## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>xi</td>
</tr>
<tr>
<td>Preface</td>
<td>xiii</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>xxvii</td>
</tr>
<tr>
<td><strong>CHAPTER 1</strong></td>
<td></td>
</tr>
<tr>
<td>The Framework: Definitions and Concepts</td>
<td>1</td>
</tr>
<tr>
<td>What Is Credit?</td>
<td>2</td>
</tr>
<tr>
<td>Evolution of Credit Markets</td>
<td>7</td>
</tr>
<tr>
<td>Defining Risk</td>
<td>11</td>
</tr>
<tr>
<td>A Word about Regulation</td>
<td>13</td>
</tr>
<tr>
<td>What Are Credit Models Good For?</td>
<td>14</td>
</tr>
<tr>
<td>Active Credit Portfolio Management (ACPM)</td>
<td>16</td>
</tr>
<tr>
<td>Framework at 30,000 Feet</td>
<td>19</td>
</tr>
<tr>
<td>Building Blocks of Portfolio Risk</td>
<td>23</td>
</tr>
<tr>
<td>Using PDs in Practice</td>
<td>32</td>
</tr>
<tr>
<td>Value, Price, and Spread</td>
<td>34</td>
</tr>
<tr>
<td>Defining Default</td>
<td>38</td>
</tr>
<tr>
<td>Portfolio Performance Metrics</td>
<td>38</td>
</tr>
<tr>
<td>Data and Data Systems</td>
<td>42</td>
</tr>
<tr>
<td>Review Questions</td>
<td>43</td>
</tr>
<tr>
<td><strong>CHAPTER 2</strong></td>
<td>45</td>
</tr>
<tr>
<td>ACPM in Practice</td>
<td></td>
</tr>
<tr>
<td>Bank Valuation</td>
<td>50</td>
</tr>
<tr>
<td>Organizing Financial Institutions: Dividing into Two Business Lines</td>
<td>52</td>
</tr>
<tr>
<td>Emphasis on Credit Risk</td>
<td>57</td>
</tr>
<tr>
<td>Market Trends Supporting ACPM</td>
<td>59</td>
</tr>
<tr>
<td>Financial Instruments Used for Hedging and Managing Risk in a Credit Portfolio</td>
<td>60</td>
</tr>
</tbody>
</table>
Mark-to-Market and Transfer Pricing 63
Metrics for Managing a Credit Portfolio 68
Data and Models 72
Evaluating an ACPM Unit 75
Managing a Research Team 77
Conclusion 86
Review Questions 87
Exercises 87

CHAPTER 3
Structural Models 89

Structural Models in Context 91
A Basic Structural Model 95
Black-Scholes-Merton 100
Valuation 107
Modifying BSM 117
First Passage Time: Black-Cox 118
Practical Implementation: Vasicek-Kealhofer 124
Stochastic Interest Rates: Longstaff-Schwartz 145
Jump-Diffusion Models: Zhou 150
Endogenous Default Barrier (Taxes and Bankruptcy Costs): Leland-Toft 151
Corporate Transaction Analysis 156
Liquidity 159
Other Structural Approaches 161
Conclusion 171

Appendix 3A: Derivation of Black-Scholes-Merton Framework for Calculating Distance to Default (DD) 171
Appendix 3B: Derivation of Conversion of Physical Probability of Default (PD) to a Risk-Neutral Probability of Default (PDQ) 177
Review Questions 179
Exercises 179

CHAPTER 4
Econometric Models 183

Discrete-Choice Models 186
Early Discrete-Choice Models: Beaver (1966) and Altman (1968) 191
Hazard Rate (Duration) Models 196
Example of a Hazard-Rate Framework for Predicting Default: Shumway (2001) 204
Hazard Rates versus Discrete Choice 206
Practical Applications: Falkenstein et al. (2000) and Dwyer and Stein (2004) 207
Calibrating Econometric Models 215
Calibrating to PDs 216
Calibrating to Ratings 227
Interpreting the Relative Influence of Factors in Econometric Models 234
Data Issues 238
Taxonomy of Data Woes 241
Biased Samples Cannot Easily Be Fixed 244
Conclusion 249
Appendix 4A: Some Alternative Default Model Specifications 249
Review Questions 252
Exercises 252

CHAPTER 5
Loss Given Default 255

Road to Recovery: The Timeline of Default Resolution 258
Measures of LGD (Recovery) 260
The Relationship between Market Prices and Ultimate Recovery 265
Conclusion 285
Review Questions 286
Exercises 286

CHAPTER 6
Reduced-Form Models 289

Reduced-Form Models in Context 291
Basic Intensity Models 296
A Brief Interlude to Discuss Valuation 310
Duffie, Singleton, Lando (DSL) Intensity Model 312
Credit Rating Transition Models 329
Default Probability Density Version of Intensity Models (Hull-White) 340
Generic Credit Curves 348