

# Why credit portfolio management?

## Introduction

This chapter focuses on the importance of credit portfolio management to commercial banks. (This is not to downplay its relevance to other investors. Their perspective is addressed in Part III, which looks at the impact of new credit instruments and technology on insurers, funds and private clients.) Portfolio management is of crucial significance to commercial banks because of the central role they fulfil as credit providers in both the cash and derivative markets. They are active investors, traders and underwriters in all sectors of the credit market, and are key providers of capital to retail clients, small businesses and the corporate sector. Despite this, they have often been poor managers of risk. Credit portfolio management has become a matter of central importance for commercial banks in allowing them to measure their exposures and hedge portfolio risk. There are a number of convergent trends that are driving credit portfolio management:

- stock market pressures on banks to improve their performance;
- availability of models to assess risk;
- regulatory changes – Basel II;
- accounting standards leading to requirement for mark-to-market prices;
- alignment of internal and external ratings; and
- increased scrutiny from regulators (eg, the UK FSA's focus on credit risk across all institutions under its control).

Who benefits from credit portfolio management? Banks have traditionally been the principal credit intermediaries and consequently have the highest exposures. They are also the main beneficiaries of improved credit management techniques. Other institutions are now increasingly involved in the credit markets and they need to adopt a consistent, rigorous risk management platform if they are to avoid some of the problems experienced by banks. Regulators are applying increasingly sophisticated measures in analysing portfolios.

Credit portfolio management aims to increase efficiency and returns by:

- identifying credit concentrations;
- calculating the exposure arising from those risks;
- assisting management in allocating economic capital to internal businesses;
- identifying the marginal contribution that a particular credit adds to risk and what return compensates the institution for it; and
- deciding which assets to hedge, sell or securitise.

## Bank credit losses and inefficiencies

The banking industry has been through a process of dramatic change over the past two decades. A number of factors have contributed to this: the globalisation of financial markets; deregulation within national markets; competition from non-bank entities for retail funds; intense competition in wholesale lending markets; application of new technologies such as the internet; the growth of the securities markets and the corresponding diminution of direct lending; and extreme volatility in rates and financial markets in general.

The response to these changes in established business patterns and far greater competition has led, in general, to the assumption of substantially higher levels of risk by banks. There are numerous examples of commercial banks taking quite significant losses in their credit portfolios due to concentrations of risk, either by geography or by industry. Frequently these problems arise because of regional lending patterns. In some cases this follows relationship patterns that override prudent lending strategies. Examples abound: the LDC (less-developed country) debt crisis in Latin America and Eastern Europe in the 1980s; Texan banks lending to local oil companies; Japanese banks extending credit to members of a *keiretsu*; European banks financing projects under the influence of state or local government shareholders; and croney capitalism in Asia – lending to friends. In other cases there may be an attempt by management to buy market share in a particular industry. In the late 1980s there was a flood of capital into the UK commercial property market, much of which was financed by international banks. Loans outstanding to UK property companies rose from £7.7 billion in 1986 to over £40 billion in 1991. Asset values subsequently declined steeply and the prevalence of over-leverage by certain companies led to record write-offs by the banking sector.

Other factors are also at work. There may be limited resources – a shortage of skills means that many banks cannot cover all sectors and therefore stick to familiar markets. Competition has reduced core banking groups and pushed smaller banks out of large corporate syndicates. There has also been a tendency for larger corporate borrowers to access capital markets directly (disintermediation), which pushes prices down. Loans were often treated as loss-leaders and priced at uneconomic levels. Banks increased individual loan exposures to sub-optimal levels with the illusion of generating profitable fee business in other areas, such as foreign exchange, derivatives or advisory. These additional sources of revenue did not always materialise.

One result of these changes has been a wave of mergers and consolidation: HSBC and Midland; Royal Bank of Scotland and NatWest; Mitsubishi Bank and the Bank of Tokyo; Chase Manhattan, Chemical, Manufacturers Hanover and JP Morgan, to name but a few. The joining of such large portfolios of assets under a new umbrella has also accentuated the need to review portfolios and adjust credit exposures to diversify. This in turn has focused banks' attention on ways to centralise technology so that an overview of risk may be obtained. In order to achieve this management need appropriate data capture, sophisticated models to analyse the portfolio and a clear understanding of the mechanisms available to manage credit risk (collateralised loan obligations (CLOs), credit derivatives, loan trading). This technology only became available from the late 1990s, when credit modelling was sufficiently developed and markets such as securitisation and credit derivatives achieved adequate liquidity.

There has therefore been a dramatic shift in the way banks run their portfolios. In the old order credit was not a tradable asset class. Banks lent money and retained credit risk on the

balance sheet. This led to concentrations and an absence of market prices. The result was that banks became vulnerable, particularly during economic slowdowns. In the new order credit is a tradable asset class. Banks arrange and transfer credit risk, and increasingly use off-balance-sheet tools to create better diversification and market prices. The result is banks becoming more resilient and better able to survive economic downturns.

Despite these positive developments, some institutions struggle to negotiate even the basic hurdles to success. Lack of centralised management controls, an absence of basic data acquisition and low skill levels may prevent many banks from taking advantage of these developments. However, the consequences are likely to be more severe, for a number of reasons discussed below.

### **Performance measures: RAROC and ROE**

Shareholders have become accustomed to the cycle of feast and famine in banking, and are now adopting an increasingly critical approach, differentiating between banks with strong internal risk controls and weaker entities with poor risk–return profiles. Banking is no longer regarded as a stable, low-risk business. Equity markets judge financial institutions on shareholder value. The key drivers of superior value creation are profitability and a sustainable growth strategy. The equity markets expect management to achieve superior returns not only during bull markets but also during economic downturns. This implies that management have a clear strategy to manage and protect their downside risk. Unexpected ‘black holes’ in the loan book result in very adverse share performance. Basel II encourages more disclosure of risk modelling.

Portfolio management is a means of reducing the equity risk premium and achieving a lower cost of capital. However, credit portfolio management requires more than just lip service from management. Because it cuts across traditional fiefdoms and business units, it requires management to take a more radical approach to their business. (Organisational issues relating to implementation are discussed in Chapter 7 where these pitfalls are examined in detail.)

Capital allocation within banks is not fully developed, but more banks are attempting to use models to allocate capital from the centre according to the relative efficiency of each business unit. In theory the centre should measure performance and risk in each separate unit, and allocate capital accordingly. Banks are now increasingly using risk-adjusted performance measures such as RAROC to evaluate businesses. RAROC is defined as:

$$\text{Return} - \text{Cost} - \text{Expected Loss/Allocated Economic Capital}$$

(See Exhibit 2.1.)

Economic capital is an important concept in credit portfolio management, and an important tool in measuring and managing business risks. Economic capital is internal equity and provides a sound theoretical basis to calculate risk because it reflects the fact that credit returns are not normal. Banks typically seek to estimate the amount of economic capital using credit models whose key output is the probability density function of credit losses.

In Exhibit 2.2 the shaded area beyond X is the probability of losses exceeding a given amount (X). The left-hand line represents the expected portfolio credit loss. Expected losses can be anticipated. This amount should be covered by provisions or reserves, but there is volatility, as credit losses are not constant across the economic cycle (see Exhibit 2.3). Unexpected credit

Exhibit 2.1

**RAROC defined**

RAROC = Risk-adjusted return/Risk-adjusted capital

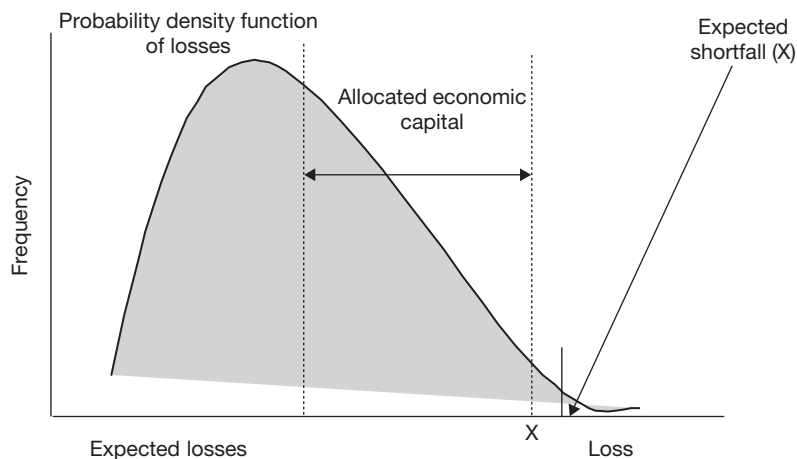
$$= \frac{\begin{matrix} \text{Revenues} \\ - \text{Expenses} \\ - \text{Expected losses} \\ + \text{Return on economic capital} \\ + / - \text{Transfer values/prices} \end{matrix}}{\begin{matrix} \text{Capital:} \\ \text{Capital reserved to cover worst case} \\ \text{losses} - \text{expected loss to a defined} \\ \text{confidence threshold} \end{matrix}}$$

Source: Author's own.

loss is defined as the amount by which actual losses exceed the expected credit loss. Credit models quantify the volatility. This is expressed in terms of a number of standard deviations or the difference between the expected credit loss and a target credit loss quantile. The economic capital required to support the credit business is determined by reference to some given confidence level – that is, the probability of unexpected credit losses exhausting economic capital is less than a given percentage or a given absolute amount. The longer and fatter the tail, the more risky the distribution is. Banks usually have a target for economic capital that is linked to their rating and in all likelihood exceeds the minimum level given by the regulators.

Exhibit 2.2

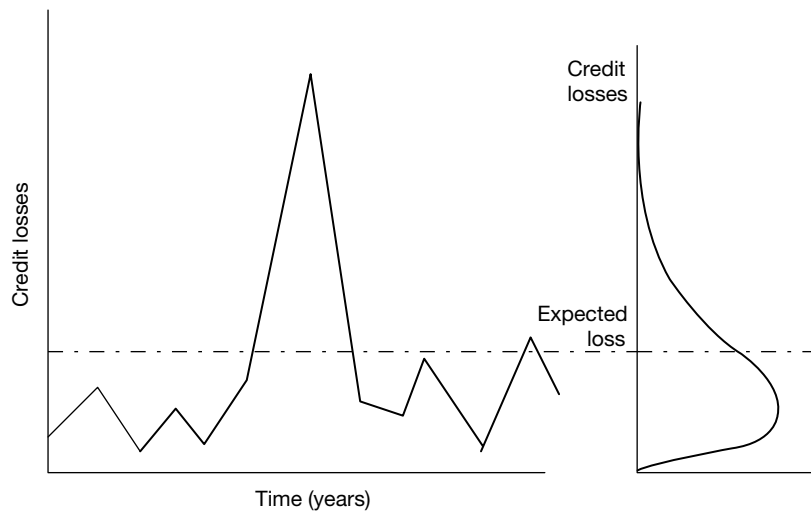
**Loss allocation**



Note: Economic capital = VaR (X) – Expected loss;  
 VaR = The value at risk at a particular confidence interval;  
 Expected shortfall is the average loss conditional on the loss being above the VaR level.

Source: Author's own.

Exhibit 2.3

**Expected and unexpected loss**

Source: Author's own.

Volatility of portfolio loss is driven by two factors: concentration and correlation. Concentration describes the lumpiness of the portfolio (specific risk); correlation describes the sensitivity of the portfolio to changes in underlying macroeconomic factors (systematic risk).

There are many competing measures of internal business performance used by banks that attempt to measure risk. RAROC has become one of the most widely accepted from an economic perspective. It is distinctive because it explicitly uses economic capital as a measure of risk. The philosophy behind RAROC is simple: the cost of risk is the expected loss and the capital charge. Because expected losses can be anticipated, they should be regarded as a cost of doing business and not as a financial risk. To get adequately paid for expected losses banks must levy a risk charge that reflects the historical charge-off behaviour of discrete loan segments directly in the loan price. Another charge that must be incorporated is the cost of capital needed to protect the bank against the risk of unexpected loss. In order to get paid for unexpected loss banks need to know how much economic capital the deal requires.

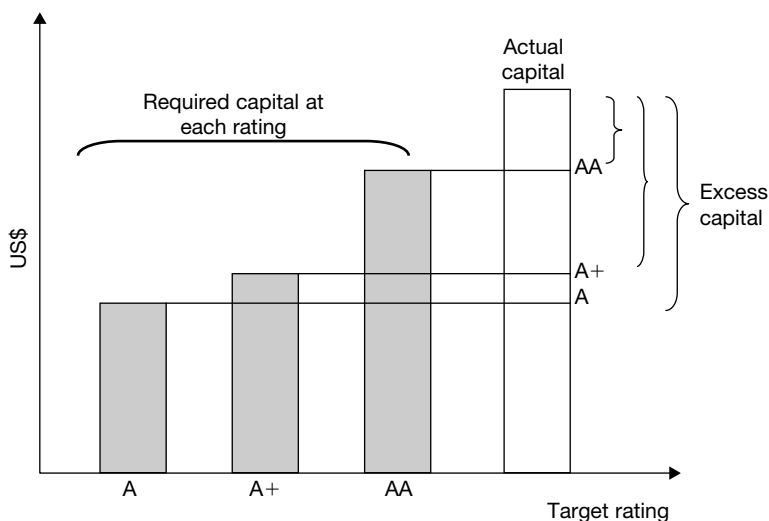
RAROC is typically used as a tool to choose between competing internal projects in terms of cost and the amount of allocated economic capital. RAROC is of great importance in financial institutions (banks or insurance companies) because capital is required to support risk, and risk is conceptually more difficult to define and quantify. In industrial organisations capital is relatively easy to grasp because it is largely used to finance plant and equipment. RAROC should identify where capital is being employed and whether value is being created or destroyed.

RAROC is a tool to help senior management to maximise shareholder value in addressing key strategic issues:

- the overall level of capital required to support the business risks;
- whether the group is over or undercapitalised;

Exhibit 2.4

**RAROC and capital adequacy**



Source: Author's own.

- whether individual businesses are creating or destroying value;
- growth opportunities within the group; and
- how to manage the business in line with regulatory and rating agency capital guidelines (see Exhibit 2.4).

RAROC works most effectively in a framework of firmwide risk management where an entity has a comprehensive view of all risks, and models and procedures in place to measure and manage them. The difficulty with this approach is whether financial institutions have the necessary sophistication to measure all risks affecting the firm's performance and whether these can be aggregated at the enterprise level. If they can, they may use RAROC as a strategic tool in allocating capital to growing businesses or in pulling out of those where returns are unsatisfactory.

The various risks facing a bank are summarised in Exhibit 2.5.

Assuming that these risks are not perfectly correlated, their combination should produce diversification benefits. While advances in risk analytics and regulatory trends have made the measurement of market and credit risk feasible, other risks, such as operational risk, are characterised by less consensus.

RAROC can also be used as a tactical tool in assessing individual transactions, such as the decision to approve or reject a new loan, by setting specific hurdles. To make it a tactical tool a bank must be able to look at the marginal contribution to risk at the individual loan or facility level: the difference in portfolio risk (for example portfolio unexpected loss) before and after inclusion of a given exposure. There is no single correct answer to calculating marginal contributions and allocation of economic capital to various facilities varies.

This technology could allow a bank to select among competing assets and pick out those with the most attractive risk-adjusted returns. Similarly, it is also possible to use RAROC as a means of measuring risk reduction in asset transfer by calculating the ratio of return reduction

Exhibit 2.5

**Risks facing a bank**

<i>Risk</i>	<i>Exposures</i>	<i>Distribution</i>
Credit	<ul style="list-style-type: none"> <li>• Loans</li> <li>• Credit lines</li> <li>• Contingent liabilities</li> <li>• Corporate bonds</li> </ul>	<ul style="list-style-type: none"> <li>• Skewed with low frequency but high loss severity</li> </ul>
Market	<ul style="list-style-type: none"> <li>• Rates</li> <li>• Fixed interest bonds</li> <li>• Foreign exchange</li> <li>• Equities</li> </ul>	<ul style="list-style-type: none"> <li>• Normally distributed returns, lognormal asset prices with fat tails</li> </ul>
Operational	<ul style="list-style-type: none"> <li>• Fraud</li> <li>• System failure</li> <li>• Unintended error</li> </ul>	<ul style="list-style-type: none"> <li>• Poisson events, exponentially-distributed severity</li> </ul>
Business	<ul style="list-style-type: none"> <li>• Decline in margins</li> <li>• Decline in volumes</li> </ul>	<ul style="list-style-type: none"> <li>• Normal</li> </ul>

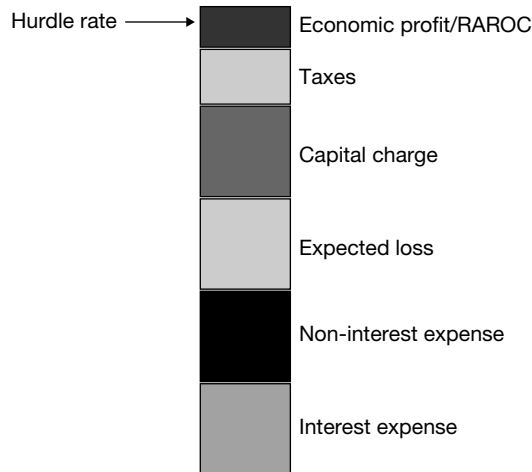
Source: Author's own.

and associated transaction costs by the amount of economic capital reduction. RAROC is a means of measuring return per unit of risk. The hurdle rate is the net margin after all costs (risk, funding, non-interest allocation, taxes) and equals the institution's required rate of return taking into consideration the economic capital needed to support the exposure (see Exhibit 2.6.)

What are the alternatives to RAROC? The simplest and most obvious yardstick measure for a bank on an individual transaction is return on regulatory capital. In most cases this looks at the 4 per cent Tier 1 requirement as a proxy for Return on Equity (ROE). This does not explicitly include costs, expected losses or transfer pricing. Furthermore, it uses regulatory capital as the denominator, which in most cases does not correspond to the true level of capital necessary to cover the risk. Economic Value Added (EVA) is also a risk-sensitive performance measure. In this measure the cost of capital in dollars is subtracted from the expected dollar return on a given portfolio, with a higher number indicating superior performance. The figure used to calculate capital may be value at risk and the opportunity cost is the estimated cost of equity capital. The product of the two is the dollar cost of capital for the portfolio. Being an absolute measure rather than a ratio, this may be a

Exhibit 2.6

**Economic profit**



Source: Author's own.

a better means of comparing the contribution made by portfolios of different sizes. RAROC is another variant that uses the expected return (unadjusted for risk) in the numerator and a value-at-risk figure in the denominator.

There are various criticisms levelled at RAROC.

## BACKGROUND AND MOTIVATION

- It relies upon historical risk data.
- It is difficult to factor in the value of a long-term business relationship.
- The allocation of costs is often cumbersome.
- Positive RAROC figures can be misleading. Asset management businesses often appear in a favourable light in RAROC because it is assumed that the only risk is operating risk. However, since the fees earned are in proportion to asset volumes, a market decline may cause asset and fee reduction – there is market exposure to the underlying funds.
- It may be difficult to establish how market risk and operational risk interact at the overall business level when trying to produce enterprise-wide RAROC numbers.

## Basel II and its implications

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