3rd floor
Kolkata - 700 016
Tel: + 91 33 6615 3400
Fax: + 91 33 2281 7750

Mumbai
6th floor & 18th floor, Express Towers
Nariman Point
Mumbai - 400 021
Tel: + 91 22 6657 9200 (6th floor)
Fax: + 91 22 2287 6401
Tel: + 91 22 6665 5000 (18th floor)
Fax: + 91 22 2282 6000

Jalan Mill Compound
95 Ganpatrao Kadam Marg
Lower Parel
Mumbai - 400 013
Tel: + 91 22 4035 6300
Fax: + 91 22 4035 6400

Block B-2, 5th Floor
Nirlon Knowledge Park
Off. Western Express Highway
Goregaon (E)
Mumbai - 400 063, India
Tel: + 91 22 6749 8000
Fax: + 91 22 6749 8200

New Delhi
6th floor, HT House
18-20 Kasturba Gandhi Marg
New Delhi - 110 001
Tel: + 91 11 4363 3000
Fax: + 91 11 4363 3200

Pune
C-401, 4th floor
Panchshil Tech Park
Yerwada (Near Don Bosco School)
Pune - 411 006
Tel: + 91 20 6603 6000
Fax: + 91 20 6601 5900

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