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*From Risk Measurement Models
to Capital Allocation Policies*

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Risk Management and Shareholders' Value in Banking

**From Risk Measurement Models
to Capital Allocation Policies**

Andrea Resti and Andrea Sironi



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Foreword

Risk Management and Shareholders' Value in Banking is quite simply the best written and most comprehensive modern book that combines all of the major risk areas that impact bank performance. The authors, Andrea Resti and Andrea Sironi of Bocconi University in Milan are well known internationally for their commitment to and knowledge of risk management and its application to financial institutions. Personally, I have observed their maturation into world class researchers, teachers and consultants since I first met Sironi in 1992 (when he was a visiting scholar at the NYU Salomon Center) and Resti (when, a few years later, he was on the same program as I at the Italian Financial Institution Deposit Insurance Organization (FITD)). This book is both rigorous and easily understandable and will be attractive to scholars and practitioners alike.

It is interesting to note that the authors' knowledge of risk management paralleled the transformation of the Italian Banking System from a relatively parochial and unsophisticated system, based on relationship banking and cultural norms, to one that rivals the most sophisticated in the world today based on modern value at risk (VaR) principles. In a sense, the authors and their surroundings grew-up together.

Perhaps the major motivations to the modern treatment of risk management in banking were the regulatory efforts of the BIS in the mid-to-late 1990's – first with respect to market risk in 1995 and then dealing with credit risk, and to a lesser extent operational risk, in 1999 with the presentation of the initial version of Basel II. These three elements of risk management in banking form the core of the book's focus. But, perhaps the greatest contribution of the book is the discussion of the interactions of these elements and how they should impact capital allocation decisions of financial institutions. As such, the book attempts to fit its subject matter into a modern corporation finance framework – namely the maximization of shareholder wealth.

Not surprisingly, my favorite part of the book is the treatment of credit risk and my favorite chapter is the one on "Portfolio Models" within the discussion of "Credit Risk" (Chapter 14 in Part III of the book). As an introduction to these sophisticated, yet controversial models, the authors distinguish between expected and unexpected loss – both in their relationships to estimation procedures and to their relevance to equity valuation, i.e., the concept of economic capital in the case of unexpected loss. While there are many structures discussed to tackle the portfolio problem, it is ironic that despite its importance, the Basel Committee, in its Basel II guidelines, does not permit banks to adjust their regulatory capital based on this seemingly intuitively logical concept. Perhaps the major conceptual reason is that the metric for measuring correlations between credit risks

of different assets in the portfolio is still approached by different theories and measures. Is it the co-movement of firm's equity values which presumably subsumes both macro and industry factors as well as individual factors, or is it the default risk correlation as measured by the bimodal or continuous credit migration result at the appropriate horizon. Or, is it simply the result of a simulation of all of these factors.

While the use of market equity values is simply impossible in many countries and for the vast majority of non-publicly traded companies worldwide, perhaps the major impediment is the difficulty in back-testing these models (as the authors point out) and the fact that banks simply do not make decisions on individual investments based on portfolio guidelines (except in the most general way and by exception, e.g., industry or geographical limits). In any event, the portfolio management of the banks' credit policies remains a fertile area for research.

It is understandable, yet still a bit frustrating, that the operations risk area only receives minor treatment in this book (two chapters). The paradox is that we simply do not know a great deal about this area, at least not in a modern, measurable and modelable way, yet operational problems, particularly human decisions or failures, are probably the leading causes of bank failure crises, and will continue to be.

In summary, I really enjoyed this book and I believe it is the most comprehensive and instructive risk management book available today.

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Motivation and Scope of this Book: A Quick Guided Tour

Banks operating in the main developed countries have been exposed, since the Seventies, to four significant drivers of change, mutually interconnected and mutually reinforcing.

The first one is a stronger integration among national financial markets (such as stock markets and markets for interest rates and FX rates) which made it easier, for economic shocks, to spread across national boundaries. Such an increased integration has made some financial institutions more prone to crises, sometimes even to default, as their management proved unable to improve their response times by implementing adequate systems for risk measurement and control.

A second trend of change is “disintermediation”, which saw savers moving from bank deposits to more profitable investment opportunities, and non-financial companies turning directly to the capital markets to raise new debt and equity capital. This caused banks to shift their focus from the traditional business of deposits and loans to new forms of financial intermediation, where new risks had to be faced and understood. Such a shift, as well as a number of changes in the regulatory framework, has undoubtedly blurred the traditional boundaries between banks and other classes of financial institutions. As a result, different types of financial intermediaries may now be investing in similar assets, exposing themselves to similar risk sources.

A third, significant trend is the supervisors’ growing interest in capital adequacy schemes, that is, in supervisory practices that aim at verifying that each bank’s capital be enough to absorb risks, in order to ensure the stability of the whole financial system. Capital-adequacy schemes have by now almost totally replaced traditional supervisory approaches based on direct controls on markets and intermediaries (e.g., limiting the banks’ geographic and functional scope of operation) and require banks to develop a thorough and comprehensive understanding of the risks they are facing.

Finally, the liberalisation of international capital flows has led to sharper competition among institutions based in different countries to attract business and investments, as well as to an increase in the average cost of equity capital, as the latter has become a key factor in bank management. This increasing shareholders’ awareness has been accompanied and favoured, at least in continental Europe, by a wave of bank privatisations which, while being sometimes dictated by public budget constraints, have brought in a new class of shareholders, more aware about the returns on their investments, and thereby increased managerial efficiency. This has made the banking business more similar to other forms of

entrepreneurship, where a key management goal is the creation of adequate shareholders' returns. Old, protected national markets, where bank management could pursue size targets and other "private" objectives, has given way to a more competitive, international market arena, where equity capital must be suitably rewarded, that is, where shareholders' value must be created.

The four above-mentioned drivers look closely interwoven, both in their causes and consequences. Higher financial integration, disintermediation and the convergence among different financial intermediation models, capital adequacy-based regulatory schemes and an increased mobility/awareness in bank equity investors: all these facts have strongly emphasised the relevance of risk and the ability of bank managers to create value for their shareholders..

Accordingly, the top management of banks – just like the management of any other company – needs to increase profitability in order to meet the expectations of their shareholders, which are now much more skilled and careful in measuring their investment's performance.

Bank management may therefore get caught in a sort of "targets' dilemma": increasing capital profitability requires to rise profits, which in turn calls for new businesses and new risks to be embraced. However such an expansion, due to both economic and regulatory reasons, needs to be supported by more capital, which in turn calls for higher profitability.

In the short term, such a dilemma may be solved by increasing per-dollar profits through slashing operating expenses and raising operational efficiency. In the long term, however, it requires that the risk-adjusted profitability of the bank's different businesses be carefully assessed and optimised.

Such a strategy hinges on three key tools.

The first one is an effective risk measurement and management system: the bank must be able to identify, measure, control and above all price all the risks taken aboard, more or less consciously, in and off its balance sheet. This is crucial not only to the bank's profitability, but also to its solvency and future survival, as bank crises always arise from an inappropriate identification, measurement, pricing or control of risks.

The second key tool is an effective capital allocation process, through which shareholders' capital is allotted to the different risk-taking units within the bank, according to the amount of risks that each of them is allowed to generate, and consequently must reward. Note that, according to this approach, bank capital plays a pivotal role not just in the supervisors' eyes (as a cushion protecting creditors and ensuring systemic stability), but also from the managers' perspective: indeed capital, being a scarce and expensive resource, needs to be optimally allocated across all the bank's business units to maximise its rate of return. Ideally, this should be achieved by developing, inside the bank, a sort of "internal capital market" where business units compete for capital (to increase their risk-taking capacity), by committing themselves to higher return targets.

The third key tool, directly linked to the other two, is organisation: a set of processes, measures, mechanisms that help the different units of the bank to share the same value-creation framework. This means that the rules for risk measurement, management and capital allocation must be clear, transparent, as well as totally shared and understood by the bank's managers, as well as by its board of directors. An efficient organisation is indeed a necessary condition for the whole value creation strategy to deliver the expected results.

This book presents an integrated scheme for risk measurement, capital management and value creation that is consistent with the strategy outlined above, as well as with

the four drivers surveyed at the outset of this preface. Moving from the definition of the measurement criteria for the main risk types to which a bank is exposed, we aim at defining the criteria for an effective capital allocation process and the management rules that should support a corporate policy aimed at maximizing shareholders' value creation.

This will be based on three logical steps: in the first step (Parts I–IV), individual risks are defined and measured. This makes it possible to assess the amount of capital absorbed by the risks generated by the different business units within a bank. Also, this enables the bank to price its products correctly (where it is free to set their price), or at least to estimate their risk-adjusted profitability (where the price is fixed by the market). Note that, while risk can be defined, in very general terms, as an unexpected change in the value of the bank or of its profits, different classes of risk exist which refer to different uncertainty sources ("risk factors"); therefore, different models and approaches will be needed, in order to get a comprehensive picture of the risks to which the bank is exposed.

In the second step (Part V), external regulatory constraints, in the form of minimum capital requirements, must be analyzed, in order to take into account their implications for the overall risk and capital management process.

The third step (Part VI) requires: (i) setting the total amount of capital that the bank needs to hold, based on the risks it is facing; (ii) fine-tuning its composition taking profit of hybrid instruments such as subordinated debt; (iii) estimating the "fair" return that shareholders are likely to expect on equity capital; (iv) finally, comparing actual profits to the "fair" cost of capital in order to assess the value creation capacity of the bank.

More specifically, the six parts of this book will cover the following topics (see also Figure 1).

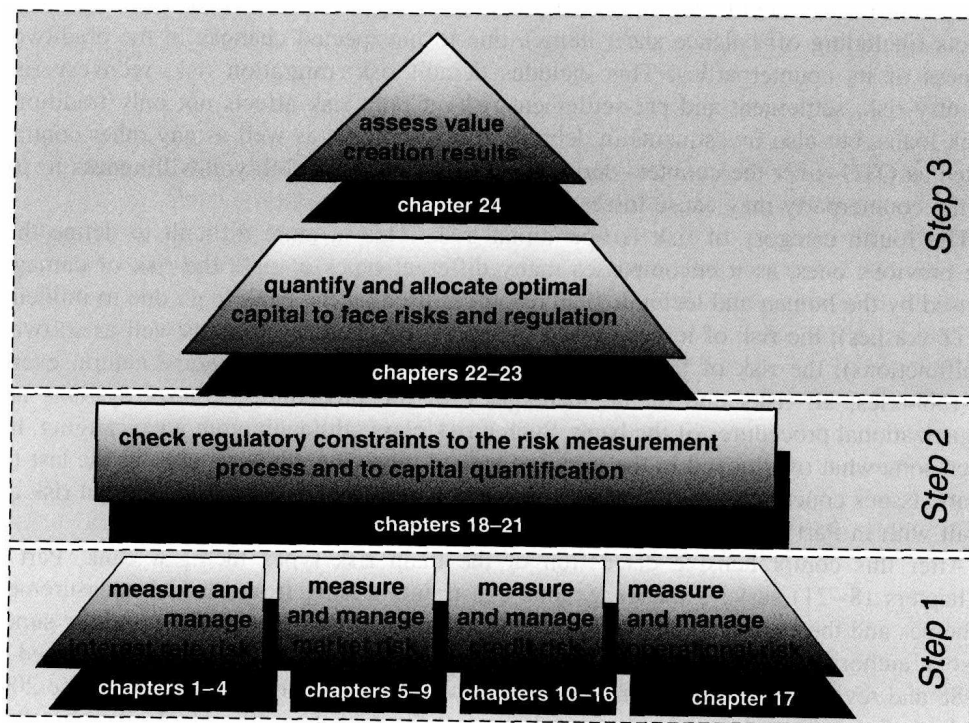


Figure 1 Plan of the book

Parts I–IV will deal with the main classes of risks that affect a bank's profitability and solvency. The first one is interest rate risk (Part I, Chapters 1–4), arising from the different maturity structure of the banks' traditional assets and liabilities (the so-called "banking book"). The models and approaches developed by academics and practitioners to tackle this type of risk have evolved significantly and can now be used to gain an accurate and comprehensive assessment of the effects that unexpected changes in the level of market interest rates produce on the net value of the bank, as well as on its profits.

The second category of risks (Part II, Chapters 5–9) revolves around market risk, that is, the risk of a decrease in the value of the bank's net investments, due to unexpected changes in market prices (such as FX rates, stock and commodities prices). Unlike the models for interest rate risk discussed in Part I, which are applied across the whole spectrum of the bank's assets and liabilities, the measurement and management of market risk usually focuses on a limited portion of the bank's balance sheet, that is, the set of investments (including short positions and derivatives) aimed at producing trading profits in the short-term, and therefore called "trading book". Note that the factors creating market risk also include the price of traded bills and bonds, which in turn depends on the level of interest rates; therefore, interest rate risk, when producing changes in the value of the bank's trading book, can also be considered part of market risk. Similarly, if a secondary market for corporate bonds exists, where credit spreads are priced, reflecting the issuer's creditworthiness, then the risk of an increase in market spreads, although it pertains to credit risk and therefore, which is addressed specifically in Part III, can also be seen as a specific type of market risk.

The third risk class faced by a bank (Part III, Chapters 10–16), and probably the most significant one, is credit risk, that is, the risk of changes in the fair value of the bank's assets (including off-balance sheet items), due to unexpected changes in the creditworthiness of its counterparties. This includes default risk, migration risk, recovery risk, country risk, settlement and pre-settlement risks. Credit risk affects not only traditional bank loans, but also investments in debt securities (bonds), as well as any other contract (such as OTC—over the counter—derivatives) in which the inability/unwillingness to pay of the counterparty may cause losses to the bank.

The fourth category of risk is operational risk. This is more difficult to define than the previous ones, as it encompasses many different types of risk: the risk of damages caused by the human and technological resources used by the bank (e.g., due to infidelity or IT crashes); the risk of losses caused by errors (e.g. human errors as well as software malfunctions); the risk of fraud and electronic theft; the risk of adverse natural events or robberies; all risks due to the inadequacy of the procedures, control systems and organizational procedures of the bank. Such a risk class, although quite wide-ranging, has been somewhat overlooked in the past and started receiving attention only in the last ten years. Issues concerning the definition, measurement, management of operational risk are dealt with in Part IV (Chapter 17).

After this comprehensive discussion of the main risk types facing a bank, Part V (Chapters 18–21) surveys the exogenous constraints arising from the risk-measurement schemes and the minimum capital requirements imposed by the regulation and the supervisory authorities. Special emphasis is given to the Basel Capital Accord approved in 1988 and revised subsequently in 1996 and 2004. The logic and implications of the 2004 update of the Accord will be discussed carefully in Chapters 20 and 21, showing how the new rules, while imposing a regulatory constraint on banks, also provide them with

a robust conceptual scheme through which their risks (especially credit and operational risk) can be understood, measured and managed.

Part VI of the book relates to capital management and value creation. Chapter 22 will show how the optimal amount of capital for a bank can be quantified, taking into account both economic capital (that is, the capital required to cover risks discussed in Parts I–IV) and regulatory capital (that is, the minimal capital imposed by the Basel rules). Chapter 23 will discuss techniques for allocating capital to the different business units inside the bank (such as the credit department, the asset management unit, the treasury and so on), taking into account the benefits of diversification, and how risk-adjusted performance measures can be computed, to assess the true level of profitability of the different units. Finally, Chapter 24, after showing how to estimate the “fair” level of profits that the bank’s shareholders can reasonably expect, will focus on tools (such as Raroc and Eva) that enable the top management to estimate the value margins created (or destroyed) by the bank, both in the short run and in a medium-term perspective.

Although some of the models and algorithms described in Parts I–IV (as well as the regulatory schemes presented in Part V) may sometimes look rather technical in nature, the reader should keep in mind that a proper understanding of these techniques is required, in order to fully assess the correctness and reliability of the value-creation metrics discussed in the last Part of the book. In a word, risk management and regulation are too serious to be left totally to...risk managers and regulators. A full and critical awareness of these instruments, as well as a constant and sharp commitment to their enterprise-wide implementation, is required directly from the bank’s top management, in order for the value-creation paradigm to be deployed safely and consistently.

In order to help the reader understand the more technical concepts presented in the book, many numerical examples and exercises are included in each chapter. Most of them (indicated by a symbol like the one on the right) are replicated and solved in the excel files found on the book’s website (www.wiley.com/go/rmsv/). Answers to end-of-chapter questions, errata and other materials may also be found on this companion site.



Finally, we would like to thank our wives for their patience and kind support during the months spent on this book. We will also be grateful to all readers that will provide us with comments and advice on this first edition.

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