

Asset and liability management: what does the future have in store?

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Abstract Advances in market risk management have had a huge impact on asset liability management in recent years, enabling the most advanced institutions to analyze their balance sheet risks in a much more realistic and dynamic way. In future, as risk management develops still further and computing power increases, ALM could find itself with a new, broader function to perform.

Keywords Assets management, Risk management

Technological innovations and advances in risk management practices have fuelled the development of asset liability management over the last decade or more. And they will provide the key to the discipline's future too. As computing power increases further; asset liability managers continue to adopt the latest market risk management techniques; and accounting standards adapt to emphasize risk management practices, ALM could in future provide the key to that much-coveted goal – full enterprise-wide risk management.

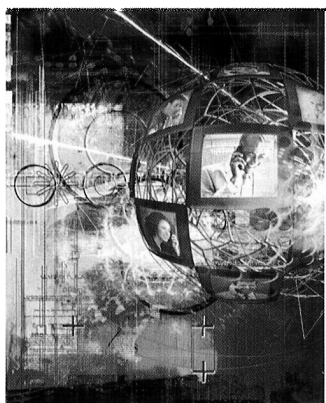
Widening the scope of ALM

The scope of ALM has widened since its early days as managers have incorporated many market risk approaches that are commonly associated with managing trading books. Traditional ALM methods have typically over-emphasized short-term gains, based on static, partial views of the balance sheet that fail to account for the risks associated with future changes in market value. A reliance on earnings and interest rate gap typifies these traditional methods and leads to a misrepresentation of the institution's financial position.

All too often, focusing on earnings creates a situation in which the long-term value of a firm is sacrificed in an effort to maximize short-term interest income. Many financial institutions still seek to optimize their earning potential using income simulation alone – a method that cannot capture risk beyond the specified time horizon, and therefore results in a measure of reward, but no corresponding measure of risk.

While focusing on earnings distorts reward measurement, using interest-rate gap distorts risk measurement. By omitting optionality, new business, natural hedges and the often-complex correlations between risk factors, interest-rate gap is approximate at best.

If ALM is to make a solid contribution to enhancing the net worth of the enterprise, it must offset measures of reward with accurate assessments of balance sheet risk, from both an accounting and an economic perspective. It must also be flexible enough to examine the impact of the



evolution of a balance sheet, in conjunction with relevant market conditions, on its risk profile over multiple time horizons, and provide realistic views of the future. Table I outlines how modern ALM practices can improve upon the traditional model.

There are three key factors influencing the evolution of ALM: market risk management; changes to accounting and regulatory rules; and technology.

Market risk management

No longer simply a means to forecast net interest income for accounting purposes, ALM has adopted many aspects of market risk technology as greater market transparency and increased capability to mark-to-market assets and liabilities have made it possible for asset liability managers to evolve their practices. The developments have come about as a result of the upsurge in market-based sources and uses of funds, and the hedging possibilities offered by derivatives.

Market risk management terms and processes, such as mark-to-market, value-at-risk, stress testing and Monte Carlo simulation, all developed in reaction to the needs of financial institutions to gain a better understanding of the risks that it's trading and banking practices posed to the institution. And today the market risk manager's mantra: "identify, measure, monitor and control" has become common among a new breed of risk managers – those responsible for ALM.

As financial markets have expanded, identifying an institution's exposure to specific risk factors has become integral to effective ALM. To keep pace with industry best practice, risk managers now need access to advanced scenario-based tools and measures that enable them to construct their own scenarios and, from these, to evaluate alternate reinvestment strategies and growth forecasts over multiple time-steps. They also need to be able to stress test global measures of risk, in order that the sensitivity of individual risk factors and behavioral assumptions, such as withdrawal and prepayment rates, can be properly assessed.

And the proliferation of new and complex financial instruments, from exotic derivative products to mortgages – which increasingly contain embedded optionality as financial institutions compete with one another for business – have necessitated changes. Largely because of this embedded optionality, many of these new instruments simply cannot be evaluated using traditional ALM approaches. To become an effective evaluation tool, risk-neutral valuation of embedded optionality has to be refined by modelling consumer behavior.

Changes to accounting and regulatory rules

International accounting rules are forcing companies to switch to "fair value" accounting, making derivatives fully accountable on the balance sheet. FAS 133 was introduced in the US by the Federal Accounting Standards Board in 2000, and IAS 39 from the International

Table I Traditional versus modern ALM

<i>Traditional ALM</i>	<i>Modern ALM</i>
Focus on short-term earnings	Focus on earnings and value
Subjective scenarios based on parallel shifts	Objective scenarios based on statistical models complemented by all manner of subjective scenarios
Focus on home-currency interest-rate risk	Include all risk factors including foreign exchange, basis, credit, commodities, and equity
Assumption of static portfolio (or at least dynamic behavior) that is scenario independent	Dynamic evolution of the balance sheet encompassing growth forecasts, reinvestment and hedging strategies

Accounting Standards Committee came into effect in Europe the following year, although it does not become compulsory until 2005.

The new accounting standards oblige companies to report derivatives at fair value on the balance sheet and to use hedge accounting only for designated transactions and matching derivatives. The primary change is that FAS 133 and IAS 39 alter the definition of a derivative instrument for accounting purposes. Futures, forwards, options, swaps and certain derivatives embedded in other instruments, such as structured notes, are affected. The standards require all derivatives to be recorded as assets or liabilities at fair value. They also make significant changes to hedge accounting procedures, requiring that any ineffectiveness in the hedge strategy be recognized in income.

New regulatory demands are also having an impact on ALM. In its new capital accord recommendations to be implemented in 2005 – commonly referred to as BIS II – the Basel Committee on Banking Supervision emphasizes the importance of banks' ALM processes. It states: "Banks should have interest rate measurement systems that assess the effects of rate changes on both earnings and economic value". The BIS II proposals are based on three mutually reinforcing pillars, which together reflect a significant departure from the "one size fits all" approach.

Technology is adapting

The changes ALM has had to make to keep pace with market risk management methodologies, best practice and new accounting and regulatory standards would have been impossible were it not for advances in computer technology. Today leading banks – and some corporates – are able to use advanced stochastic simulation techniques that simply did not exist before. These new techniques enable them to analyze and manage their balance sheets in a more dynamic fashion.

Rather than relying on pre-determined scenarios, such as changes in the yield curve, they can now assess the effect on the balance sheet of implementing specific hedging or reinvestment strategies and growth forecasts. Improvements in technology also enable ALM analysis to be carried out more frequently than in is traditionally the case, although institutions today still report on a periodic basis at the end of each month, quarter and year. More and more institutions today are attempting to model their projected business, creating forward-looking balance sheets that include new – and exclude maturing – business and funding requirements.

Current technology allows financial institutions to forecast their interest rate and liquidity risks, as well as their impact on earnings. It is possible to simulate thousands of different scenarios (such as interest rate or exchange rate changes) and monitor the effects on all positions in the bank. These projections can be multiple – from early payment of mortgages and loans to projected maturities in non-maturing liabilities (such as customer savings), and future business growth (see Figure 1).

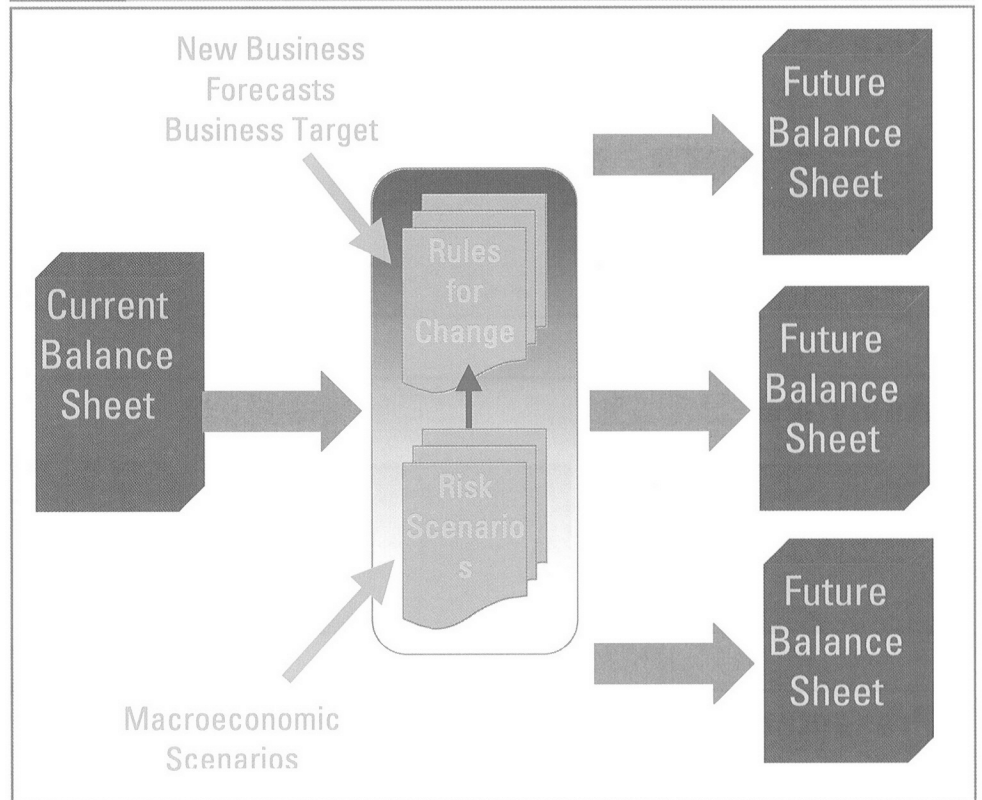
Scenario-based ALM

As market risk management practices have been incorporated into ALM, asset liability managers now face the delicate task of balancing alternative measures of reward and risk.

Earnings have traditionally been managed on a short-term basis – generally a one year time horizon. This practice evolved because earnings reflect risk from an accounting perspective, and accounting rules were traditionally based on a day-to-day accrual of income and expense over the financial year. But using this timeframe, the effect on earnings over a longer period is lost. Unless assets and liabilities are perfectly matched (which is very unlikely), interest rate risk will continue to affect the balance sheet well beyond the one-year horizon.

Value, on the other hand, reflects a longer-term perspective. But measuring value is far from straightforward. It requires maturity dates for non-maturing assets and liabilities to be identified,

Figure 1 A simulation model



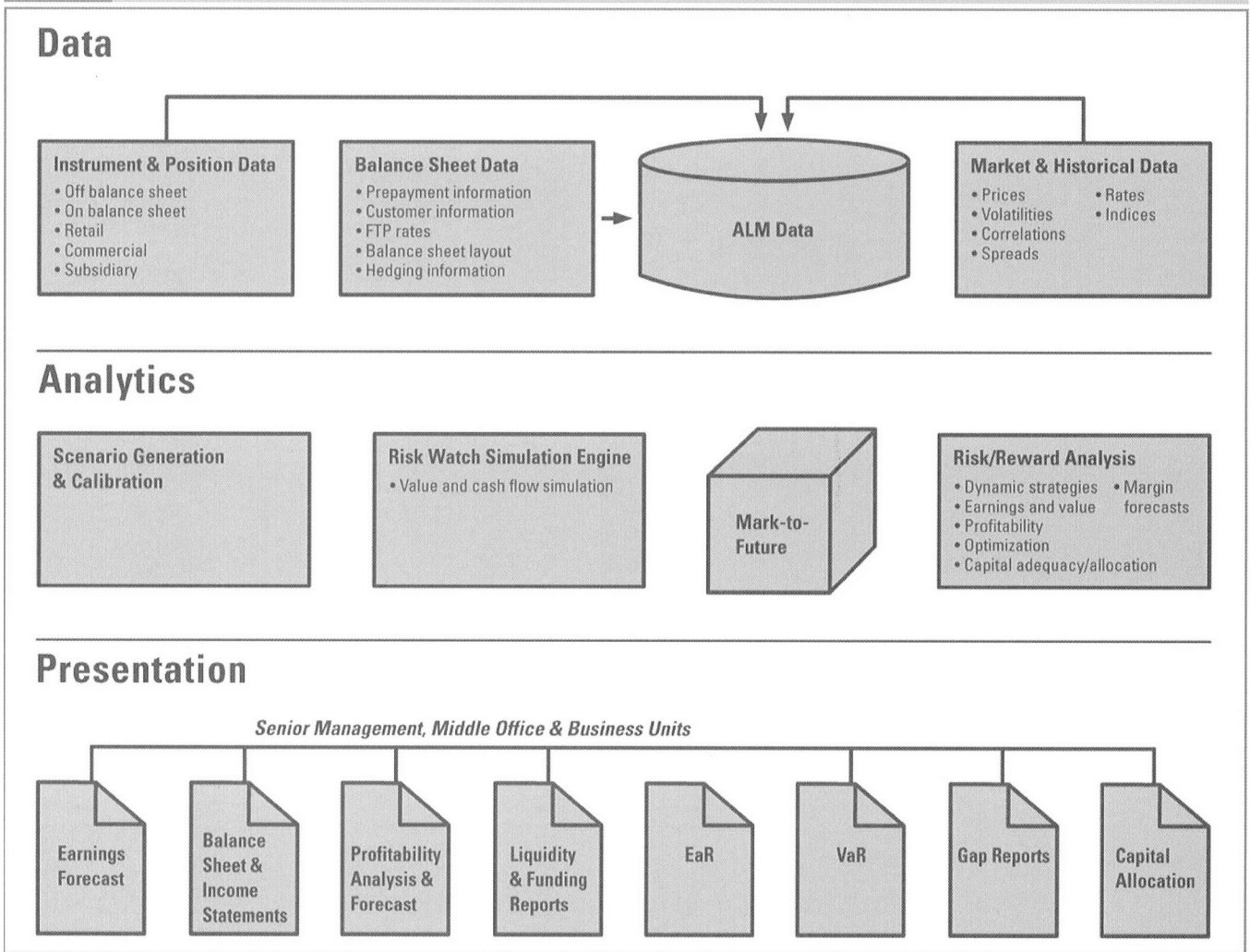
and option values to be incorporated for potential pre-payments. This entails not just option-adjusted spreads and values, but option-adjusted sensitivity analysis – durations and convexities – as well.

Analyzing and comparing changes in earnings and value together, over given time horizons, can offer asset liability managers a much more accurate view of the balance sheet. However, this requires a considerable extension of traditional ALM and market risk methodologies. Most importantly, it means that value must be simulated not just over a one- or ten-day horizon, but over one year or more, and that new business over the life of the simulation must be incorporated.

The most advanced software solutions, such as Algo ALM from Algorithmics, offer advanced scenario-based measures of earnings-at-risk and value-at-risk; dynamic balance sheet income simulation; stress testing; portfolio optimization; and liquidity or funding risk analysis, as well as all traditional reporting requirements. Algo ALM allows users to simulate the balance sheet over time, over thousands of scenarios, while incorporating changes in business, and calculating earnings and value in a single, consistent manner (see Figure 2).

The wider corporate world

It is not only financial institutions that are developing their ALM practices. Non-financial companies also receive income or make payments in different currencies and face interest rate mismatches. Many larger institutions today use quite advanced market risk management analytics to control those risks and regularly use derivatives – mostly interest rate swaps and options and foreign exchange options – to hedge their risks. Especially in the newly deregulated and privatized markets of electricity and telecoms capacity, investment in risk management technology and expertise is soaring as companies become aware of the nascent market risks in their businesses.



Corporate ALM is especially challenging, as the risk factors almost always comprise more than interest rates alone. Commodities and other supply-and-demand variables are also involved. Scenario-based ALM is particularly useful in these circumstances. By using scenarios that incorporate the correlations between the risk factors, it becomes possible to create risk and return measures that integrate these different sources of risk.

In the insurance industry too, risk management is becoming both more widespread and more complex. Many insurance or reinsurance companies are establishing their own financial subsidiaries to offer derivatives products, subjecting them to the same risks as investment banks. They are also offering “blended transactions”, which bundle together insurance and financial products. These entail complex risk monitoring and have a major impact on balance sheet management. In addition, it is likely that insurance firms will soon face similar regulatory demands to banks in terms of how they manage their risks.

Enterprise-wide risk management

All the changes we have outlined across ALM, accounting and market risk management are pushing in the same direction. They are integrating risk management practices across risk categories throughout the institution. Market risk, credit risk, liquidity risk, funding risk and operational risk are moving out of their separate silos. And the link that holds all the other risk categories together is ALM. All these separate areas of risk management entail fundamental

management of assets and liabilities and could one day be incorporated into an ALM framework in a timely and consistent fashion. ALM, sensibly carried out and with the right technology, could become capable of providing institutions with a powerful and robust solution to the risk manager's dream – enterprise-wide risk management.

The concept of enterprise-wide risk management entails taking a big picture of the institution's risks at a very senior level. Not only interest rate risk, but all other classes of market risk – foreign exchange; equity; debt; and commodities are taken into account. Credit risk – the risks associated with counterparties, whether through financial products or business trades; and operational risks – those associated with people, processes and technology can all be linked together by ALM. In addition, risks relating to liquidity, funding and reputation can be eliminated by proper management of fundamental assets and liabilities.

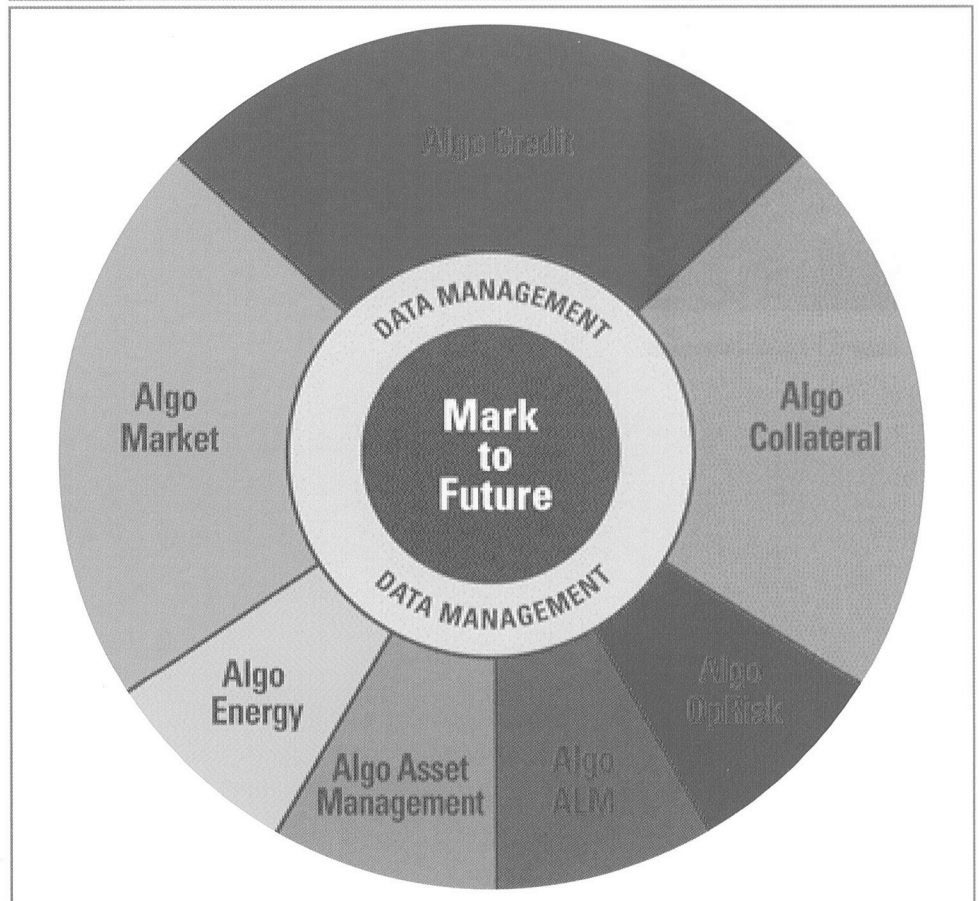
But moving from traditional silos to enterprise-wide risk management is not a process that can be completed overnight. In order advance, the industry needs to address several fundamental challenges.

Constraints – the data problem

Vast quantities of data would be needed to run an enterprise-wide system accurately. Even with risk management divided into smaller silos, managers today usually pinpoint data as their greatest constraint. For credit risk managers, there is simply not enough historical data on, say, small and medium-sized company defaults, to be able to model risks efficiently.

For operational risk managers the problem is yet more pressing. Big operational losses represent so-called "tail-end" risks – the tiny percentage of low frequency, high impact events

Figure 3 Mark-to-Future framework



that are so difficult to model and manage. And most large financial institutions have only in the last two years or so started to gather and log loss data. Smaller financial firms and corporates are only now beginning to get to grips with the mere concept of operational risk.

The problem asset liability managers face is that they are dealing with the big picture. Unlike market or credit risk managers, who can focus on certain factors within their risk category, asset liability managers need all the information there is to provide an overall risk view at an institutional level.

Algorithmics has helped its clients address these issues with AlgoSuite. This enterprise-wide risk management platform has a single data architecture designed for risk management and a single risk engine to ensure consistent analytical results. Thanks to its Mark-to-Future framework (www.mark-to-future.com) (see Figure 3), results can be distributed around the firm to provide true enterprise-wide, integrated risk management.

