



MANAGING BANK RISK

An Introduction to
Broad-Base Credit Engineering

MORTON GLANTZ

With Contributions by Moody's-KMV and Johnathan Mun

Foreword by Jeffrey R. Bohn



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FOREWORD

The new economy did not arrive in the way some pundits predicted at the end of the last century. Instead of perpetual economic growth and the death of business cycles, we are in the midst of rapidly evolving markets and rapidly changing corporate structures. It is the pace at which companies appear and disappear that marks our new economy. However, many of the old economic problems remain: the correlation of corporate failures rises during the worst of economic times; financial institutions periodically face crises; and borrowers of all sizes fail to meet their obligations.

Over a decade ago, the Basel committee produced guidelines for determining bank regulatory capital. The objective of this accord was to level the global playing field for financial institutions and protect us all against systemic risk in the financial system. As markets evolved, the accord became irrelevant. An army of investment-banking professionals regularly create collateralized structures designed to circumvent regulatory capital requirements. A bank may find itself with too much exposure to a particular class of assets not paying the kind of returns needed to justify the regulatory capital allocated to these assets. A collateralized loan obligation (CLO) is the answer. The assets are placed in the CLO

and presto, the regulatory capital requirement disappears. Oddly enough, most of these deals are done in a way so that the bank continues to hold the equity piece of the CLO—effectively retaining the credit risk on the assets. All that has happened is the assets are moved off the bank's balance sheet; the bank continues to hold the credit risk. In fact, the current accord when not circumvented, distorts lending behavior (e.g. lending to a AAA reinsurer requires more regulatory capital than lending to a sub-investment grade OECD bank.)

Over time, regulators have figured out the Basel accord needs to be substantially revamped. In recent years, arduous debates over how best to regulate financial institutions has hampered the release of a new accord. The markets, however, are not waiting for Basel. Financial institutions continue to build portfolios and periodically fail. In the case of Japan, an entire financial system sits on the brink of collapse. Technology and deregulation have enabled non-bank financial institutions to enter the credit markets in unprecedented ways. The result is a constellation of credit instruments ranging from credit sensitive notes to credit default swaps.

In the midst of these tumultuous times, Professor Glantz's book fills an expanding void around understanding practical implementation of new and more efficient credit portfolio engineering. Historically, banks held a near monopoly on the provision of credit. The opaque nature of the dealer-controlled markets in corporate bonds has hampered the development of liquidly traded debt markets. The world is changing. The internet has given birth to an assortment of credit exchanges. Theories once relegated to academia have facilitated rigorous modeling of credit instruments. Active management of credit portfolios has become the mantra of bankers and regulators, alike. New market participants ranging from large asset managers to CFOs managing account receivable portfolios portend a global market for credit where risk can be more sensibly managed. Market data and credit models become much more important in this new environment. This book provides the context for understanding these issues.

At one time a bank loan officer only had to track the fortunes of a handful of large, well known companies. The skills needed for this kind of analysis centered on understanding the qualitative aspects of a business. While fundamental analysis continues to have a place in understanding an obligor's credit quality, the nature of the credit business has changed. Narrowly focused, simplistic stand-alone credit analysis is no longer enough. To stay competitive, financial institutions must look to more sources of information and adapt sophisticated tools: cash flow computer modeling, time series / regression, simulation analytics, stochastic optimization, and interactive credit risk rating systems, to name a few. And information sources should cover the entire spectrum of obligors—not just the large, higher quality firms. In fact, portfolios of many small, risky companies may be safer than similarly sized portfolios of a few large, safe companies. This conclusion is not always intuitive or easily discerned. Portfolio analytics are needed to compare these two very different kinds of portfolios. This book will introduce you to these analytics.

Market-observable data are playing an increasingly important role in credit modeling. Equity-based measures of default probability such as the EDFTM credit measure developed by KMV can provide a framework to leverage credit analysts already doing fundamental analysis. Equity data provides a means to develop a forward-looking view of a company's credit risk. While lenders and credit analysts may have access to private information on a company, these private data are sometimes misleading and it is not always clear how to compare data across companies. Rigorous models of credit can be used to place all information in a common framework facilitating more meaningful comparisons across a large universe of obligors.

Debt markets also provide forward-looking and objective data. Unfortunately, debt-based measures still suffer from data quality problems. The corporate bond and loan markets are much less transparent than the equity markets. Nonetheless, efforts are underway to improve disclosure in the publicly traded debt markets. As the data from debt markets improves, we will have another source of information to estimate both expected default probabilities and expected recovery in the event of default. From a modeling perspective, bond and loan instruments typically embed both a default option and a pre-payment (or call) option. Combined with a liquidity risk premium, sorting out each piece of the credit puzzle in a loan or bond can be difficult without analyzing another instrument such as equity. The best strategy is to develop a comprehensive view of an obligor analyzing all data—both fundamental and market— and integrate it into a portfolio framework that treats all instruments similarly. This book fills in the details of this analytical process.

Given these various trends, institutions that can simultaneously implement robust risk management procedures and strategies for uncovering credit risk investments with the highest return per unit of risk will be rewarded with higher market valuations. This orientation requires characterization of the correlation among the exposures in a portfolio. Once identified, strategies utilizing instruments such as credit derivatives can be used to improve a portfolio's return per unit of risk and minimize the probability of insolvency. This method of credit portfolio management requires an understanding of the analytics underlying valuation, correlation, and risk inherent in credit-risky instruments. In recent years, these types of analytics have highlighted many examples of mis-pricing in the debt markets. Many obligors still do not have a clear, objective understanding of their own level of riskiness. Since many participants (ranging from bank loan originators to corporate bond traders) in the debt markets suffer from a similar lack of understanding, the markets for credit periodically exhibit inefficiencies. Market-based measures of risk clear up this picture facilitating much more efficient pricing of debt. Institutions originating and trading credit that understand these market-based, credit portfolio analytics will hold a considerable advantage as credit markets evolve.

The 20th century has been punctuated by financial crises at different times in different countries. The U.S. experienced serious problems in its banking

industry starting in the 1970s continuing into the 1980s. Once the seas had calmed, the emergent financial system reflected a tough market orientation with the government less inclined to bail out mismanaged institutions. Today we face a similar financial crisis in Japan. Tomorrow it will be some other country. The common current in these crises is the tendency of financial institutions to create highly concentrated portfolios without the discipline of regularly marking these portfolios to market. Developing this discipline underlies much of the rhetoric among regulators; whether the new Basel accord will encourage this discipline remains to be seen. Regardless, the tools and analytics described in this book can be implemented to meet the demands of whatever the Basel committee finally agrees upon. Satisfying regulators, however, should not be a portfolio manager's focus. Regulations should be viewed as a constraint within which portfolio managers must operate to maximize the value of the equity held by the portfolio's shareholders. The most competitive institutions will implement the analytics and technology necessary to facilitate market-oriented portfolio management. The market is an ocean of powerful waves that can harass or be harnessed. Institutions without this market focus will capsize or be rescued as has been particularly apparent in the bank failures and bank consolidations during the past decade. We will continue to see tidal waves of change in the financial industry. The ideas and strategies described in this book can be a compass for navigating these challenging currents.

Dr. Jeffrey R. Bohn
Managing Director, Moody's-KMV

PREFACE

This book as the title suggests, is concerned with the characteristics and analysis of individual credit exposures, as well as with the theory and practice of combining these exposures into portfolios, pricing them with appropriate credit insight, and optimally allocating capital. I've written *Managing Bank Risk* book for both bank practitioners and students of banking. My book was also drafted for readers involved with banking who want to develop additional analytical and marketing opportunities, or simply yearn to move a bit closer to the (credit) heartbeat. This group includes educators, entrepreneurs, accountants, investors, consultants, turnaround specialists, financial engineers and executives, investment bankers, research and ratings personnel and portfolio managers.

Managing Bank Risk focuses on myriad regulatory concerns presented in the September 2000 consultative document issued by the Basel Committee on Banking Supervision, *Principles for the Assessment of Banks' Management of Credit Risk*. This important position paper established broad guidelines for bankers so they might establish a sound credit risk environment, operate under

sound credit granting processes, maintain appropriate administrative, and monitoring credit policies, and ensure that adequate controls over credit risk are part and parcel credit-management.

Employing the essence of “Principles,” the book’s two sections, *New Approaches to Fundamental Analysis*, and *Credit Administration* deal with recent developments in bank risk management. We focus on how connectivity between credit engineering and more traditional methods works as seamless partners. The art of banking is, after all, a matter of knowing how to balance scales. This involves assimilating into the lending blueprint disciplines that include statistics and simulation driven forecasting, risk adjusted pricing, credit derivatives, ratios, cash flow computer modeling, distress prediction and workouts, capital allocation, credit exposure systems, computerized loan pricing, sustainable growth, interactive risk rating models and probabilistic default screening.

This last concept is covered in Chapter 14, EDFTM Credit Measure, written by Moody’s-KMV, the world’s leading provider of market-based quantitative credit risk products. Moody’s-KMV maintains one of the largest and most accurate databases of corporate default experience internationally.

What does *Broad-base Credit Engineering* mean? The concept involves utilizing appropriate risk-measuring tools that ensure credits are made in accordance with bank policy and regulatory requirements, and to provide bankers with a solid platform to judge asset quality and value. Effective analysis—on two fronts: micro and macro, not only helps detect poorly underwritten credits, it also serves to prevent weak credits from being granted, since credit personnel are likely to be more diligent if they know their analysis will be subject to review by bank examiners and senior management.

Serving this end, bankers need courage and wisdom to take reasonable risks: booking loans falling within defined parameters, and meeting risk-adjusted return goals set by a sound loan policy. Even with the best techniques, though, credit issues need definition and prioritization, solutions must be structured to fit specific deals, and a proper balance struck between credit engineering and good old-fashioned common sense.

Failure to follow prudent loan policies and procedures has led to asset quality problems, disappointing performance, numerous bank failures and intensified regulatory exams. When lending areas fail to master their craft, two things increase—portfolio risk and the probability of taking sizable hits to earnings. For these reasons, bankers need *new* analytic guidelines that spell the difference between successful banking and chaotic, lax lending infrastructures.

Creditors should be prepared to handle complex problems, understand strategic management goals set by the bank’s corporate clients, and make crucial decisions involving millions of dollars of their company’s money. Finally, even with the best techniques, it is important to define and prioritize credit issues, to modify analysis to fit specific circumstances, to strike a proper balance between

quantitative analysis and qualitative credit concerns, and to evaluate individual credits and loan portfolios insightfully and creatively.

PEDAGOGY

Managing Bank Risk was developed on an intermediate to advanced level providing readers with abundant hands on approach. Each chapter includes a brief introduction and is then partitioned into several sections, with exhibits and tables numbered and titled to facilitate a systematic reading. Chapters are reinforced with end-of-chapter questions and, where appropriate, appendices and case studies. Noteworthy equations are highlighted. The derivations for equations are provided but are differentiated or appear in appendices. The reader who is not mathematically inclined can skip quantitative passages with no loss of qualitative ideas. A *References and Suggested Readings* section follows most chapters, as well. A special section in *References and Suggested Readings* catalogues important Internet links whereby readers can access additional sources and/or download software cognate to chapters.

CD-ROM

The book contains a CD that includes a collection of banking and risk models and related software. We are especially pleased to announce the publication of a new software tutorial: the author's interactive ten-point risk rating model. The program contains over 1300 lines of macro coding. It is a self-contained, spreadsheet-based tool allowing readers to learn risk rating in a self-study environment. The author also designed the program to allow easy adoption into the portfolio system.

The CD also includes:

- Enron Corporation comprehensive cash flow decomposition model
- Decisioneering's Crystal Ball software risk analysis demos including simulation, time series/regression, stochastic optimization and real options
- Stochastic net borrowed funds pricing model
- Trial versions of WizSoft data mining systems: a data mining analyzer and predictor and a data mining business rules detector for data auditing
- Asset based lending models, courtesy of the Federal Reserve Bank
- The Uniform Financial Institutions Rating System (CAMELS)
- Two portfolio optimization software models

- A library of documents and manuals from the International Swap Dealers Association, the Basel Committee on Banking Supervision, the Federal Reserve Bank, and others

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I am especially indebted to Jeffrey R. Bohn a senior official at Moody's-KMV. Dr. Bohn and Peter J. Crosbie authored Chapter 13, Portfolio Management of Default Risk and Chapter 14, EDF™ Credit Measure.

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Finally, my beautiful, patient and inspirational wife, Maryann, for sacrificing many hours so that I could devote time to this book, deserves the flower of all credits.

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