BTRM

The Certificate of Bank Treasury Risk Management

WHITE PAPER

Strategic Advantage in Bank Treasury and Risk: Regulation, Data and Analytics

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Introduction

The treasury function in a commercial bank is as old as commercial banking itself. However, it is evident that in the centuries since modern banking was established, Treasury functions have had to adapt and maintain balance sheet resilience through both stable and volatile times. That said, the core principles of bank asset-liability management (ALM) remain unchanged: maintaining adequate levels of capital and liquidity in a mix that is optimum for both firm safety and return on capital (RoC), is as important now as they were when first considered centuries ago.

Given the heritage of ALM with its beginnings over 500 years ago, it is surprising to learn that it was articulated formally only within the last 50 years.[1] This was in response to the interest-rate and foreign exchange (FX) rate volatility of the early- to mid-1970s, which presented balance sheet management challenges of a magnitude hitherto unseen.

Half a century later, Bank Treasuries are once again facing unprecedented challenges. In this white paper, prepared in collaboration between Bloomberg and The Certificate of Bank Treasury Risk Management (BTRM), we consider the current opportunities and challenges that Bank Treasury teams face, given increasing volatility in global financial markets, and point to those areas of focus that they should consider to address to add value to their banks' strategic advantage.

[1] We refer to the expression "asset-liability management" in the context of banking. Texts from the 18th and 19th century address the importance of capital and liquidity in bank balance sheet management, although collectively the term "ALM" is observed in the published literature only from the 1970s. Source: Choudhry, M., *The Principles of Banking, 2nd edition* (Wiley 2023), chapter 24.

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Setting the Scene

Almost two decades after the Global Financial Crisis, the financial system has become demonstrably more resilient, in line with more stringent regulation and yet, new forms of complexity continue to emerge. As regulation matures and technology advances, the strategic edge in Bank Treasury now lies not in crisis management, but in using data, analytics, and transparency to optimise the balance sheet within a robust risk framework.

A Treasury function that can utilise a data analytics solution, sourced directly from the general ledger, as part of its aggregate balance sheet management information (MI) reporting, may deliver its bank a significant competitive edge in a challenging economic and financial market environment.

What are the primary issues for a Treasury function to address today? We suggest the following:

- Bank balance sheet managers will continue to have to address and solve for a wide range of issues for the foreseeable future; ranging from onerous regulatory compliance to volatile financial market conditions.
- Irrespective of their specific operating model, banks face challenges from new entrants across non-traditional bank sectors such as digital banks, e-payments firms, and deposit aggregator services, that raise already significant competitive pressures in the marketplace;
- On both sides of the Atlantic, opinion is almost evenly divided between those who believe that central banks should be aggressively cutting rates and those who would prefer they focus on the battle against inflation – leading to uncertainty in interest rates forecasts and a pressure on net interest margin (NIM).

In such an environment, an ability to understand one's balance sheet position down to a granular level, and to use that understanding when making medium-term decisions about pricing, hedging and loan-deposit structure can make the critical difference between resilient success or stagnation.

In this paper we ask the question, "What are the key areas of focus for a Treasury function today, and how best can banks address these to their advantage?"

We discuss these issues in the following four sections:

- Overcoming Regulatory Complexity
- Addressing Risk, Liquidity & Financial Market Volatility
- Streamlining Disconnected Data & Inefficient Workflows
- Managing Pressure to Drive Strategic Value

The final section of this white paper offers potential ways to address the challenges we highlighted.

Overcoming Regulatory Complexity

Regulatory guidance issuance continues apace around the world. For Bank Treasury departments in any country, "horizon scanning" is currently a full-time job.

Basel 3.1 (or Basel IV) remains on the radar principally because of continuing delays in confirming its final implementation. This adds the first level of complexity to the Treasury balance sheet optimisation challenge: deciding on the optimum capital and liquidity mix on the balance sheet mix when the final rules guiding the minimum requirements for both is not known with complete certainty. Implementation delays maintain uncertainty, particularly with regard to capital minimums, capital adequacy between jurisdictions, and the complex Fundamental Review of the Trading Book (FRTB) rules.

In their Regulatory Consistency Assessment Programme (RCAP) update on 3rd October 2025[2] Bank for International Settlement (BIS) noted,

> "*Overall, the final Basel III standards became effective in more than 40% of the 27 member jurisdictions over the past 12 months. Consequently, the revised credit risk and operational risk standards, as well as the output floor, are now effective in around 80% of the member jurisdictions, the CVA standard in nearly 70%, and the revised Market Risk standards in nearly 40%.*"

This is shown at Exhibit 1, taken from the Basel Committee on Banking Supervision (BCBS) RCAP update.

It is encouraging that the BIS has a "glass half-full" outlook. This statement merely confirms that 15 years after the first steps were taken along the road to post-crisis reforms, there is less than 100% full implementation of said reforms even within the 27 member countries of the Basel committee. Take-up of Basel guidance in the remaining 168 countries in the world, one surmises, is quite possibly lower. Even in the European Union, which is perhaps at the forefront of Basel implementation, certain aspects of the guidance have not yet been transposed into relevant legislation (see Table 2).

[2] See https://www.bis.org/bcbs/implementation/rcap_reports.htm

Exhibit 1: Progress on Basel III Final Implementation as of September 2025

Table 1: Member jurisdictions that have issued additional final rules as of end-September 2025

Standard		Increase in adoption during last year	Cumulative adoption	
			number	per cent
Capital	Margin requirements for non-centrally cleared derivatives	1	23	85
	Revised standardised approach for credit risk	1	23	85
	Revised IRB approach for credit risk	1	21	91
	Revised CVA framework	1	19	70
	Revised minimum requirements for market risk	2	20	74
	Revised operational risk framework	1	24	89
	Output floor	1	20	87
LEV	Revised leverage ratio (2017) exposure definition	2	23	85
IRRBB	Interest rate risk in the banking book	1	25	93
Crypto-assets	Cryptoassets	2	2	9
Disclosure	Market risk disclosure	1	19	70
	Key metrics, RWA Overview, Leverage ratio, Credit risk, Operational risk, modelled and standardised RWA comparison	2	21	78

Note that shaded rows show the final elements of Basel III that were due to be implemented on 1 January 2023; not all standards are applicable to all 27 member jurisdictions, eg some jurisdictions have decided not to implement the IRB approach to credit risk.

Source: RCAP on timeliness: Basel III implementation dashboard

Table 2: Basel III mapping to EU regulations

Basel III Standards	Organisation EU legislation	EU legislation (please always check for latest amendments)
Basel III: A global regulatory framework for more resilient banks and banking systems - revised version June 2011	EUR-Lex	Directive (EU) 2013/36/EU (CRD) & subsequent amendments Regulation (EU) 575/2013 (CRR) & subsequent amendments
https://www.bis.org/publ/bcbs189.htm	EUR-Lex	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013L0036 https://www.eba.europa.eu/regulation-and-policy/(https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013R0575)
Liquidity Coverage Ratio (January 2013)	EUR-Lex	Regulation (EU) 575/2013 (CRR) & subsequent amendments with additional specifications in Commission Delegated Regulations
https://www.bis.org/publ/bcbs238.htm	EUR-Lex	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02013R0575-20201228 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R0061
Net Stable Funding Ratio (October 2014)	EUR-Lex	Regulation (EU) 2019/876 (CRR2)
https://www.bis.org/bcbs/publ/d295.htm	EUR-Lex	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02013R0575-20201228
Basel III: Finalising post-crisis reforms	N/A	Not yet transposed in EU legislation
https://www.bis.org/bcbs/publ/d424.htm	N/A	Not yet transposed in EU legislation
Minimum capital requirements for market risk	N/A	Not yet transposed in EU legislation
https://www.bis.org/bcbs/publ/d457.htm	N/A	Not yet transposed in EU legislation

Source: Periklis Thivaios, Faculty BTRM 2025.

To illustrate the challenges associated with regulatory compliance of Basel 3.1-related guidance, we consider just two segments of it: model risk management (MRM) and interest-rate risk management in the banking book (IRRBB), and associated with it credit spread risk in the banking book (CSRBB). Both are of importance to the ALM desk and illustrative of the impact on strategic thinking in Bank treasury.

Model risk management (MRM)

A number of jurisdictions have seen guidance published in this space. For example, SR 11-7 in the USA, E-23 in Canada and SS1/23 in the UK. The UK Prudential Regulation Authority (PRA) had previously issued PS7/18: so not one, but two guidance statements on MRM within the space of four years, highlighting the importance regulators place on this subject. It should come as no surprise that banks, and Treasury departments in particular, are large users of models.
Using the PRA's PS7/18 and SS1/23 to illustrate, Principle 2 states that *banks [must] have implemented an effective governance framework, policies, procedures and controls to manage their model risk*.

Complying with this requires that models must be documented to a sufficient level that an appropriately qualified person could replicate the model. This single area can be problematic for banks. A white paper published in April 2025 stated:

> *"…the process of documenting models particularly complex ALM models has grown increasingly challenging and resource-intensive. Traditional methods of documentation often rely on manual processes that are time-consuming, error prone and difficult to maintain. Model documentation provided by developers is often found to be poorly written and with significant omissions, that render it inadequate to support a rigorous validation effort to the standards of SR 11-7."*[3]

Treasury desks rely on different models of increasing sophistication to manage and enable a number of key processes in balance sheet management:

- funding and cash management, and forward-looking funding planning;
- interest-rate risk exposure calculation;
- FX risk in the banking book reporting;
- liquidity risk exposure measurement and forecasting;
- capital planning;
- scenario planning and stress testing for capital and liquidity;
- asset-liability committee (ALCO) management information (MI) reporting.

This is not an exhaustive list. Even before the various regulatory rules governing MRM were published, we appreciate the problems associated with efficient MI when different models, often taking their data from different sources, attempt to reconcile to a single, unified picture. The most common issue here in banks is the proliferation of models and datasets. For example, one of this white paper's authors recalls at one bank he worked at, the IRRBB exposure number for any specific day differed depending on whether one asked this question of the Treasury department or the Finance department. The two teams were using different models to make this calculation.

This presents an opportunity for banks, regarding documentation and ALCO reporting: a transition to a single "source of truth", using general ledger (GL) data, and a single solution for producing all ALM reports, whether they be capital, liquidity, funding or market risk related. This is why Bloomberg has continued to invest in bringing risk and treasury functions onto a unified solution, fed directly from general ledger data. By establishing a single source of truth for all ALM reporting, banks can strengthen governance, simplify validation, and deliver ALCO-ready insights with greater consistency, speed, and reliability.

Another potential solution to this could be an artificial intelligence (AI) solution to assist with model documentation. This presents threats as well as opportunities.
For example, as AI evolves from deterministic prediction to probabilistic decision-making, it requires adequate model governance policies and processes. This issue is especially acute as the banking sector moves beyond traditional AI to agentic AI.

[3] From *Rethinking the Future of Model Risk Management*, Ife Osakuade, Modelstacks, April 2025.

This is a non-trivial concern. Traditional AI addresses queries such as “What is the probability that this loan defaults?”. However, agentic AI makes the decision on loan approval, any escalation, and gathering of additional customer data. In essence AI tools no longer only predicts: it plans, reasons, adapts, and acts.

Of course, regulatory compliance isn’t simply about the model documentation; it is also about decision traceability. The risk exposure for the bank isn’t static; it unfolds over time and context.

Interest-rate risk management (IRR and IRRBB)

Banks have always had to manage their interest-rate risk (IRR). The need became urgent from the 1970s, when rates volatility took off and more crucially, banks started to offer fixed-rate product that generates material IRR. A bank that offered only loan product that was linked explicitly to the central bank base rate, and only deposit product linked explicitly to the “risk-free” reference rate, would be exposed to very little material IRR (given the close positive correlation between those two references, almost all of the time, we can label any of the resulting basis risk IRR as not material). Once banks started originating fixed-rate term product, their IRR for both earnings and net present value became material.

The Basel committee recognised this and issued guidance as part of the Basel III post-crisis reforms in 2016. Regulatory guidance, in any aspect of finance, is at its best when it is clear and unambiguous. For example, the Leverage Ratio (also a Basel III measure) leaves very little room for ambiguity: it is straightforward to understand, apply and calculate. In certain respects, national jurisdiction rules on IRRBB are clear: there is no equivocation in the rules surrounding the requirements to report an earnings sensitivity (NII Delta) and a present value sensitivity (EVE Delta).

Nine years later supervision authorities are still publishing guidance on this topic, and banks are still debating what the IRRBB rules mean for their origination and optimisation strategy. The European Banking Authority (EBA) published a Final Report on IRRBB in 2018 and another Final Report in 2022. Its guidance is perhaps closest to what is contained in BCBS368, and it expands on the latter when describing credit-spread risk in the banking book (CSRBB). (The EBA does depart from Basel in allowing banks to include their equity base in the EVE Delta calculation; that has proved very useful for some banks’ sensitivity values).

The guidance has been implemented at varying pace across jurisdictions; Bank Negara Malaysia (BNM) published Exposure Draft 029-38 (an update consultation) on IRRBB only in September this year. Like the EBA, BNM also applies the Basel guidance more or less verbatim.

In the European Union every bank is obliged to follow IRRBB guidance, but this is not the case in every jurisdiction. In the US and Australia, for example, only banks designated as “systemically important” are so required. This became a debating point after the failures of Silicon Valley Bank and First Republic Bank in 2023; both were large institutions but below the balance sheet size at which point Basel-related guidance kicks in.

This in itself leaves potentially grey areas for banks that may not be obliged to follow the rules but would wish to still manage their IRRBB. In essence, complying with IRRBB rules is one challenge for banks; working with the rules in a way that enables a bank to optimise its balance sheet structure is quite another.

In this section, we pose selected specific questions on applying IRRBB principles that have, as is common in finance, more than one answer and which pose optimisation challenges at the individual bank level.

Which metric should a bank prioritise?

NII Delta and EVE Delta are conceptually different metrics. The first measures the sensitivity of earnings over the next 12 (or 24, or 36) months to a shock change in interest rates. The latter measures, in essence, the sensitivity of the balance sheet net present value to the same shock change in interest rates.

Unsurprisingly, for most bank balance sheet structures the two deltas move in opposite directions under the same scenario. Exhibit 3 is a typical example: it shows the two values for a regional bank of just over £1bln balance sheet size and a Tier 1 capital base of £90mln. With this level of exposure, what metric should the bank’s ALCO prioritise? Or, put more directly for the bank’s Board, what balance sheet structure should the bank adopt? This question does not elicit a single answer at any time; it was perhaps easier to answer in the second half of 2021, because of the overwhelming consensus that the next move in rates was only going to be upwards.

Today it is more of a conundrum. Should a bank immunise its balance sheet so that earnings are unaffected, or enhanced, by the rate movement? Or should it address the preservation of its economic value? Noting that publicly traded banksmake it easy to assess accurately for market value of its stock, rarely if ever see their share price reflecting the net present value of their balance sheet.

The interest rate picture today is slightly less clear cut than in 2021. For every commentator urging the Federal Reserve to cut rates aggressively, there is another urging restraint. The US Treasury daily par yield curve at time of writing reflected an orthodox view as it is positively sloping (see Exhibit 4). When addressing IRRBB concerns, how should the bank look to position its balance sheet? And as important: what ALCO MI data does it need to help it reach a decision?

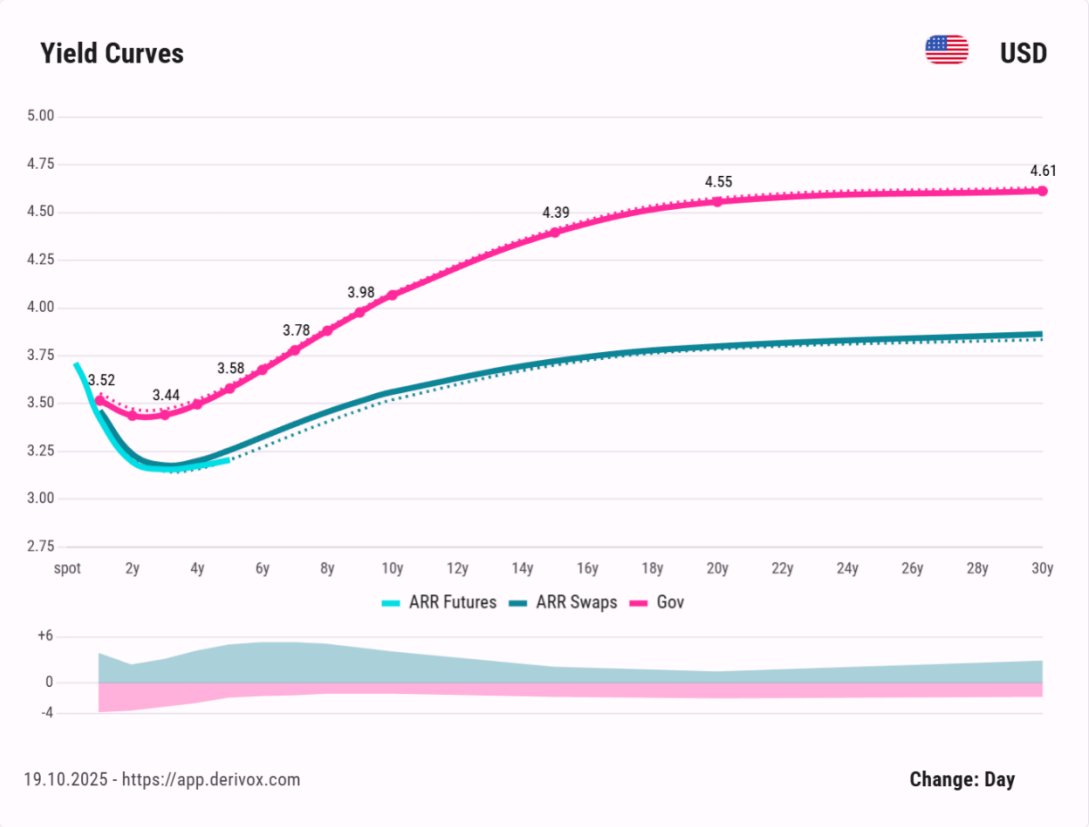
Exhibit 3: IRRBB ALCO MI for UK Regional Bank

	NII (1 Year)	Total EVE
Baseline	£34,585,714	£195,584,318

Stress scenarios - Delta		
Parallel Up (200 bps)	£11,205,353	-£11,942,380
Parallel Down (200 bps)	-£8,297,873	£12,214,743
Steepener		-£6,208,372
Flattener		£3,172,580
Short-rate up		-£1,370,497
Short-rate down		£1,166,354
Parallel Up (25bps)	£1,400,669	-£2,119,585
Parallel Down (25bps)	-£1,061,516	£2,583,562

Source: Choudhry, *The Principles of Banking, 2nd ed.*, Wiley 2023.

Exhibit 4: UST Yield Curve As of October 19, 2025



Source: Derivox. Used with permission.

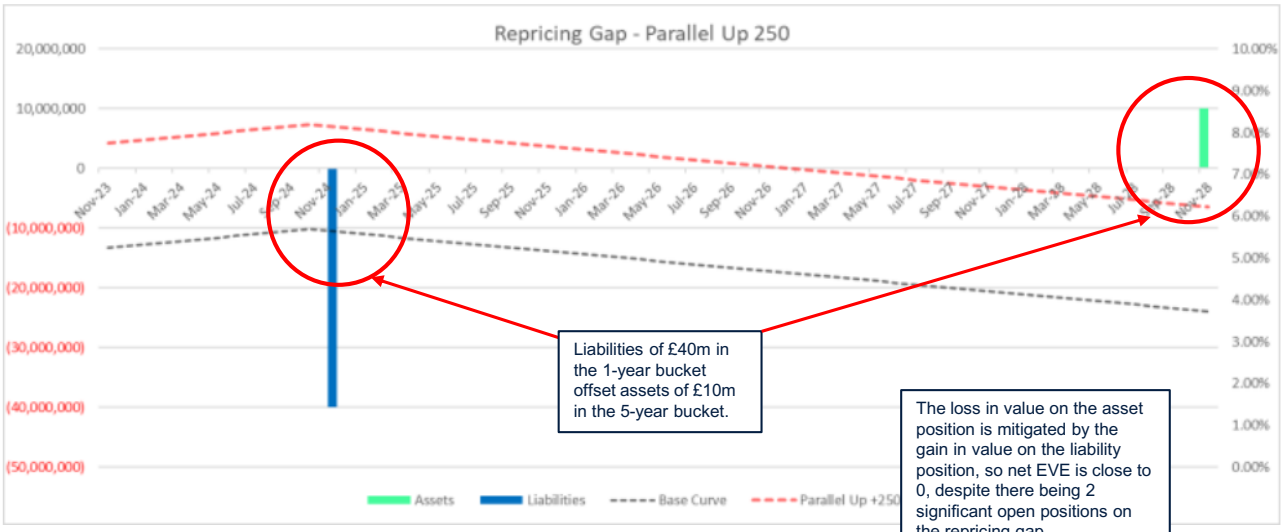
Non-parallel shocks

The EVE concept is based on the traditional "DV01" market risk metric of the bond trading desk, itself based on the "modified duration" concept that followed Macauley Duration (1930). Calculation of DV01 assumes a parallel shift in the yield curve. Of course, no yield curve ever moves in a parallel shift. This fact presents another ALCO, and data analytics challenge: banks must address the non-parallel shift exposure of their balance sheet, by modelling changes in interest rates that do not move uniformly across the yield curve. It is essential to understand how different segments of the yield curve affect a bank's interest rate risk profile. Non-parallel shocks offer more comprehensive understanding of the rate repricing gap and hidden risks, which parallel shocks may not reveal.

See Exhibit 5 for a simple hypothetical example . We see how the orthodox EVE metric shows no material exposure for a parallel shock 250bps move, whereas the steepener shock reveals significant PV mismatch (Exhibit 6).

The six standardised shock tests required by Basel III do include steepening and flattening rate moves. However, they are very broad and scatter-gun based. In practice a bank will need to look at the specific tenor bucket mismatches that are relevant to its balance sheet. Its ALCO MI reporting should address those buckets and adjust the EVE Delta metric accordingly.

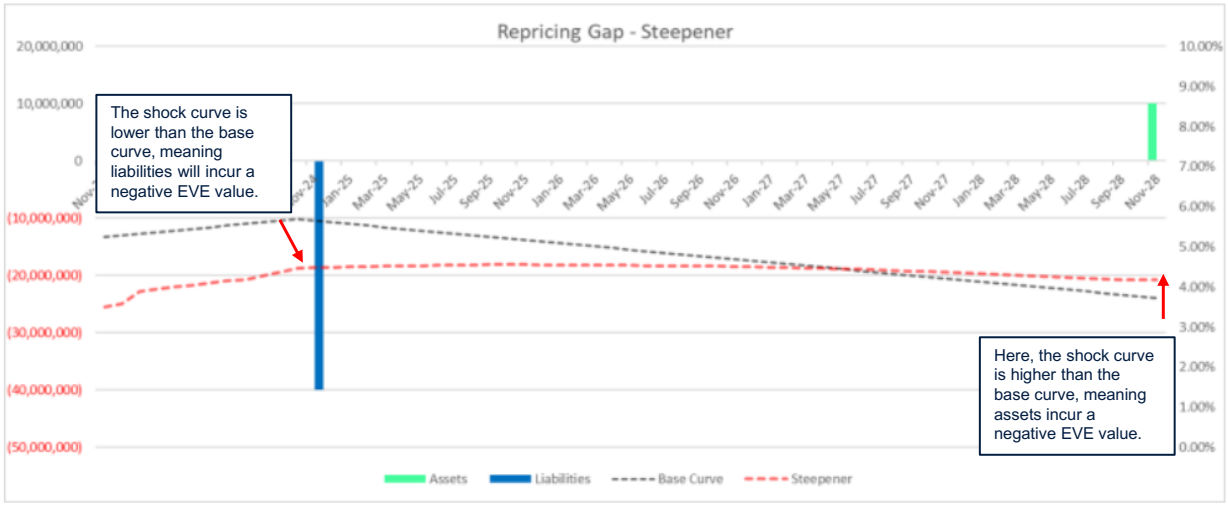
Exhibit 5: IRRBB Shock Example Parallel Up 250



Period	Assets	Liabilities	Net--	Base Curve	Parallel Up +250bps	DF BC	DF PU	Net Base	Net Shock	EVE
Nov-24		(40,000,000)	(40,000,000)	5.65%	8.15%	0.94	0.92	- 37,687,850	- 36,744,972	942,878
Nov-28	10,000,000		10,000,000	3.73%	6.23%	0.83	0.74	8,301,427	7,354,901	- 946,526

Source: Claire Sutherland, Faculty BTRM 2024.

Exhibit 6: IRRBB Shock Example Steepener



Period	Assets	Liabilities	Net←	Base Curve	Steepener	DF BC	DF PU	Net Base	Net Shock	EVE
Nov-24		(40,000,000)	(40,000,000)	5.65%	4.48%	0.94	0.95	- 37,687,850	- 38,145,273	- 457,423
Nov-28	10,000,000		10,000,000	3.73%	4.17%	0.83	0.81	8,301,427	8,124,715	- 176,712

Source: Claire Sutherland, Faculty BTRM 2024.

As Exhibit 6 shows, both the asset and the liability position incur a negative value for EVE, exposing the open positions as a double hit to EVE, rather than offsetting each other. The non-parallel IRR shock, the steepener, shows a negative EVE impact for both of the open positions, highlighting the importance of non-parallel shocks in IRRBB management.

In other words, banks need to look beyond the regulation when addressing IRRBB Regulation provides the floor for compliance, but performance comes from insight. By unifying risk and treasury analytics within one solution, banks can assess both NII and EVE sensitivities (parallel and non-parallel) using a consistent dataset. This integration enables ALCOs to respond to industry shifts faster and with greater confidence.

The EBA SOT NII: regulatory complexity and unintended consequences

Jose Manuel Campa, former Chair of the European Banking Authority (EBA), noted that complex and non-proportionate regulation can impede efficiency and effectiveness, and that it remains important to review any regulatory framework and revise where any policy does not produce the intended outcomes.

The EBA's Supervisory Outlier Test (SOT) may be a case in point. Put briefly, the SOT sets a 5% of Tier 1 capital base as the sensitivity for NII delta in the shock scenario. In operation in the EU for over a year now, it was introduced following the failure of Silicon Valley Bank. While certainly well intentioned, it may be suffering from the same things that greet many attempts to impose a one size fits all approach on industry practitioners.

A new paper written by Konrad Kompa and Jacek Rzeźnik of mBank SA, a Polish commercial bank, (forthcoming in the BTRM *Thought Leadership* Series[4]) highlights this issue succinctly. The authors suggest that the policy may be distorting the way EU banks manage IRR. Partly this reflects the different proportions of NII as share of total revenue, notwithstanding that NII remains the key revenue driver.

The EBA emphasises harmonisation across banks in the way they manage the balance sheet as the main method of achieving resilience, and also to achieve a "level-playing field". However, the banking industry in the 27 countries of the EU is not homogenous. There is considerable variety in operating model: NII versus fee income, the share of fixed rate versus floating rate lending practices, branch based businesses versus digital banking, and so on. Kompa and Rzeźnik ask if setting the SOT NII threshold at 5% of Tier 1 has resulted in the harmonised outcomes the EBA desires and suggest that it does not.

In essence, after one year of operation (perhaps too early to be conclusive) there does not appear to be any evidence that SOT NII has incentivised banks to avoid stabilising their NII sensitivity exposure by reliance on unstable operational deposit funding. As the authors note, "That's exactly what SVB did."

This is another example of regulatory processes and complexity adding to the challenge of the Treasury in recommending to ALCO exactly what their bank's medium-term balance sheet structure should look like.

Overcoming regulatory complexity: Conclusions

It goes without saying that ALCO should at all times possess a clear understanding of the bank's balance sheet, particularly its sensitivity to changes in external factors. This is a 500-year-old discipline. That said, the complexity of modern balance sheet structures and the high level of competition in banking industry makes this more important than ever. In today's data-driven age, being able to know the current state of the balance sheet, with respect to capital, liquidity and market risk, is vital. The ability to conduct multi-factor stressed scenarios at any time and with instant results will provide ALCO with a head start in its decision-making ability.

We noted earlier an example of different departments in a bank working with different datasets and whose MI on the same topic showed different results. Any bank exhibiting this level of MI inaccuracy is at a distinct competitive disadvantage. Today, the ability to produce ALCO MI using single-source general ledger balance sheet data, the same dataset as used for producing regulatory reporting, is vital.

[4] See https://btrm.org/learning/thought-leadership/

Addressing Risk, Liquidity and Volatility

Addressing liquidity and funding demands was the original risk management imperative of banks. And like much of the principles of ALM, the key tenets remain unchanged. The challenge today is data-driven; to manage liquidity risk efficiently in a competitive environment requires up-to-the-minute reporting and risk exposure metrics and forecasting.

In this section, we discuss two aspects of the liquidity risk challenge for Treasury, and suggest areas where potential advantage can be gained:

- Liquidity Coverage Ratio (LCR) is universal at practically every bank in the world:
  - How important is low latency computation ability to benefit most from what it is telling us? Employing analytics ability on an instant basis will help LCR's value to ALCO
  - Forecast LCR: the value in rapid updates
  - Bank failures in 2023 highlighted the importance of a very short-term stressed liquidity metric: we suggest adding a7-day Liquid Cash Ratio to the liquidity risk dashboard
- Intra-day liquidity risk management: the quintessential data analytics challenge, and how accurate reporting can enable collateral optimisation.

Enhancing Liquidity Coverage Ratio (LCR) value

LCR is well established in global banking as a baseline risk metric.[5] As a stressed liquidity metric, it relies heavily on assumptions on what the outflow rate for every balance sheet product would be during a 30-day stress event. For a multi-currency, multi-product bank a consolidated LCR has little practical value; greater understanding is gleaned from more granular level LCR values, by currency and by business unit.

Reviewing LCR values in this way enables the bank's ALCO to derive comfort that specific divisions, regions, business lines and customer segments are liquidity-resilient. And, an ability to forecast the LCR at this front-line levelat any time, on both a "business-as-usual" basis as well as under a stressed scenario, would assist ALCO to make more optimised origination decisions. Businesses can see the liquidity risk impact of proposed lending and deposit taking mixes, under different scenarios. This points to the need for adequate balance sheet data reporting.

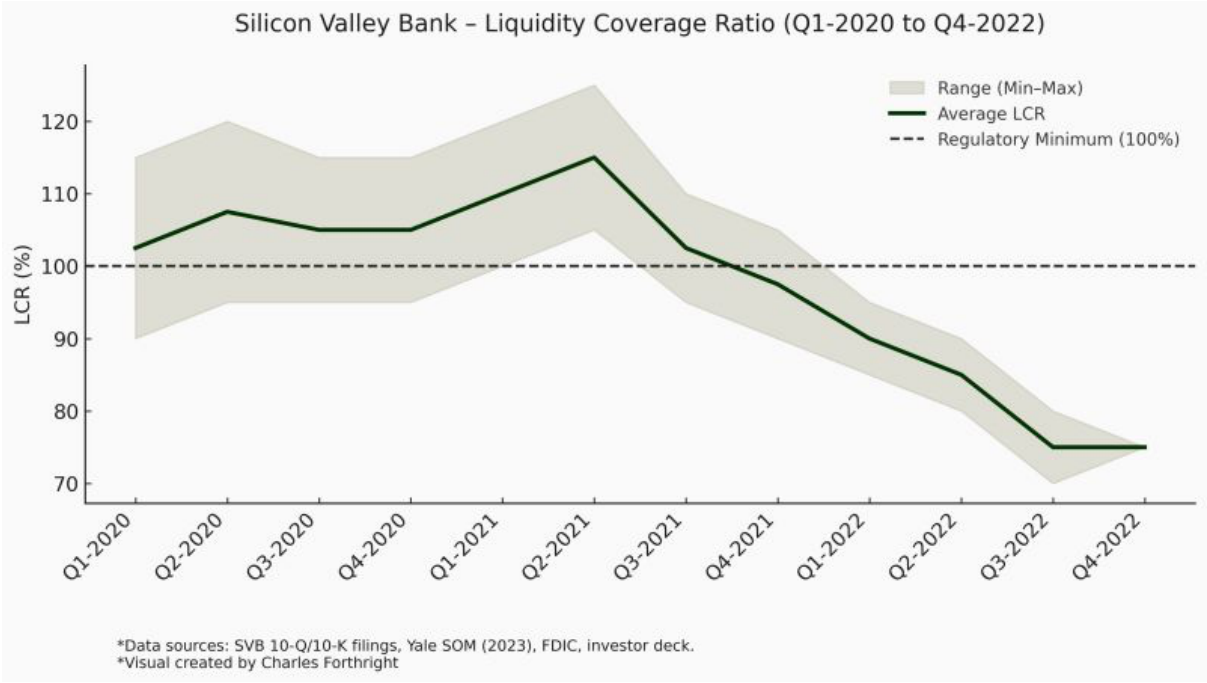
[5] LCR demonstrates the value of regulation that is simple, easy to understand and easy to apply. Unlike many aspects of Basel III guidance that has been adopted at varying pace around the world, LCR was adopted early on in every country (either formally or informally).

The practical value of LCR is implied from Exhibit 7. This shows Silicon Valley Bank's LCR value in the period up to its demise. An interesting counterfactual runs thus; if the bank had been obliged to maintain its LCR above 100% throughout this period, might it have survived the initial loss of confidence that triggered the run on its deposits? One can only surmise. However, this chart is at least circumstantial evidence of the value of the metric in assisting the preservation of balance sheet resilience. It would also have been a genuine "early warning indicator".

Banks are learning an additional lesson from the bank failures of 2023. Bank runs are as old as banks themselves; the only difference today is the speed at which a run can take place. Exhibit 8 illustrates this in crystal clear terms: compared to a previous era, the 80% outflow level over the first two days at SVB paints a very clear picture and learning lesson.

In today's environment, a bank must be able to survive the first few days of a run. The 30-day tenor of the LCR metric may end up providing a false sense of security; under SVB-style circumstances, a bank could become illiquid in a much shorter time than that. This is a classic "Pillar 2" liquidity risk type, as described by the PRA in PS 2/18.

Exhibit 7: SVB LCR value 2020-2023



Source: BTRM Case Study.

Exhibit 8: Deposit outflow and LCR outflow of distressed banks

Table A.1: Deposit outflow of distressed banks

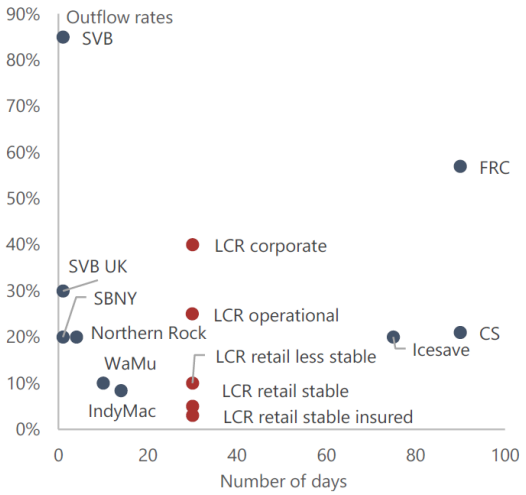
Bank	Deposit outflow	Number of days
SVB (2023)[a]	85%	2
FRC (2023)[a]	57%	90
SVB UK (2023)	30%	1
CS (2023)	21%	90
SBNY (2023)	20%	1
Icesave (2008)	20%	75
Northern Rock (2007)	20%	4
WaMu (2008)	10%	10
IndyMac (2008)	8%	14
LCR[b]	3% - 40%	30

Sources: FRB (2023), NAO (2009), Rose (2015), Zeissler et al (2019), published accounts and Secretariat calculations.

(a) FRC deposit outflows excludes $30bn of deposits placed by banks during Q1 23. SVB outflows include expected outflows by management for 10 March.

(b) LCR outflow rates are the range for retail, SME, operational and corporate deposits.

Graph A.1: Distressed banks and LCR outflows[a]



Sources: FRB (2023), NAO (2009), Rose (2015), Zeissler et al (2019) published accounts and Secretariat calculations.

(a) FRC deposit outflows excludes $30bn of deposits placed by banks during Q1 23. SVB outflows include expected outflows by management for 10 March.

Source: BCBS Report on 2023 banking turmoil, October 2023. Used with permission.

Our conclusion is that the 100% level at day 30 may be insufficient. For this reason, a suggested solution is adding to its risk metrics a 7-day "Liquid Cash Ratio". This LCR differs from the Basel LCR in two significant aspects: (i) the denominator is the net 7-day stressed outflow, and (ii) crucially, the numerator excludes securities but includes cash held at clearing banks.

In other words, how confident is the bank in its ability to access cash instantly in the event of a bank run? Maintaining this LCR above 100% provides this comfort. In today's environment surviving the first seven days of a run probably guarantees longer-term survival.

Intra-day liquidity and collateral optimisation: the ultimate data-analytics challenge

Principle 8 of the BCBS *Principles for Sound Liquidity Risk Management and Supervision* (September 2008) stated:

> *"A bank should actively manage its intraday liquidity positions and risks to meet payment and settlement obligations on a timely basis under both normal and stressed conditions and thus contribute to the smooth functioning of payment and settlement systems."*

The consultative document *Monitoring indicators for intraday liquidity management* (July 2012, made final 2014 in BCBS 248) followed on from this. There are eight different intraday liquidity metrics that clearing banks are obliged to follow. Given the nature of these metrics, and the difficulty of calculating them on an instant basis, banks have had to apply very conservative assumptions (of their maximum same-day funding requirements, under both BAU and stress) when determining how much intra-day collateral they are obliged to hold with payments systems and the central bank. This clearly acts as a drag on the balance sheet.

Implementing aggregate balance sheet calculation of the intra-day position, on instantaneous basis, is the holy grail for banks' liquidity reporting, for both Basel III compliance and balance sheet optimisation. Enhancing collateral optimisation for intra-day liquidity is only possible with instant aggregate b/s data analytics capability, otherwise the supervision authority will fall back on the conservative estimate made hitherto.

A bank that can produce MI reporting of this type will have a competitive advantage because its collateral management process will enable a more optimised balance sheet: more funds can be deployed in higher-yielding (customer) assets rather than earning the overnight risk-free rate at the payments agency.

The potential benefit is as follows: speaking generally, banks are over collateralised at the central bank reserve account and at the payments systems. A bank that can report a proven "realistic" intra-day requirement number, due to its intra-day liquidity risk metric being more accurate and reliable, would be able to reduce this level of collateral. This is the reduction of the "opportunity cost foregone" currently suffered by many banks.

What are the key components needed to build a model to effectively calculate a bank's current and future actual returns (based on usability of liquid funds) when contemplating a more flexible collateral value calculation? Optically, it is not onerous:

- Time and rate horizon
- Cash volumes freed up following more reliable intra-day risk reporting
- The rate attracted by central bank reserve account compared to the returns from other assets

Intra-day liquidity risk reporting is commonly still on an end-of-day basis as opposed to a instantaneous basis. Once this has been addressed, the benefits for the Treasury desk would be material. Bloomberg's work in this area focuses on evolving intraday liquidity reporting from end-of-day snapshots to on demand, continuous measurement. By streaming payments, collateral, and general ledger data into a single framework, banks can release trapped liquidity, optimise collateral, and materially enhance their balance sheet resilience.

Streamlining Disconnected Data and Inefficient Workflows

We stated earlier that to manage and steer the balance sheet effectively, a bank's ALCO MI should be accurate and up to date, at the aggregate level. This is a continuing issue for banks, particularly heritage banks and established banks with numerous banking services often spread across different subsidiaries.

Data analytics remains challenging for ALM reporting often due to:

- Siloed datasets;
- Subsidiary legal entities / cross-border entities using different systems and MI production systems;
- Bolt-on solutions not able to access the core general ledger in real time.

This makes Board decision-making at group level problematic, with resulting delay. This risks losing the initiative to competitors and more nimble operators who may be unencumbered with disaggregated data analytics solutions (often the case with new entrants such as neo-banks).

The solution is, on paper at least, straightforward: ALCO requires a single "source of truth" to be accessed by any service used for balance sheet MI reporting. This will enable more efficient and speedier decision-making under conditions of greater certainty.

A good (and common) example is net interest margin (NIM) management. Preserving NIM under any interest rate regime is an important goal for any bank. However, the decisions that need to be made concerning product mix, currency mix, customer mix and rates basis suffer not only from incomplete MI, but also a less than adequate ability to undertake "what if?" scenarios of the impact on NIM from different balance sheet mix options. Exhibit 9 illustrates this in a single slide: what mix of all these factors would deliver the maximum NIM over the next 12 months?

Exhibit 9: Data Attributes to be Captured at Account Level to Support an Effective NIM Model

Asset or Liability		Amount		Product Type		Currency	
Asset		Account Value		Overdraft		Sterling	
Liability				Business Loan		US$	
				Credit Card		Euro	
				Personal Loan		Other	
				Residential Mortgage			
				Commercial Mortgage			
				Current Account			
				Instant Access Deposit			
				Notice Account			
				Fixed Term Bond			
	2		1		10		4
Reference Rate		**Margin to Reference Rate**		**Contractual Maturity ***		**Repayment Type**	
Non-Interest Bearing		-3.00%		1 month		Interest Only	
SONIA		-2.50%		2 months		Capital and Interest	
Base Rate		-2.00%		3 months			
Standard Variable Rate		-1.50%		4 months			
Finance House Base Rate		-1.00%		5 months			
Fixed Rate - 1 Year		-0.50%		6 months			
Fixed Rate - 2 Year		0.00%		.....			
Fixed Rate - 3 Year		0.50%		5 years			2
Fixed Rate - 4 Year		1.00%					
Fixed Rate - 5 Year		1.50%				**Repayment Holiday**	
		2.00%				No Holiday	
		2.50%				Capital and Interest Holiday	
		3.00%				Interest Holiday	
	10		13		60		6
* Behavioural Maturity will be dependent upon the level of interest rates so will be the subject of a separate set of assumptions							

Source: Choudhry, M., *Moorad Choudhry Anthology* (Wiley 2018), chapter 18.

Another area demanding attention from ALCO is balance sheet data integration and reporting. This is pertinent for the following reasons:

- For example, in the UK the PRA's focus on granular liquidity data means ALM systems must pull clean, reconciled data across lending, treasury, finance, and risk systems. If this is not available, banks have to manage delays, manual adjustments, and higher compliance risk;
- Product pricing: banks need to ensure that their pricing models are comprehensive, prudent, and capable of accurately reflecting all material risks and costs, including but not limited to: (1) factoring all relevant costs into their cost of funds (notably hedging, liquidity term premium, and liquidity holding costs); (2) ensuring pricing is reflective of the risk being taken on; and (3) ensuring models are validated in line with regulatory expectations[6];

Hence, banks need ALM solutions that deliver:

- dynamic balance sheet simulation: robust scenario modelling across liquidity, interest rate, and financial market risks;
- Data harmonisation: integrated architectures unifying finance, risk, treasury, and lending data;
- Automated regulatory reporting: for example, PRA110, ICAAP, ILAAP, IRRBB, and produced reliably without manual intervention;

[6] The relevant guidance is PRA SS1/23.

- Built-in compliance reporting templates: aligned with relevant national jurisdiction reporting frameworks.

For ALCO and the Board, this will enable accessible MI that allows them to glean, almost at a glance, the current state of the balance sheet as well as the sensitivity of capital and liquidity to changes in external factors. ALM solutions enabling this will mitigate compliance risks, and give banks insight and agility to remain viable in a highly competitive industry.

Managing Pressure to Drive Strategic Value

Banking segments in many countries in the world today are characterised by intense competition, from a variety of players (including "fintech", e-money providers, cross-border payments solutions, and online deposit aggregators). A competitive industry, where both corporate and retail customers have considerable choice whether borrowing or lending money, demands balance sheet optimisation. This is because in such an environment capital and liquidity are constrained resources; they cost more the more demands there are on them from different players.

Capital, liquidity, funding and market risk are interconnected; impacting both sides of the balance sheet. They are drivers of – or obstacles to – an optimised balance sheet. For efficient ALCO decision-making, banks require efficient and effective reporting MI at the ALCO level. This needs intra-day aggregate data analytics capability.

"Strategic ALM", a term first coined by one of this white paper's authors, Moorad Choudhry, and later described in his book *Anthology* (Wiley 2018), describes a proactive, as opposed to the traditional reactive, approach to operating the ALM process in a bank. Implementing a genuine "Strategic ALM process" at Board level, via a direct ALCO reporting line, is imperative for banks wishing to arrive at an optimised balance sheet structure. This would maximise the utility for all three stakeholders (shareholders, regulators, customers). It would not be possible without the type of ALM solution we described in the previous chapter.

Conclusion: From Compliance to Advantage

Banks that embrace modern, integrated ALM solutions, together with effective ALCO management and strong board oversight, can move from simple regulatory compliance into competitive advantage. Banks that fail to adapt will be constrained by inefficiency, regulatory challenge, and limited strategic options. The conclusion is self-evident: banks must invest in resilience, agility, and insight. This is not possible without an integrated data analytics solution for regulatory reporting and ALCO MI reporting.

In the context of heightened financial market volatility and macroeconomic uncertainty, a key question arises; how should a bank's ALCO respond to these evolving conditions to ensure prudent balance sheet management? The core mandate of the ALCO remains unchanged, that is to safeguard the long-term resilience of the balance sheet across the economic cycle, with particular attention to liquidity risk and interest rate risk. Today the question ALCOs should be asking is "How should elevated uncertainty shape our near- to medium-term ALM strategy?" Notably, Elevated uncertainty underscores the importance of connected insight. By bringing risk and treasury together on a unified, data-driven solution, ALCOs can model scenarios, assess sensitivities, and act decisively in real time. In his view, "strategic resilience now depends as much on the speed and consistency of information as on the strength of capital and liquidity themselves."

In an environment of competitive pressure, geopolitical tension and rates uncertainty, and absent effective MI, ALCO should be asking questions such as:

- If it is understood that interest rates are uncertain to predict, and one cannot necessarily draw comfort from the current shape of the yield curve, does this argue for staying as short-duration as possible?
- Given that lending will remain long-dated due to customer demand, and where this is fixed-rate, should the ALCO always hedge the interest-rate basis on the balance sheet to net-net floating-floating? Where futures contracts or interest-rate swaps are not available in sufficient volume (for any reason), should tenor bucket asset-liability mismatch limits be implemented, at least to the 10-year tenor?
- Where longer-dated fixed-rate lending can be match-funded where IRS is unavailable, should ALCO consider doing so, even though this eats into net interest spread, since it assists a longer-dated structural funding position?
- If financial market instability is prolonged and expected to impact funding, should the funding base be made as contractually long-term as possible? How often should assumptions on the "stickiness" of customer deposits be reviewed and revised?
- Should short-term wholesale financial markets that are sourced to fund lending in a foreign currency be reviewed for future stability? If there is a danger that such FX lines may become inaccessible due to a financial market event, should this be an area to reduce lending in for now?

- For banks operating multi-currency balance sheets (we assume for customer demand reasons), should ALCO consider diversifying into a greater share of EUR assets, including euro sovereign assets (a number of which are AAA-rated, like US Treasuries). Given that eurozone financial markets lack sufficient depth and liquidity to entirely replace USD on all global banks' balance sheets, but with an expectation that USD will weaken further this year against GBP and EUR, it is logical to position a share of the balance sheet in EUR (within the limitations of customer demand requirements)?

This paper has argued that for the foreseeable future banks will be operating in a challenging environment. Balance sheet resources will remain constrained. To gain an operating advantage requires that the Board and ALCO are well informed about the balance sheet. ALM risk reporting has never been as important as it is now.

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