

**Advanced Credit Risk Analysis
and Management**

Ciby Joseph

WILEY

Contents

Preface

xvii

PART I INTRODUCTION

1	Credit Basics	3
1.1	Meaning of Credit	4
1.2	Role of Credit	6
1.3	Credit Market	6
1.4	Credit – Advantages and Disadvantages	7
1.4.1	Merits of Credit	7
1.4.2	Demerits of Credit Usage	9
1.4.3	Is Wealth Creation Through Use of Credit Easy and Simple?	10
1.5	Suppliers of Credit	11
1.6	Credit Risk Study	12
	Appendix: Credit Creation	13
	Questions/Exercises	14
2	Essentials of Credit Risk Analysis	15
2.1	Meaning of Credit Risk	15
2.2	Causes of Credit Risk	16
2.3	Credit Risk and Return	17
2.4	Credit Risk Analysis	17
2.5	Historical Progress of Credit Risk Analysis	19
2.6	Need for Credit Risk Analysis	19
2.7	Challenges of Credit Risk Analysis	22
2.7.1	The Art and Science of Credit Risk Analysis	22
2.8	Elements of Credit Risk Analysis	24
	Questions/Exercises	25
3	Credit Risk Management	27
3.1	Strategic Position of Credit Risk Management	27
3.2	Credit Risk Management Context	28
3.3	Credit Risk Management Objectives	28
3.4	Credit Risk Management Structure	29

3.5	Credit Risk Culture	29
3.6	Credit Risk Appetite	30
3.7	Credit Risk Management in Non-Financial Firms	31
3.8	Credit Risk Management in Financial Intermediaries	31
3.8.1	Stages of Credit Risk Management in Financial Intermediaries	31
3.8.2	Credit Risk Management Process	33
	Questions/Exercises	34

PART II FIRM (OR) OBLIGOR CREDIT RISK

4	Fundamental Firm/Obligor-Level Risks	37
4.1	Firm (or) Obligor Risk Classification	37
4.1.1	Business Risks or Operating Risks (OR)	37
4.1.2	Financial Risks (FR)	38
4.2	Risk Matrix	39
4.3	Different Risk Levels	39
4.3.1	Low Operating Risk and Low Financial Risk	39
4.3.2	Low Operating Risk and Medium Financial Risk	39
4.3.3	Low Operating Risk and High Financial Risk	40
4.3.4	Medium Operating Risk and Low Financial Risk	40
4.3.5	Medium Operating Risk and Medium Financial Risk	40
4.3.6	Medium Operating Risk and High Financial Risk	40
4.3.7	High Operating Risk and Low Financial Risk	40
4.3.8	High Operating Risk and Medium Financial Risk	41
4.3.9	High Operating Risk and High Financial Risk	41
	Questions/Exercises	42
5	External Risks	43
5.1	Business Cycle	43
5.1.1	Benefits of Study of Business Cycles	45
5.1.2	Credit Risk in the Business Cycle	46
5.2	Economic Conditions	46
5.2.1	Private Consumption	47
5.2.2	Government Spending	47
5.2.3	Investment	48
5.2.4	Imports and Exports	48
5.2.5	How to Link NI Components to the Firm	48
5.2.6	Benefits of Study of National Income	49
5.3	Inflation and Deflation	50
5.4	Balance of Payments and Exchange Rates	51
5.5	Political	52
5.6	Fiscal Policy	53
5.7	Monetary Policy	53
5.8	Demographic Factors	54
5.9	Regulatory Framework	55
5.10	Technology	55
5.11	Environment Issues	55

5.12	International Developments	56
5.13	Others	56
5.14	Monitoring External Risks	57
	Questions/Exercises	58
6	Industry Risks	61
6.1	Understanding Obligor’s Industry or Market	61
6.1.1	Sector vs. Industry vs. Market Segment	61
6.1.2	Challenges of Industry Classification	62
6.2	Types of Industry Risks	63
6.3	Industry Life Cycle	64
6.4	Permanence of Industry	65
6.5	Government Support	65
6.6	Industry and Factors of Production	66
6.7	Industry and Business Cycles	66
6.8	Industry Profitability	67
6.8.1	Competition Among the Existing Firms Within the Industry	68
6.8.2	Threat of New Entrants	68
6.8.3	Threat of Substitute Products	69
6.8.4	Bargaining Power of Buyers	69
6.8.5	Bargaining Power of Suppliers	70
6.9	Competitor/Peer Group Analysis	71
	Questions/Exercises	77
7	Entity-Level Risks	79
7.1	Understanding the Activity	80
7.2	Risk Context and Management	81
7.3	Internal Risk Identification Steps	82
7.3.1	Interviews and Questioning	82
7.3.2	Market Developments and Peer Comparison	83
7.4	SWOT Analysis	83
7.5	Business Strategy Analysis	84
7.5.1	Cost Leadership	85
7.5.2	Differentiation	86
7.5.3	Contraction	86
7.5.4	Market Penetration	86
7.5.5	New Markets	87
7.5.6	New Products/Product Synergy Diversification	87
7.5.7	Product/Market Diversification	87
7.5.8	Consolidation	87
7.5.9	Merger/Takeover	87
7.5.10	Expansion	88
7.5.11	Cost Control	88
7.5.12	Focus	88
7.6	Pitfalls in Strategy	89
7.7	Management Analysis	90
7.7.1	One-Man Rule	91
7.7.2	Joint Chairman/CEO/MGD Position	91

7.7.3	Imbalance in Top Management Team	91
7.7.4	Weak Finance Function	92
7.7.5	Lack of Skilled Managers (or Inability to Attract Skilled Managers in Key Positions)	92
7.7.6	Disharmony in Management	92
7.7.7	Change in Ownership	92
7.7.8	Cultural Rigidity	92
7.7.9	Lack of Internal Controls	93
7.7.10	Low Staff Morale	93
7.7.11	Fraudulent Management	93
7.7.12	Myopic Vision	93
7.7.13	Big Projects	93
7.7.14	Inadequate Response to Change	94
7.7.15	Poor Corporate Governance	94
7.8	Other Internal Risks	94
	Questions/Exercises	97
8	Financial Risks	99
8.1	Importance of Financial Statements	99
8.2	Quality and Quantity of Financial Statements	101
8.2.1	Quality of Financial Statements	101
8.2.2	Quantity of Financial Statements	102
8.3	Role of Historical Financial Statements	102
8.4	Financial Analysis	103
8.4.1	Balance Sheet	103
8.4.2	Income Statement (or) Profit and Loss Account	104
8.4.3	Cash Flow Statement (CFS)	105
8.5	Analytical Tools	105
8.5.1	Accounting Analysis	105
8.5.2	Common Sizing Analysis (CSA)	107
8.5.3	Indexed Trend Analysis (ITA)	110
8.5.4	Ratio Analysis	113
8.6	Solvency Ratios	115
8.6.1	Liquidity Ratios	115
8.6.2	Long Term Solvency Ratios	117
8.6.3	External Finance Ratios	120
8.6.4	Dividend and Equity Ratios	120
8.6.5	Cash Flow Ratios	121
8.7	Operational Ratios	123
8.7.1	Performance Ratios	123
8.7.2	Profitability Ratios	124
8.7.3	Return on Investment (ROI) Ratios	125
8.7.4	Asset Management (or Activity) Ratios	126
8.7.5	Leverage (Operating and Financial) Ratios	128
8.7.6	Cost-Volume-Profit (CVP) Ratios	133

8.8	Encapsulated Ratios	134
8.8.1	Dupont Model	134
8.8.2	Predictive Power of Ratios	135
	Questions/Exercises	143
9	Integrated View of Firm-Level Risks	147
9.1	Relevance of an Integrated View	147
9.2	Judgement	147
9.3	Identifying Significant Credit Risks	148
9.4	Risk Mitigants	150
9.5	Types of Mitigants	150
9.5.1	Qualitative Mitigants	150
9.5.2	Quantitative Mitigants	152
9.5.3	Difference between Qualitative and Quantitative Mitigants	153
9.6	Principles to be Borne in Mind While Selecting Mitigants	153
9.7	Monitoring of Credit Risk	154
	Appendix: Credit Risks and Possible Mitigants	155
	Questions/Exercises	158
10	Credit Rating and Probability of Default	161
10.1	Credit Risk Grading	161
10.1.1	Linking EIIIF Evaluation to Credit Risk Grades	161
10.1.2	Benefits of Credit Risk Grade System	163
10.2	Probability of Default	163
10.2.1	Benefits of PD Values	165
10.2.2	PD Values and Credit Decisions	165
10.3	External vs. Internal Rating	166
10.3.1	Reliability of External Ratings	167
10.3.2	Internal Ratings	168
10.4	PD in Credit Structural Models	169
10.4.1	The Merton Model (1974)	169
	Questions/Exercises	172
PART III CREDIT RISKS – PROJECT AND WORKING CAPITAL		
11	Credit Risks in Project Finance	177
11.1	Distinctive Features of Project Finance	177
11.2	Types of Project Finance	178
11.3	Reasons for Project Finance	179
11.3.1	Scarce Resources	179
11.3.2	Risk Sharing	179
11.3.3	Off-Balance Sheet Debt	179
11.3.4	Avoidance of Restrictive Covenants	179
11.3.5	Tax Considerations	180
11.3.6	Extended Tenor	180

11.4	Parties Involved in Project Finance	180
11.4.1	Sponsors	180
11.4.2	Project Lenders	180
11.4.3	Project Contractors/Consultants/Lawyers/Accountants	181
11.4.4	Governments	181
11.4.5	Multilateral Agencies	181
11.5	Phases of Project and Risks	182
11.5.1	Construction Phase Risks	182
11.5.2	Start-Up Phase Risks	182
11.5.3	Operational Phase Risks	183
11.6	Project Credit Risks	183
11.6.1	EIIF Risks	183
11.6.2	Project Specific Risks	184
11.6.3	Project Financial Viability Risks	186
11.7	Financial Study	187
11.7.1	Cash Flow Forecasts	187
11.7.2	Estimation of the Economic Worth of the Project	189
11.7.3	Assessing Creditworthiness – Building a Lender’s Case	190
11.8	Project Credit Risk Mitigants	192
	Questions/Exercises	202
12	Credit Risks in Working Capital	207
12.1	Definition of Working Capital	207
12.1.1	Working Capital Cycle – Finance Manager’s Key Concern	207
12.1.2	Working Capital Cycle – Lending Bank’s Point of View	208
12.2	Assessing Working Capital through the Balance Sheet	208
12.3	Working Capital Ratios	210
12.4	Working Capital Cycle	212
12.5	Working Capital vs. Fixed Capital	216
12.6	Working Capital Behaviour	216
12.6.1	Availability of Finance	217
12.6.2	Changes in Trade Terms	218
12.6.3	Changes in Business Volume	219
12.6.4	Price Changes	222
12.6.5	Others	222
12.7	Working Capital, Profitability and Cash Flows	223
12.8	Working Capital Risks	225
12.8.1	Over-trading	225
12.8.2	Diversion Risk	227
12.8.3	Inadequate Financial Management	228
12.8.4	Inflation Risk	228
12.8.5	Inadequate Provisioning of Working Capital in Original Project Costs	228
12.8.6	Losses and Reducing Profitability	228
12.8.7	Inadequate Structuring of Facilities by Banks	229
12.8.8	Unforeseen Contingencies	229
12.9	Impact of Working Capital Risks	229

12.10	Working Capital Risk Mitigants	230
12.10.1	Covenants	230
12.10.2	Cancellation/Tightening/Temporary Freeze of Facilities	230
12.10.3	Increase Pricing	231
12.10.4	Liquidation of Non-Core Assets	231
12.10.5	Owners' Injection/Strengthening Net Working Capital	231
12.10.6	Improvement of Working Capital Management	231
12.10.7	Insure against the Risk from Unforeseen Contingencies	231
12.11	Working Capital Financing	232
	Questions/Exercises	236

PART IV CREDIT PORTFOLIO RISKS

13	Credit Portfolio Fundamentals	241
13.1	Credit Portfolio vs. Equity Portfolio	241
13.2	Criticality of Portfolio Credit Risks	242
13.3	Benefits of Credit Portfolio Study	242
13.3.1	Active Credit Portfolio Management	242
13.3.2	Overall Credit Risk Reduction	243
13.3.3	Optimizes Liquidity	244
13.3.4	Assists Sales and Marketing	244
13.3.5	Insights into Sectoral Risk Exposures	244
13.3.6	Solves the Capital Dilemma	245
13.3.7	Portfolio Management Strategies	246
13.3.8	Credit Quality Issues	247
13.4	Portfolio Analysis	247
13.5	Credit Portfolio Risk vs. Return	249
	Appendix: Organizational Conflict in Credit Risk Management	249
	Questions/Exercises	251
14	Major Portfolio Risks	253
14.1	Systematic Risk	253
14.1.1	Triggers of Systematic Risk	254
14.1.2	Consequences of Systematic Risk	254
14.2	Diversifiable Risk	255
14.3	Concentration	258
14.3.1	Industry or Sector Concentration	258
14.3.2	Exposure or Name Concentration	259
14.3.3	Region/Location/Country Concentration	259
14.3.4	Foreign Currency Concentration	259
14.3.5	Collateral Risk	260
14.3.6	Maturity Risks	260
14.3.7	Funding Risk	261
14.3.8	Correlation Risks	262
14.4	Credit Portfolio Beta	263
	Questions/Exercises	263

15 Firm Risks to Portfolio Risks and Capital Adequacy	265
15.1 Obligor PD and Portfolio PD	265
15.2 Migration Risk	266
15.2.1 Firm Credit Risk Migration	266
15.2.2 Portfolio Risk Migration	268
15.2.3 Benefits of Migration Risk Study	269
15.3 Default Risk	269
15.3.1 Firm-Level Defaults	269
15.3.2 Portfolio-Level Defaults	270
15.4 Loss Given Default (LGD)	270
15.5 Expected Loss (EL)	271
15.5.1 Obligor EL	271
15.5.2 Portfolio EL	271
15.6 Provisioning	272
15.6.1 Provisioning – Firm Level	272
15.6.2 Portfolio-Level Provisioning	273
15.7 Credit Loss Distribution	274
15.7.1 Characteristics of Credit Loss Distribution	275
15.7.2 Benefits of Developing a Credit Risk (or Loss) Distribution	275
15.8 Economic Capital	276
15.8.1 Regulatory Capital vs. Economic Capital	277
15.8.2 Measuring Economic Capital	278
15.8.3 Optimizing Economic Capital	279
Questions/Exercises	282
16 Credit Risk and The Basel Accords	285
16.1 Basel Accords	285
16.2 Basel I (1988) – First Basel Accord	286
16.2.1 Criticisms of Basel I	287
16.3 Basel Accord II (2006)	288
16.3.1 Alternative Approaches for Credit Risk in Basel II	289
16.3.2 Risk Weighted Assets (RWA) and Capital Adequacy in Basel II	293
16.3.3 Do Higher LGD and PD Always Translate into Higher RWA under the IRB Approach?	294
16.3.4 Criticisms of Basel II	295
16.4 Basel III	296
16.4.1 Credit Risk Measurement in Basel III	297
16.4.2 Other Key Features of Basel III	298
16.4.3 Can Basel III Prevent Future Financial/Credit Crises?	299
Appendix	300
Questions/Exercises	302

PART V PORTFOLIO RISK MITIGANTS

17 Credit Risk Diversification	305
17.1 Traditional Diversification	305

17.1.1	Industry Limit	306
17.1.2	Counterparty Limit	307
17.1.3	Region-Wise Restriction	307
17.1.4	Size	308
17.2	Modern Diversification of Credit Portfolio	309
17.2.1	Portfolio Selection Theory	309
17.2.2	Application of PS in Credit Portfolio	310
17.2.3	More Tools to Study Diversification of Portfolio Risks	314
17.3	Correlations in Credit Risk Models	315
	Questions/Exercises	315
18	Trading of Credit Assets	317
18.1	Syndicated Loans/Credit Assets	317
18.2	Securitization	318
18.2.1	Asset Backed Securities (ABS)	319
18.2.2	Collateralized Debt Obligations (CDO)	319
18.2.3	Downfall of CDOs (and Similar Securitized Instruments)	321
18.3	Distressed Debt	321
18.4	Factoring	322
18.5	Distressed Receivables	322
	Questions/Exercises	322
19	Credit Derivatives	323
19.1	Meaning of a Credit Derivative	323
19.1.1	Credit Event	324
19.2	Credit Default Swap (CDS)	324
19.2.1	Is CDS an Insurance?	326
19.2.2	CDS and Speculation	327
19.2.3	Uses of CDS	327
19.2.4	Sovereign CDS	329
19.2.5	Criticism of CDS	329
19.3	Total Return Swap	330
19.3.1	Uses of TR Swap	331
19.4	Credit Option (CO)	332
19.5	Credit Spread Options (CSO)	333
19.6	Credit Derivative Linked Structures	333
19.7	Future of Credit Derivatives	334
19.8	Credit Derivatives and Over-the-Counter (OTC) Markets	334
	Questions/Exercises	334
PART VI CREDIT RISK PRICING		
20	Pricing Basics	337
20.1	Credit Pricing Factors	337
20.1.1	Credit Risk Premium	337
20.1.2	Portfolio Risk	339
20.1.3	Cost of Capital	340

20.1.4	Cost of Leverage	340
20.1.5	Sector Risks	340
20.1.6	Overheads	341
20.1.7	Other Factors	341
20.2	Pricing Structure	342
20.2.1	Interest Rates	342
20.2.2	Commission and Fees	344
20.3	Credit Risk Pricing Model	344
20.4	Prime Lending Rate	345
	Questions/Exercises	348
21	Pricing Methods	349
21.1	RORAC (Return on Risk-Adjusted Capital) Based Pricing	349
21.2	Market Determined	351
21.3	Economic Profit Based Pricing	351
21.4	Cost Plus	353
21.5	Structured Pricing	353
21.6	Grid Pricing	354
21.7	Net Present Value (NPV) Pricing	354
21.8	RANPV (Risk-Adjusted NPV) Pricing	355
	Questions/Exercises	355
 PART VII THE LAST LINE OF DEFENCE – SECURITY		
22	Security Basics	359
22.1	Need for Security	359
22.2	Merits and Demerits of a Security	360
22.2.1	Advantages to the Creditor	360
22.2.2	Disadvantages to the Creditor	360
22.2.3	Advantages to the Borrower	361
22.2.4	Disadvantages to the Borrower	361
22.3	Attributes of a Good Security	362
22.4	Security and Pricing	362
22.5	Impact of Systematic Risks on Security	364
22.6	Facility Grades	364
	Questions/Exercises	366
23	Collaterals and Covenants	367
23.1	Tangible Security	367
23.1.1	Deposits (with Banks, Financial Institutions, etc.)	367
23.1.2	Stock and Shares	367
23.1.3	Property/Land	367
23.1.4	Goods	368
23.1.5	Gold or Other Precious Metals	368
23.1.6	Bank Guarantees/Letters of Credit	368
23.2	Intangible Security	369
23.2.1	Unregistered Charges	369

23.2.2	Assignment of Debtors	369
23.2.3	Corporate Guarantee	369
23.2.4	Letter of Comfort (LOC)	370
23.2.5	Letter of Awareness	370
23.2.6	Letter of Negative Pledge	370
23.3	Methods of Taking Security	371
23.3.1	Mortgage	371
23.3.2	Pledge	371
23.3.3	Hypothecation	372
23.3.4	Lien	372
23.4	Realizing Security	372
23.5	Covenants – A Trigger to Seek Additional Security	373
23.5.1	Financial Covenants	373
23.5.2	Non-Financial Covenants	376
	Questions/Exercises	377

PART VIII CREDIT CRISIS

24	Road to Credit Crisis	381
24.1	Credit and Growth	381
24.2	Role of Banks	382
24.2.1	Credit Creation	382
24.2.2	Confidence in Banking	383
24.2.3	Ultimate Use of Credit	384
24.3	Formation of Credit Bubbles	385
24.4	Types of Credit Bubble	386
24.5	Credit Bubble Explosion	387
	Questions/Exercises	390
25	2008 Credit Crisis	393
25.1	Credit Asset – Prime vs. Sub-Prime	393
25.2	Securitization	394
25.2.1	Higher Risk Appetite	394
25.2.2	Availability of CDS	395
25.3	US Housing Bubble	396
25.4	Role of OTC Derivatives	398
25.4.1	Reasons for Popularity of OTC Derivatives	399
25.4.2	Complexity and Opaqueness – the Hallmark of OTC Derivatives	399
25.4.3	Systemic Risk and OTC Derivatives	400
25.5	Role of Rating Agencies	400
25.6	Why Did the Bubble Burst?	401
25.7	Consequences	402
25.7.1	2007	402
25.7.2	2008	402
25.7.3	2009	403
25.8	Impact of the Lehman Collapse	403

25.9	Housing Crisis to Credit Crisis to Economic Crisis	404
25.10	Common Factors 1929 vs. 2009	406
25.11	Lessons of the 2008 Credit Crisis	407
	Questions/Exercises	410
	Bibliography	411
	Index	415