UPRAVLJANJE RIZIKOM BANEK – ALM MENADŽMENT
MANAGING OF BANK’S RISK – ASSET – LIABILITY MANAGEMENT (ALM)¹

dr Miljana Barjaktarović
Alfa Univerzitet, Beograd

1. Introduction

The topics of risk management and asset liability management (ALM) in banks are particularly broad and each could be the subject of separate book. The reality, however, is that each subject is

interrelated and there is a logic in looking at them together. Deregulation in financial markets over past two decades, together with ensuing growth in new product offerings to customers has supported the evolution of both. While ALM consist of a specific set of core bank management activities, it is encompassed within the overall risk management processes of the bank.

This paper is in no way intended to comprehensively review either subject. Its intention is to „focus“ in on key areas that are fundamental to establishment and development of the risk management function in banks and on select areas of the ALM process where failure to get these areas „right“ can have cataclysmic impact on the organization.

2. The History of Risk Management Failures

Emphasis and commitment to risk management historically intensifies when there is a crisis and wanes as markets progress through normal cycles. It has recently emerged, however as a central issue in financial management – the main driver for this being a number of costly and highly publicised failures. Evidence suggests that the resulting losses can be attributed on the whole to failures in controls as well as management failures to detect or manage speculative, fraudulent or unauthorised transactions. Table 1 some of the better publicised debacles.

<table>
<thead>
<tr>
<th>Year</th>
<th>Firm</th>
<th>Losses</th>
<th>Cause</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>Hammersmith and Fulham</td>
<td>GBP600 million</td>
<td>Derivatives - Swaps</td>
<td>Authority/ Documentation and Suitability</td>
</tr>
<tr>
<td>1994</td>
<td>Metallgesellschaft</td>
<td>US$660 million</td>
<td>Oil Hedging</td>
<td>Systems, control and management failure</td>
</tr>
<tr>
<td>1995</td>
<td>Orange County</td>
<td>US$1.5 billion</td>
<td>Derivatives swaps</td>
<td>Speculation. Authority/documentation and Suitability</td>
</tr>
<tr>
<td>1995</td>
<td>Baring Brothers</td>
<td>GBP900 million</td>
<td>Options</td>
<td>Speculation. Fraud Systems, control and management failure</td>
</tr>
<tr>
<td>1996</td>
<td>Sumitomo Corp</td>
<td>US$2.6 billion</td>
<td>Commodity futures</td>
<td>Management oversight failure, Speculation – oversize position</td>
</tr>
<tr>
<td>1998</td>
<td>Long Term Capital Management (LTCM)</td>
<td>US$4 billion</td>
<td>Derivatives, debt and equity options</td>
<td>Speculation. Leverage, control and management failure</td>
</tr>
<tr>
<td>2001-2002</td>
<td>Enron</td>
<td>US $ 50 billion</td>
<td>Corporate Governance/ Financial Control</td>
<td>Fraud. Control, Board and Management Failure</td>
</tr>
<tr>
<td>2002</td>
<td>Allied Irish</td>
<td>US$691 million</td>
<td>Financial Control Currency Options</td>
<td>Unauthorised trading, fraud, control and management failure</td>
</tr>
<tr>
<td>2007</td>
<td>Cred Agricole</td>
<td>US$347 million</td>
<td>Credit market indicies</td>
<td>Management and control oversight failure oversize positions</td>
</tr>
<tr>
<td>2008</td>
<td>Societe Generale</td>
<td>US$7.2 billion</td>
<td>Futures and European equity market indicies</td>
<td>Unauthorised trading, fraud, management and control failure</td>
</tr>
<tr>
<td>2007-2008</td>
<td>Systemic Meltdown – Global Impact</td>
<td>US$400 billion and counting</td>
<td>Structured and securitised product, credit, ABS, Funding/Liquidity</td>
<td>Speculation. Management, regulatory and rating agency failure, leverage, systems and controls</td>
</tr>
</tbody>
</table>

Source: Independent Risk consultants P/L
Since the beginning of the 1980s in particular, financial institutions have been grappling with the risk management of an ever increasing range of new variant products. Developments from this time onwards have revolutionised risk management through new quantitative techniques that allow banks to disaggregate, price, package, hedge and distribute risks that were previously undifferentiated, unmeasured and illiquid.

In 1988, the Bank of International Settlements (BIS) introduced the Basel Accord\(^2\) which was designed to ensure minimum capital requirements for banks. It provided for the implementation of a credit risk management framework with a minimum capital standard of 8% by the end of 1992. By the early 1990s a number of further risk management failures had occurred and this led to a specific G30 initiative in 1993 which reviewd activity in the global derivative industry.

As the implementation of the Basel accord proceeded, it was recognised that numerous shortcomings existed in the framework and in June 2004, following extensive consultation with industry, the Basel II Accord was published.\(^3\) This version suspeised the 1988 Accod and aimed at ensuring that capital allocation is far more risk sensitive, establishing a framework for convergence of regulatorly and economic capital. Additionally, it separates and quintifies risk into credit, market and operational components, establishing a viable structure and measurement system for each.

The events that began in 2007 with the sub-prime crisis have now forced regulators and financial services organizations globally to again re-examine and reasses risk management frameworks and processes.

### 3. Risk Management Framework

Establishing a framework to deal with risks is fundamental. In many cases, a significant cause of failure can be tied directly to an incomplete or absent framework for managing risk. Figure 1 below depicts a process for the development of a risk management framework. The steps identified are aimed at understanding the risk in the busines and the importance or danger of each—knowing this is a prerequisite to quantifying the risk appetite of the organization in the context of the business strategy. The outcome of these four steps can then be used to crystallise a governance and management framework for risk which in–turn can be used to fully develop implementation and management plans.

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Some risk are more difficult to manage than others and a process of assessing the level and importance to each individual organization is necessary. The same risks can represent a higher or lower exposure in different organizations. For example, the recent crisis has highlighted the vastly different risk profile attached to the re-financing risk of a bank's mortgage portfolio versus a nonbank. The strenght of a commercial banks deposit franchise, with or without access to credit guarantees, means that the refinancing risk is significantly lower and less costly than that of a nonbank, which in contrast tends to be reliant on the securitised markets for funding. This represents a competitive advantage for the banks, particularly in a high stress environment. Clearly the refinancing risk needs to be managed by both organizations; however, a non-bank would rank the importance and difficulty of managing the risk differently than a bank. Another important aspect is that risks within the enterprise are interrelated and cannot be viewed in isolation – understanding these relationship can assist in the identification of natural offsets.
Determining risk appetite is difficult. It is both a quantitative and qualitative process and should be undertaken considering: the current operating environment; the organization cash-flow; strategy and earnings/balance sheet capacity. A bank should understand its business portfolio and the likely impact, under different scenarios (including high stress), of associated risks on earnings of each segment – both aggregated and disaggregated. The recent global crisis, which has brought a number of organizations previously considered impregnable to their knees, has reinforced the significance of understanding how risk levels change impact during different operating environments.

The work in analysing the organizational risks, ranking risks and quantifying risk appetite is prerequisite to establishing the framework and governance structure. The final components of the framework will depend on the nature of the underlying business—in the case of a bank. Figure 2 below shows the typical components.
4. Risk Management

Credit risk

While there have been many reasons why financial institutions have faced difficulties historically, the major causes of serious banking problems are directly related to credit standards for borrowers and counterparties. A credit risk framework focuses primarily on; the measurement of credit risk, credit controls and risk administration, including monitoring compliance with credit risk limits; and, establishing of regulatory/economic capital required to support credit risk. The Basel II framework provides for the discrete modeling and measurement of credit risk. The typical risk structure is based on a distributed risk function. This structure generally consists of, the board of directors; various committees at board and management levels (depending on the scale and sophistication of the bank); a centralised risk management function – usually responsible for policy formulation and oversight; and risk management functions located in each business responsible for the day to day oversight of risks.

Liquidity Risk

This risk refers to the ability to continually enter into market transactions and is also referred to as market liquidity or asset liquidity risk. A good example of the impact of this risk was demonstrated during the recent crisis when interest rate derivative spreads increased markedly with the drying up of product availability in combination with the ongoing need for hedging transactions. It resulted in a dramatic increase in cost, threatening economic viability. A central aspect during the period was contagion effect which impacted on multiple product groupings and underlined the need to fully understand the risks associated with the interrelated nature of financial service products. The concept of liquidity is increasingly important in managing financial risk. It is driven by: the structure and depth of markets; volatility of market prices/rates; the presence of traders willing to make markets and commit capital to support trading; and, trading/leverage strategies deployed. It has historically been thought of as associated with funding, however, it can be separated into two distinct risk types—Funding Liquidity Risk and Trading Liquidity Risk.

Perhaps the most poignant example is the recent crisis-driven drying up of access to debt securities markets globally which forced governments in most jurisdictions to provide massive “window”

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4 The shortcomings in the 1988 Basel Accord have been addressed with an internal ratings based approach (both) Foundation and Advanced allowable under Basel II. As with Market risk, a Standardised Approach is also allowable – banks and supervisors can select approaches that are most appropriate for their operations and financial markets infrastructure.


In September 2008 the BIS released a detailed guidance document on liquidity management - “Principles for Sound Liquidity Risk Management and Supervision”. The document provides a number of guidance principles around; governance, measurement and management; public disclosure; and, the role of supervisors. It is the most comprehensive regulatory/supervisory response on the subject to date. This refers of course to the ability to meet funding obligations by either financing through sale of assets by borrowing.
facilities to market participant. At the strategic level banks will manage funding liquidity risk through the ALM process and this looked at in the sections on ALM below. In many smaller banks, however, it can be responsibility of the trading department that also has day to day responsibility for operationalising the strategy.

**Market risk**, which describes the sensitivity of the value of positions to changes in market prices and/or rates, requires a separate framework for oversight and management. Different methods of modeling are used for traded market risk versus non-traded risk. Traded market risk is modelled and calculated using a Value at Risk (VaR) methodology. VaR facilitates a number of functions in the market risk area including, generation of management information and oversight; establishment of trading limits and control of trading operations; performance evaluation; asset and resource allocation including hedging decisions; and regulatory reporting and risk oversight. Recent market events have brought into question the validity of certain underlying assumptions in the VaR methodology. For example, the model assumes that positions can be hedged or liquidated over a specified time horizon. The liquidity constraints in markets during the recent crisis invalidated this assumption – VaR accuracy is questionable when dealing with illiquid instruments. It has not been considered a substantial problem historically but has become a major issue with the extent of volatility during the recent turmoil and emphasises the need to supplement modelling activities with adequate stress testing of portfolios.⁶

**Operational risks**

Under the Basel II Accord, operational risk is defined as „....the risk of loss resulting from inadequate processes, people and systems or from external events.” The Accord also recognizes however that the term “operational risk” can include different meanings, and therefore permits banks to use their own definitions provided the key elements of the Basel II definition are included. While banks have always engaged in operational risk management, the Basel II related rules introduce new dimensions to this practice in the form of explicit capital requirements and corresponding changes in supervisory oversight. management of operational risk requires systems capable of identifying, recording and quantifying operational failures that may cause financial loss. The systems are essentially tracking processes that monitor the behaviour and performance of existing systems and processes. The essential elements include:

1. the ability to track and monitor performances of specified operational processes and systems,
2. maintenance of databases of operational loss experience history, and
3. capacity to provide exception reporting or initiate actions to enable intervention to reduce operational risk

⁶ Under the Basel II Accord, market risk can be measured using differing approaches. The „Internal Model Approach“, requires extensive data collection, systems and quantitative expertise. Capital requirements under the „Standardised Approach“, however, are prospectively higher. Banks need to carefully consider the cost and benefits associated with both approaches as the Internal Model Approach is time consuming and expensive and provides, arguably, little incremental benefit for a smaller and less complex organization. The same point is applicable to credit an operational risk categories.
5. Asset and Liability Management (ALM)

There are organizational and governance models that guide the management of bank asset liability activities. The models reflect fundamentally different risk philosophies that tend to evolve with the growing sophistication and depth of financial markets together with the position and activities undertaken by a bank in the market. The terms “ALM unit” and “treasury unit”, can be confusing as they are often used by organizations who assign different responsibilities to them—this will be explained below. Successful ALM units create a properly aligned risk and return management process. The right mix between skills and risk appetite must be identified, expected outcomes of activities known and appropriate metrics established. The approach adopted needs to be aligned to the realities of the market the bank is operating within and its desired risk appetite.

5.1. Mismatch Management

The mismatch position of the balance sheet represents the interest rate and liquidity risk profile inherent. Assuming a single portfolio without hedges, a large and well diversified bank, with transactions weighted broadly across all market segments will find that its balance sheet will naturally take on countercyclical characteristics as the business environment consolidates through the economic cycle. This makes sense as the bank is effectively providing customers with solutions they are demanding as they operate in the external environment. The market itself will also provide limitations and one of the areas where this can manifest strongly is on the liability side of the balance sheet. Various techniques are used to examine the mismatch in a bank’s balance sheet and it can be a difficult process if not supported with adequate systems. Depending on the systems and analytical support the ALM process will undertake a number of analysis designed to identify; static and dynamic mismatch; sensitivity of net interest income; and, market value under multiple scenarios— including under high stress.

The majority of bank set net interest income (NII) limits as a main measure of performance with the more advanced banks also using market or economic value as a secondary measure. NII has become the industry benchmark simulation tools because; it is relatively easy to understand and implement; it’s a single period measure that does not require many assumptions, and; it is easy for investors to relate to because it is directly linked to reported financial results. On the negative side, it is limited as it does not provide a full view of the risks run by a bank or reflect fully the economic impact of interest rate movements. Market value or economic value simulations on the other hand, offer a more complete assessment of the risk being run but require significantly more detailed analysis which is out of reach of many banks at this point. The process require multiple assumptions that are difficult to form in some cases and is less intuitive and more difficult to understand. Not with standing the difficulties of the later, both metrics are important in the measurement and management of embedded risk in banks. In less developed ALM units, the time it takes to collect and analyse...
information can render much of it useless for active management as by the time it is available markets have moved making hedging ineffective.

Access to timely and accurate data is critical in support of any form of ALM activity.

5.2. Funds Transfer Pricing (FTP)

The funds transfer pricing system has become a fundamental ALM tool in a bank. It creates the ability to immunize business units from risk and provides the basis for economic and product transparency.

The process of FTP is designed to identify interest margins and remove interest rate and funding or liquidity risk. Looking at it from business unit perspective, it effectively locks in the margin on loans and deposits by assigning a transfer rate that reflects the repricing and cash flow profile of each balance sheet item – it is applied to both asset and liabilities. From the ALM unit’s perspective, it isolates business performance into discrete portfolios that can be assigned individualized metrics and facilitates the centralization and management of interest rate mismatches. A by-product is that it effectively allocates responsibilities between the organizational business units and the treasury department.

In more developed banks, the FTP mechanism can also be used as a tool to assist with management of the balance sheet structure with FTP rates adjusted to either encourage or discourage product and customer flows. The associated analytical process leads to greater understanding of a bank’s competitive advantage, assisting with asset allocation and protection of the franchise. Similarly, in smaller and/or less developed banks it is of equal value as both a management and strategy tool.

The method used by banks are generally consistent – FTP rates are structured to include both interest rate and funding liquidity risks with the derived transfer yield curve constructed to include appropriate premiums. Such premiums should capture all elements associated with the bank funding cost. These should include the cost of items such as; holding liquidity reserves; optionality costs, where pre-payment rights exist; term funding program cost; and, items such as basis risk.

5.3. Liquidity management

The main liquidity concern of the ALM unit is the funding liquidity risk embedded in the balance sheet. The funding of long term mortgages and other securitised assets with short-term liabilities (the maturity transformation process), has moved to centre stage with the contagion effect of the sub-prime debacle. Both industry and regulators failed to recognize the importance of funding created intrinsic flaws in the business model. Banks must assess the buoyancy of funding and liquidity sources through the ALM process.

Banks are in the business to maturity transformation to meet their customer’s requirements and these result in liquidity, interest rate and currency mismatches which need to be managed. ALM
units have traditionally analysed and „managed“ liquidity within pre set limits; however it is only the recent crises that have brought its true importance into focus. Failure to manage effectively can have dire result but the events of recent times demonstrated that liquidity impacts can be cataclysmic to a bank.

Like all areas of risk management, it is necessary to put a workable framework in place to manage liquidity risk. It needs to look two aspects:

1) managing liquidity under the business as usual scenario, and
2) managing liquidity under stress conditions

It also needs to include a number of liquidity measurement tools and establish limits against them. Some of tools that have become industry standard are shown in table 2.

<table>
<thead>
<tr>
<th>Static Funding Gap</th>
<th>Defines the short fall in maturing liabilities required to service maturing assets-it is usually calculated on a maturity bucket basis and is calculated as the net asset position over total liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Cash Flow Gap</td>
<td>This includes a measurement based on maturing assets and liabilities plus assumed marketable asset liquidation over a given period</td>
</tr>
<tr>
<td>Liquidity Asset Ratios</td>
<td>This is the ratio of liquid assets to total liabilities with liquids defined to include items such as cash and cash equivalents, trading account securities, repos investments into government securities, etc.</td>
</tr>
<tr>
<td>Concentration Ratios</td>
<td>This is an important ratio that reassures the funding from a particular source to assets/liabilities or capital</td>
</tr>
<tr>
<td>Liquidity Stress Management</td>
<td>A number of ratios can be examined here looking at multiple low stress and high stress scenarios</td>
</tr>
</tbody>
</table>

Source: Modified From GARP 2008 Best Practice Presentation

At the governance level, boards need to recognise liquidity risk as the ultimate killer. This means a board needs to clearly articulate the risk tolerance of the organization and subject the balance sheet to regular scrutiny. Guiding principles need to be included as part of this process. The following 5 principles are valuable:

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1. Diversify sources and term of funding - concentration and contagion were the killers in the recent crisis.

2. Identify, measure, monitor and control - it is still surprising that many banks do not fully understand the composition of their balance sheet to a sufficient level of detail to allow for management of the risks.

3. Understand the interaction between liquidity and other risks - e.g. basis risk - the flow on impact of an event in one area can be devastating to others.

4. Establish both tactical and strategic liquidity management platforms - keep a focus on both the forest and the trees.

5. Establish detailed contingency plans and stress test under multiple scenarios regularly

6. External Implications

6.1. New technologies

Large organizations that compete in rapidly evolving markets are held hostage to the out dated systems that run their business. The issue for risk managers is that most systems are unable to cope with the demands for clean, accurate and timely data used in the risk management analytical process. Fortunately, in recent years there has been recognition that technology can be a key competitive differentiator and superior systems are seen by the customer facing business units as the basis of competitive advantage. As a result there has been a substantial growth in proven off-the-shelf software and it exists for almost every industry application.

The risk management of complex portfolios would not be feasible without the availability of systems designed to provide information on a near real time basis. In developing and developed markets, banks are increasingly involving themselves in higher trading volumes, a broader range of products, and complex products that require increased risk management and controls. Specialised systems are essential to exercising risk oversight of all these activities. Table 3 below looks at these briefly.

Table 3 – Technology Success Factors

<table>
<thead>
<tr>
<th>Senior Level Commitment</th>
<th>There has to be a board level understanding and commitment to the technology initiative. Budgets need to be in place and there needs to be clarity about the challenges and difficulties in executing a program that spans the enterprise. The commitment needs to be well communicated down the line including expectation of divisional commitment and support necessary to get the job done. Too often, large projects fail because the extent of the work required was not well enough understood, communicated and committed to.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment with Strategic Direction</td>
<td>The technology initiative needs to be aligned with the strategic goals of the bank. While all banks require robust systems, not all need the same level of analysis. Smaller institutions that are less complex, and do not foresee substantial broadening of activity of transaction complexity, do not need to implement as complex and costly systems as a large diverse bank. Scalability is often touted by vendors as the answer to this; however, a bank needs to be certain of the appropriateness and cost implications of an intended solution.</td>
</tr>
</tbody>
</table>
### Appropriate Systems Architecture and Application Selection

It is desirable to establish a clear and defined systems architecture within which individual systems can be implemented. This ensures that costs are contained and the right level of support is devoted to ensuring inter-changeability of information and data. In today’s environment a bank of any size should complete a detailed diagnostic on its systems architecture and application portfolio and establish a road map which can be used to centre post development.

### Adequacy of Support and Resourcing

Adequate support needs to be given to each aspect. This does not just include the budget and reporting process. Professional project management methodologies are required and the structure needs to be resourced with qualified and competent business and technology people. The full stakeholder group needs to be identified and commitment enlisted where necessary.

Source: Independent Risk Consultants P/L

### 6.2. Human Resources

Competitive pressures have pushed costs for good people higher and higher over recent years with a focus on decomposing and disaggregating the business into components that can better analysed and managed. Unfortunately, the lessons learned from the recent crisis have highlighted the need to not just focus on the bits - there needs to be an understanding of the complex relationships and inter-relationships not only between the component parts of the bank, but also between those part and the external environment. A key failure in the risk management processes leading into the current crisis was the almost singular focus on the component parts of management and this gave participants a false sense of security as they were not seeing the potential contagion effects or systemic risk that was the ultimate fallout.

The implication for the people portfolio is significant. Although quantitative skills will remain very much in demand, there has been a realisation that experience and knowledge of markets and market behaviours is equally critical. The ability to understand and/or forecast the likely impact of a series of complex unrelated and interrelated events on the business environment is not simply a quantitative process that can be solved by algorithms that are becoming ever increasingly complex. There is a balance of qualitative factors that influence market outcomes. As a result there has been a shift within banks to locate individuals who can provide a depth of additional market based experience. With the realisation that markets will continue to provide events that will challenge the risk management practices of banks, the trend towards a more balanced business/quant people mix in risk management disciplines will continue.

### 7. Summary

The crisis that began with the subprime mortgages and has now become a global meltdown of markets, banks and other institutions should leave no doubt that effective risk management and
ALM in banks is not an optional function. All banks irrespective of size need to develop a strategy and implementation plan for both areas that is properly aligned to the individual banks strategy. Banks need to assess the fundamentals of their own operations and environment to do this - there is no one solution or size that fits all.

A practical starting point is to construct a framework for risk management considering the detail of the business activities the bank is involved in, analysing and ranking the risks involved in the various businesses and deciding how much risk the bank should take. While the ‘headline’ categories in the risk management framework will be similar for all banks, the needs in both analysis and management will vary considerably for banks of different sizes and operating in markets of different stages of development. The program to build effective risk management in a bank must be sponsored and overseen by the highest levels of the bank and governance and oversight structures established and embedded in the organizational fabric. This commitment needs to be backed up with a range of additional commitments to ensure budget, technology and people resources are sufficient to execute the implementation plans.

A final, critical point to note is that risk management and ALM are not static activities. Both continue to evolve and new aspects are presented that challenge the organizations capacity. Regular board oversight together with a periodic and detailed review process has to be built into the framework to ensure focus remains appropriate and relevant.

REFERENCES

Abstract

ALM strategy is made in the eighties as a response to dynamic changes in the environment and financial markets aimed at optimizing the relationship of liabilities and assets. Banks had to design their strategies to achieve a high degree of adaptability to long-term development and change, in terms of speed of methods and sources and investments. This strategy allows the management of the bank, starting from balance sheet items and their estimated risk rank, to implement an active policy of structuring the assets and liabilities of the bank. The aim of this strategy is to minimize credit risk, interest rate risk, and other types of banking risks arising from its business. The organizational aspects of the strategy are the responsibility of the ALCO (Asset and Liability Committee), the governing body composed of directors and top managers.

Keywords: Customer relationship management assets-liabilities, credit risk, liquidity risk, market risk, Duration Analysis, Gap Management.