Asset Liability Management: An Overview

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Asset Liability Management (ALM) can be defined as a mechanism to address the risk faced by a bank due to a mismatch between assets and liabilities either due to liquidity or changes in interest rates. Liquidity is an institution's ability to meet its liabilities either by borrowing or converting assets. Apart from liquidity, a bank may also have a mismatch due to changes in interest rates as banks typically tend to borrow short term (fixed or floating) and lend long term (fixed or floating).

A comprehensive ALM policy framework focuses on bank profitability and long-term viability by targeting the net interest margin (NIM) ratio and Net Economic Value (NEV), subject to balance sheet constraints. Significant among these constraints are maintaining credit quality, meeting liquidity needs and obtaining sufficient capital.

An insightful view of ALM is that it simply combines portfolio management techniques (that is, asset, liability and spread management) into a coordinated process. Thus, the central theme of ALM is the coordinated – and not piecemeal – management of a bank's entire balance sheet.

ALM is a systematic approach that attempts to provide a degree of protection to the risk arising out of asset/liability mismatch.

Although ALM is not a relatively new planning tool, it has evolved from the simple idea of maturity-matching of assets and liabilities across various time horizons into a framework that includes sophisticated concepts such as duration matching, variable-rate pricing, and the use of static and dynamic simulation.

MEASURING RISK

The function of ALM is not just protection from risk. The safety achieved through ALM also opens up opportunities for enhancing net worth. Interest rate risk (IRR) largely poses a problem to a bank's net interest income and hence profitability. Changes in interest rates can significantly alter a bank's net interest income (NII), depending on the extent of mismatch between the asset and liability interest rate reset times. Changes in interest rates also affect the market value of a bank's equity. Methods of managing IRR first require a bank to specify goals for either the book value or the market value of NII. In the former case, the focus will be on the current value of NII and in the latter, the focus will be on the market value of equity. In either case, though, the bank has to measure the risk exposure and formulate strategies to minimise or mitigate risk.

The immediate focus of ALM is interest-rate risk and return as measured by a bank's net interest margin.

NIM = (Interest income – Interest expense) / Earning assets

A bank's NIM, in turn, is a function of the interest-rate sensitivity, volume, and mix of its earning assets and liabilities. That is, NIM = f (Rate, Volume, Mix)

Sources of interest rate risk

The primary forms of interest rate risk include repricing risk, yield curve risk, basis risk and optionality.

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Effects of interest rate risk

Changes in interest rates can have adverse effects both on a bank's earnings and its economic value.

The earnings perspective:

From the earnings perspective, the focus of analyses is the impact of changes in interest rates on accrual or reported earnings. Variation in earnings (NII) is an important focal point for IRR analysis because reduced interest earnings will threaten the financial performance of an institution.

Economic value perspective:

Variation in market interest rates can also affect the economic value of a bank's assets, liabilities, and Off Balance Sheet (OBS) positions. Since the economic value perspective considers the potential impact of interest rate changes on the present value of all future cash flows, it provides a more comprehensive view of the potential long-term effects of changes in interest rates than is offered by the earnings perspective.

Interest rate sensitivity and GAP management

This model measures the direction and extent of asset-liability mismatch through a funding or maturity GAP (or, simply, GAP). Assets and liabilities are grouped in this method into time buckets according to maturity or the time until the

Interrelationship between GAP and ΔNII

Sl. No.	Type of GAP	Change in Interest Rates (Δr)	Change in Net Interest Income (ΔNII)
1	RSA = RSLs	Increase	No change
2	RSA = RSLs	Decrease	No change
3	RSAs ≥ RSLs	Increase	NII increases
4	RSAs ≥ RSLs	Decrease	NII decreases
5	RSAs ≤ RSLs	Increase	NII decreases
6	RSAs ≤ RSLs	Decrease	NII increases

first possible resetting of interest rates. For each time bucket the GAP equals the difference between the interest rate sensitive assets (RSAs) and the interest rate sensitive liabilities (RSLs). In symbols:

GAP = RSAs – RSLs

When interest rates change, the bank's NII changes based on the following interrelationships:

ΔNII = (RSAs - RSLs) x Δr
ΔNII = GAP x Δr

A zero GAP will be the best choice either if the bank is unable to speculate interest rates accurately or if its capacity to absorb risk is close to zero. With a zero GAP, the bank is fully protected against both increases and decreases in interest rates as its NII will not change in both cases.

As a tool for managing IRR, GAP management suffers from three limitations:

- Financial institutions in the normal course are incapable of out-predicting the markets, hence maintain the zero GAP.
- It assumes that banks can flexibly adjust assets and liabilities to attain the desired GAP.
- It focuses only on the current interest sensitivity of the assets and liabilities, and ignores the effect of interest rate movements on the value of bank assets and liabilities.

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Cumulative GAP model

In this model, the sum of the periodic GAPs is equal to the cumulative GAP measured by the maturity GAP model. While the periodic GAP model corrects many of the deficiencies of the GAP model, it does not explicitly account for the influence of multiple market rates on the interest income.

Duration GAP model (DAGAP)

Duration is defined as the average life of a financial instrument. It also provides an approximate measure of market value interest elasticity. Duration analysis begins by computing the individual duration of each asset and liability and weighting the individual durations by the percentage of the asset or liability in the balance sheet to obtain the combined asset and liability duration.

DURgap = DURassets – Kliabilities DURliabilities
Where, Kliabilities = Percentage of assets funded by liabilities

DGAP directly indicates the effect of interest rate changes on the net worth of the institution. The funding GAP technique matches cash flows by structuring the short-term maturity buckets. On the other hand, the DGAP hedges against IRR by structuring the portfolios of assets and liabilities to change equally in value whenever the interest rate changes. If DGAP is close to zero, the market value of the bank's equity will not change and, accordingly, become immunised to any changes in interest rates.

DGAP analysis improves upon the maturity and cumulative GAP models by taking into account the timing and market value of cash flows rather than the horizon maturity. It gives a single index measure of interest rate risk exposure.

The application of duration analysis requires extensive data on the specific characteristics and current market pricing schedules of financial instruments. However, for institutions which have a high proportion of assets and liabilities with embedded options, sensitivity analysis conducted using duration as the sole measure of price elasticity is likely to lead to erroneous results due to the existence of convexity in such instruments. Apart from this, duration analysis makes an assumption of parallel shifts in the yield curve, which is not always true. To take care of this, a high degree of analytical approach to yield curve dynamics is required. However, immunisation through duration eliminates the possibility of unexpected gains or losses when there is a parallel shift in the yield curve. In other words, it is a hedging or risk-minimisation strategy; not a profit-maximisation strategy.

Simulation analysis

Simulations serve to construct the risk-return profile of the banking portfolio. Scenario analysis addresses the issue of uncertainty associated with the future direction of interest rates by allowing the analysis of isolated attributes with the use of 'what if' simulations. However, it is debatable if simulation analysis, with its attendant controls and ratification methods, can effectively capture the dynamics of yield curve evolution and interest rate sensitivity of key financial variables.

MANAGING INTEREST RATE RISK

Depending upon the risk propensity of an institution, risk can be controlled using a variety of techniques that can be classified into direct and synthetic methods. The direct method of restructuring the balance sheet relies on changing the contractual characteristics of assets and liabilities to achieve a particular duration or maturity GAP. On the other hand, the synthetic method relies on the use of instruments such as interest rate swaps, futures, options and customised agreements to alter the balance sheet risk exposure. Since direct restructuring may not always be possible, the availability of synthetic methods adds a certain degree of flexibility to the asset-liability GAP management process. In addition, the process of securitisation and financial engineering can also be used to create assets with wide investor appeal in order to adjust asset-liability GAPs.

Using interest rate swaps to hedge interest rate risk

Interest rate swaps (IRS) represent a contractual agreement between a financial institution and a counterparty to exchange cash flows at periodic intervals, based on a notional amount. The purpose of an interest rate swap is to hedge interest rate risk. By arranging for another party to assume its interest payments, a bank can put in place such a hedge. Financial institutions can use such swaps to synthetically convert floating rate liabilities to fixed rate liabilities. The arbitrage potential associated with different comparative financing advantages (spreads) enables both parties to benefit through lower borrowing costs.

In case of a falling interest rate scenario, prepayment will increase with an attendant shortening of the asset's average life. The financial institution may have to continue exchanging swap cash flows for a period longer than the average life of the asset. In order to protect such situations, options on swaps or 'swaptions' may be used. Call options on swaps allow the financial institution to call the swap, while put options on swaps allow the institution to activate or put the swap after a specific period.

Using financial futures to hedge interest rate risk

A futures contract is an agreement between a buyer and seller to exchange a fixed quantity of a financial asset at an agreed price on a specified date. Interest rate futures (IRF) can be used to control the risk associated with the asset/liability GAP either at the macro-level or at the micro-level. A macro-hedge is used to protect the entire balance sheet, whereas a micro-hedge is applied to individual assets or transactions. A buyer, holding a long position, would purchase a futures contract when interest rates are expected to fall. The seller of a futures contract, on the other hand, would take a short position in anticipation of rising rates. The protection provided by financial futures is symmetric in that losses (or gains) in the value of the cash position are offset by gains (or losses) in the value of the futures position. Forward contracts are also available to hedge against exchange rate risk.

Futures contracts are not without their own risks. Among the most important is basis risk, especially prevalent in cross hedging. Financial institutions must also pay close attention to the hedging ratio, and managements must be careful to follow regulatory and accounting rules governing the use of futures contracts.

Using options to hedge interest rate risk

Options can be used to create a myriad risk-return profiles using two essential ingredients: calls and puts. Call option strategies are profitable in bullish interest rate scenarios. With respect to the ALM process, options can be used for reducing risk and enhancing yield. Put options can be used to provide insurance against price declines, with limited risk if the opposite occurs. Similarly, call options can be used to enhance profits if the market rallies, with the maximum loss restricted to the upfront premium.

Customised interest rate agreements

'Customised interest rate agreements' is the general term used to classify instruments such as interest rate caps and floors. In return for the protection against rising liability costs, the cap buyer pays a premium to the cap seller. The pay-off profile of the cap buyer is asymmetric in nature, in that if interest rates do not rise, the maximum loss is restricted to the cap premium. Since the cap buyer gains when interest rates rise, the purchase of a cap is comparable to buying a strip of put options. Similarly, in return for the protection against falling asset returns, the floor buyer pays a premium to the seller of the floor. The pay-off profile of the floor buyer is also asymmetric in nature since the maximum loss is restricted to the floor premium. As interest rates fall, the pay-off to the buyer of the floor increases in proportion to the fall in rates. In this respect, the purchase of a floor is comparable to the purchase of a strip of call options.

By buying an interest rate cap and selling an interest rate floor to offset the cap premium, financial institutions can also limit the cost of liabilities to a band of interest rate constraints. This strategy, known as an interest rate 'collar,' has the effect of capping liability costs in rising rate scenarios.

The role of securitisation in ALM

By using securitisation, financial institutions can create securities suitable for resale in capital markets from assets which otherwise would have been held to maturity. In addition to providing an alternative route for asset/liability restructuring, securitisation may also be viewed as a form of direct financing in which savers are directly lending to borrowers. Securitisation also provides the additional advantage of cleansing the balance sheet of complex and highly illiquid assets as long as the transformations required to enhance marketability are available on a cost-effective basis. Securitisation transfers risks such as interest rate risk, credit risk (unless the loans are securitised with full or partial recourse to the originator) and pre-payment risk to the ultimate investors of the securitised assets.

Besides increasing the liquidity and diversification of the loans portfolio, securitisation allows a financial institution to recapture some part of the profits of lending and permits reduction in the cost of intermediation.

CONCLUSION

As the landscape of the financial services industry becomes increasingly competitive, with rising costs of intermediation due to higher capital requirements and deposit insurance, financial institutions face a loss of spread income. In order to enhance the loss in profitability due to such developments, financial institutions may be forced to deliberately mismatch asset/liability maturities in order to generate higher spreads.

ALM is a systematic approach that attempts to provide a degree of protection to the risk arising out of the asset/liability mismatch. ALM consists of a framework to define, measure, monitor, modify and manage liquidity and interest rate risk. It is not always possible for financial institutions to restructure the asset and liability mix directly to manage asset/liability GAPs. Hence, off-balance sheet strategies such as interest rate swaps, options, futures, caps, floors, forward rate agreements, swaptions, and so on, can be used to create synthetic hedges to manage asset/liability GAPs.

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