

Summary Table of Contents

Volume 1

- Chapter 1:** An Asset/Liability Management Overview
- Chapter 2:** Defining and Quantifying Interest Rate Risk
- Chapter 3:** Gap Analysis
- Chapter 4:** Income Simulation
- Chapter 5:** Duration and Convexity
- Chapter 6:** Economic Value Simulation
- Chapter 7:** Measuring the Rate Risk of Indeterminate Maturity, Administered Rate, and Puttable Deposits
- Chapter 8:** Measuring the Rate Risk of Loans and Investments
- Chapter 9:** Rate Changes: Deterministic Scenarios and Stochastic Models
- Chapter 10:** Selecting and Installing AL Models
- Chapter 11:** Using Models and Managing Model Risk
- Chapter 12:** Interest Rate Risk Measurement Summary

Volume 2

- Chapter 13:** ALM Policies, Management Structures, and Risk Limits
- Chapter 14:** ALM Decision Making, Implementation, and Oversight
- Chapter 15:** Managing Interest Rate Risk Without Using Off-Balance Sheet Derivatives
- Chapter 16:** Rate Risk and Investment Portfolio Management
- Chapter 17:** Managing Interest Rate Risk: Hedging with Off-Balance Sheet Derivative Instruments
- Chapter 18:** Liquidity Risk Measurement and Management
- Chapter 19:** Optimizing the Mix of Loans and Investments
- Chapter 20:** Perspectives
- Glossary**

Contents

About the Author	iii
Acknowledgments	v
How to Use This Manual	vii
Summary Table of Contents.....	xi

Volume 1

Chapter 1

An Asset/Liability Management Overview

Risk and Financial Institutions	1-1
What Is Risk?	1-1
Types of Risk	1-1
Credit Risk.....	1-2
Liquidity Risk.....	1-2
Interest Rate Risk.....	1-2
Operations Risk	1-3
Legal Risk	1-3
Reputation Risk	1-3
Exhibit 1.1: Risks Inherent in the Business of Banking as Seen by the Federal Reserve.....	1-3
Exhibit 1.2: Risks Inherent in the Business of Banking as Seen by the Comptroller of the Currency.....	1-4
What Is Asset/Liability Management?	1-4
The Focus Is on Interest Rate Risk/Market Risk.....	1-5
Interest Rate Risk/Market Risk Is Neither Simple Nor Undifferentiated.....	1-5
Primary Components of Interest Rate Risk	1-5
Repricing Risk.....	1-5
Basis Risk.....	1-6
Yield Curve Risk	1-7
Option Risk	1-8
Exhibit 1.3: Estimated Components of Interest Rate Risk for a Typical Bank When Interest Rate Volatility Is Low	1-9
Exhibit 1.4: Estimated Components of Interest Rate Risk for a Typical Bank When Interest Rate Volatility Is High.....	1-9
Secondary Components of Interest Rate Risk	1-10
Measurement Risk.....	1-10
Reporting Risk	1-10
People Risk	1-11
Decision Process Risk	1-11
Summary of Interest Rate Risk Components	1-11
Exhibit 1.5: Interest Rate Risk and Its Components	1-12
Section Review.....	1-13
Managing Interest Rate Risk.....	1-13

Unavoidability of Interest Rate Risk	1-14
The Relative Importance of Interest Rate Risk	1-14
Effect on Credit and Liquidity Risks.....	1-15
Effect on Profitability	1-16
Measuring, Monitoring, and Controlling Interest Rate Risk.....	1-16
Section Review.....	1-17
Elements and Structure of Asset and Liability Management.....	1-18
Information Requirements.....	1-19
Management Committee.....	1-19
Asset/Liability Management Policy.....	1-19
Role of Bank's Treasury Department	1-20
Section Review.....	1-20
Chapter 1 Test	1-23

Chapter 2

Defining and Quantifying Interest Rate Risk

The Influence of Rate Volatility on Rate Risk	2-1
Rate Volatility Is an Occasional Thing.....	2-1
The Impact of Rate Volatility	2-2
What the Volatility Requires	2-3
Coping with Rate Volatility.....	2-4
It's All About Cash Flow	2-4
Uncertain Cash Flows.....	2-6
Principal Cash Flows.....	2-6
Interest Cash Flows	2-7
Cash Flow Summary	2-7
Focus on the Net Cash Flows.....	2-8
Embedded Options — The Single Most Important Risk Management Challenge.....	2-9
Puts, Calls, Caps, and Floors — Some Definitions	2-9
Put and Call Options	2-9
Caps, Floors, and Collars.....	2-9
Bank Products and Customer Options.....	2-10
Understanding Key Option Characteristics.....	2-11
In-the-Money and Out-of-the-Money Options	2-11
The Option Time Value	2-12
European-Style and American-Style Options	2-12
Understanding Option Exercise.....	2-13
Changes in Prevailing Rates Drive Most Option Decisions	2-13
Changes in Prevailing Rates Do Not Drive All Option Decisions.....	2-13
Suggestions for Measuring Rate Risk from Embedded Options.....	2-14
Embedded Options: A Risk Measurement Challenge.....	2-15
Two Ways to Understand Interest Rate Risk.....	2-16
Accounting Perspective	2-17

Economic Perspective Defined.....	2-18
How Interest Rate Risk Affects Profits — A Sample Calculation.....	2-18
Effect on Noninterest Income and Expense.....	2-20
How Interest Rate Risk Affects Equity.....	2-21
Accounting Perspective vs. Economic Perspective	2-22
Accounting Perspective — Advantages and Disadvantages	2-23
Economic Perspective — Advantages and Disadvantages.....	2-23
Best Use for Each Perspective.....	2-23
Different Audiences — Different Points of View	2-24
Summary	2-25
Chapter 2 Test	2-26

Chapter 3 Gap Analysis

Overview of Gap Analysis.....	3-1
Gap Methodologies	3-1
Gap Defined	3-2
Repricing Defined	3-2
Grouping Assets and Liabilities.....	3-3
Selecting Time Intervals	3-3
Selecting the Number of Buckets to Use	3-4
Determining Amount of Interest Rate Risk.....	3-4
Positive and Negative Gaps	3-5
Cumulative Gaps	3-6
Formulas for Gap Concepts	3-7
Static Gap Analysis.....	3-9
Report Formats.....	3-9
Monthly Intervals.....	3-13
Graphic Formats.....	3-13
What the Reports Actually Show	3-14
Disadvantages of Contractual Repricing Basis.....	3-15
Modified Static Gap Analysis.....	3-18
Reports Based on Modified Repricing Terms.....	3-18
Weaknesses of Repricing Modifications.....	3-19
Beta-Adjusted Gap Analysis	3-20
Beta Calculation Techniques	3-20
Weaknesses of Beta-Adjusted Analysis	3-24
Dynamic Gap Analysis	3-25
Business-Related Volume Changes	3-25
Interest Rate Related Volume Changes.....	3-27
Dynamic Gap Analysis Introduces Assumption Dependency.....	3-29
Additional Types of Gap Analysis Formats	3-30
Gap Reports with Interest Cash Flows	3-30

Gap Margin Analysis	3-30
Gap Formats That Incorporate Off-Balance Sheet Positions.....	3-31
Treatment of Hedges.....	3-32
Why You Should Not Rely on Gap Reports.....	3-34
1. The Selection of Beginning and Ending Dates for Each Time Bucket Can Mask IRR	3-34
2. The Size of Time Intervals Used for Each Bucket Can Mask IRR.....	3-35
3. Often Ignores Basis Risk.....	3-36
4. Often Ignores Yield Curve Twist Risk	3-37
5. Often Fails to Capture Different Time Lags in Rate Changes	3-37
6. Difficult and Sometimes Arbitrary Treatment of Volumes Without Contractual Repricing Dates.....	3-38
7. Often Fails to Reflect Option Risk	3-38
8. Difficult and Sometimes Arbitrary Treatment of Changes in Bank-Administered Rates	3-39
9. Gap Analysis Assesses IRR at Only One Point in Time.....	3-39
10. Gap Analysis Does Not Reflect IRR Arising from Interest Income and Expense	3-40
11. Gap Analysis Does Not Reflect IRR in All Bank Activities	3-40
Noninterest Income and Expense Items.....	3-41
Credit Losses	3-41
Noninterest-Bearing Balances	3-41
12. Gaps Are Easy to Understand but Difficult to Equate to Meaningful Measures of Risk.....	3-42
Gap Analysis — A Summary	3-43
Chapter 3 Test.....	3-45

Chapter 4

Income Simulation

An Improved IRR Measurement Approach.....	4-1
What Is Income Sensitivity Simulation?.....	4-2
Prerequisites for Superior Income Simulation	4-2
Understand the Simulation Process Dynamics.....	4-6
Understand the Dangers and Benefits of Simulating Future Business and Risk Management Actions	4-7
Income Simulation Inputs, Processes, and Outputs	4-8
Income Simulation Inputs: Data and Assumptions.....	4-9
Income Simulation Outputs: Summary Tables and Graphs	4-10
Uneven Outcomes.....	4-12
Earnings at Risk vs. the Rate Sensitivity of Risk-Neutral Earnings	4-12
Summary Reports Depicting Changes Over Time	4-13
An Illustration for Understanding Ear Concepts and Dynamics	4-16
Using Income Simulation to Evaluate IRR.....	4-18
Evaluating How the Constituent Elements Contribute to the Overall Risk Level.....	4-19
Risk by Product.....	4-19
Risk by Information Source	4-21
Using Income Simulation to Manage IRR.....	4-21
Advantages of Income Simulation Modeling	4-22

1. Specific Measure of Rate Risk Exposure.....	4-22
2. More Accurate Reflection of Reality.....	4-22
3. Focus on Changes That Count.....	4-23
4. Focus on Management’s Reactions to Changes.....	4-23
5. Flexibility in Reflecting Rate Shifts for Different Maturities	4-24
6. Flexibility in Reflecting Basis Changes in Different Instruments.....	4-24
7. Integration with Other Management Information Processes	4-24
Disadvantages of Income Simulation Modeling	4-25
1. Assumptions Require Careful Development, Analysis, Increased Controls, and Testing.....	4-25
2. Assumptions Can Intentionally or Inadvertently Understate Risk Exposures.....	4-26
3. More Complex Interest Rate Risk Management	4-26
4. Understatement of Long-Term Interest Rate Risk.....	4-27
5. Limited Number of Alternatives May Not Capture the Full Extent of the Bank’s IRR Exposure.....	4-28
6. Accuracy May Be Impaired by Limited Incorporation of Interrelations Between Variables.....	4-28
Summary	4-29
Chapter 4 Test	4-31

Chapter 5

Duration and Convexity

What Is Duration Analysis?	5-1
Measuring the Dollar Weighted Average.....	5-2
Measuring the Weighted Average of the Present Value.....	5-2
Exhibit 5.1: Macaulay Duration* for a 6 Percent Five-Year Bond (par amount \$100, paying interest semiannually).....	5-3
Exhibit 5.2: Macaulay Duration* for a 12 Percent Seven-Year Bond (par amount \$10,000, paying interest annually).....	5-4
Section Review.....	5-4
Using Duration	5-5
Comparing Maturities with Weighted Averages and Durations.....	5-5
Exhibit 5.3: Cash Flows of Assets with Five-Year Maturities.....	5-6
Exhibit 5.4: Cash Flows — Weighted Averages and Durations.....	5-7
Characteristics of Duration.....	5-8
Section Review.....	5-8
Modified Duration	5-9
Calculating Modified Duration	5-10
Section Review.....	5-11
Convexity.....	5-11
Exhibit 5.5: Rate Sensitivity of a 6 Percent 10-Year Treasury	5-12
Positive Convexity	5-13
Exhibit 5.6: Price/Yield Relationship for a 6 Percent 10-Year Noncallable Bond	5-14
Negative Convexity	5-14
Exhibit 5.7: Price/Rate Relationship 5.5 Percent 30-Year FNMA Pool.....	5-15
Characteristics of Convexity.....	5-15
Convexity Describes Duration Errors That Only Become Material for Large Changes in Rates.....	5-15

Convexity Describes Duration Errors in Particular Directions.....	5-16
Convexity Is More Material for Longer Term Than for Shorter Term Instruments.....	5-16
Exhibit 5.8: Comparative Convexity.....	5-16
Convexity Is More Material for Amortizing Instruments.....	5-16
Exhibit 5.9: Volatility Comparison Between a 10-Year Treasury Bond and a 12-Year Mortgage Pass-Through Bond.....	5-17
Adjusting Duration to Compensate for Convexity.....	5-18
Section Review.....	5-18
Limitations of Macaulay and Modified Duration.....	5-19
Section Review.....	5-21
Effective Duration, Option-Adjusted Duration, and Partial Duration.....	5-21
Effective Duration and Empirical Duration.....	5-22
Effective Duration and Option-Adjusted Duration.....	5-23
Key Rate Duration.....	5-23
Exhibit 5.10: Key Rate Duration Table.....	5-24
Partial Duration.....	5-24
Section Review.....	5-25
Applying Duration to Measure IRR for the Entire Bank.....	5-25
Calculating Duration of Equity.....	5-26
Understanding Changes in Duration of Equity.....	5-27
Key Rate Duration for the Whole Bank.....	5-28
Exhibit 5.11: Key Rate Duration Graph.....	5-28
An Empirical Alternative.....	5-28
Positive and Negative Durations.....	5-29
Capturing the Duration of All Cash Flows.....	5-29
Section Review.....	5-30
Advantages of Duration.....	5-30
1. Captures Interest Rate Risk from All Time Periods.....	5-30
2. Expresses the Measured Quantity of IRR as a Single Value.....	5-31
3. Expresses the Measured Quantity of IRR as a Change in a Well-Understood Variable.....	5-32
4. Captures IRR Obscured by Accrual Accounting Methods.....	5-32
5. Facilitates Segregation of Rate Risk Components.....	5-33
Section Review.....	5-33
Disadvantages of Duration.....	5-33
1. Managing Duration Can Increase Earnings Volatility.....	5-33
2. Duration Relies on the Unlikely Assumption That All Rates Change at the Same Time.....	5-34
3. Duration Ignores Basis Risk.....	5-34
4. Duration Is Difficult to Calculate for Products with Administered Interest Rates.....	5-34
5. Duration Is a Static IRR Measurement.....	5-35
Future Cash Flows — Assumptions.....	5-36
Focus on Current Position.....	5-36
6. Duration Masks Dispersion.....	5-37
7. Duration Calculations Exclude a Material Component of Interest Rate Risk.....	5-37
Duration Summary.....	5-38

Section Review..... 5-39
 Chapter 5 Test 5-40

Chapter 6
Economic Value Simulation

What Is Economic Value Sensitivity Simulation? 6-1
 MV, PV, and EV 6-2
 PV Often Does Not Equal MV 6-2
 Economic Value of Equity 6-2
 Economic Value Sensitivity 6-3
 A Note on Equity Value Terminology 6-4
 How Does Economic Value Sensitivity Simulation Differ from Duration-Based Economic Value? 6-5
 Section Review..... 6-7
 Using Economic Value of Equity Sensitivity Simulation to Measure IRR..... 6-7
 Exhibit 6.1: Typical Bank (amounts shown in thousands) 6-8
 Using Real World EVE Models in Real Banks..... 6-10
 Dealing with Assumptions in Economic Value of Equity Sensitivity Simulation..... 6-11
 Section Review..... 6-12
 Discount Rates and Yield Curve Smoothing 6-12
 Introduction to Yield Curve Smoothing 6-13
 What Is Yield Curve Smoothing?..... 6-14
 Choosing a Smoothing Method 6-14
 Linear Yield Curve Smoothing..... 6-15
 Cubic Spline Yield Smoothing..... 6-15
 Exhibit 6.2: Example of a Cubic Spline Calculation 6-16
 Maximum Smoothness Forward Rates 6-16a
 What Smoothing Technique Should You Use? 6-16a
 Exhibit 6.3: Contrasting Smoothing Methods..... 6-17
 Exhibit 6.4: Average Error in Estimating 7-Year Swap Rates..... 6-18
 Section Review..... 6-18
 Evaluating the Rate Sensitivity of EVE..... 6-19
 EVE Sensitivity — Dispersion 6-20
 Exhibit 6.5: Economic Value of Equity 6-20
 Exhibit 6.6: Economic Value Sensitivity of Assets, Liabilities, and Equity 6-21
 Exhibit 6.7: Economic Value of Equity Sensitivity 6-22
 Plus or Minus? A Note on Arithmetic Signs..... 6-22
 Exhibit 6.8: Sample Output of Economic Value Simulation Model Interest Rate Scenario
 (in thousands of dollars)..... 6-23
 Uneven Outcomes..... 6-23
 Relating the Rate Sensitivity of the Economic Value to the Rate Sensitivity of Net Income..... 6-24
 The Conceptual Relationship Between EVE and EAR..... 6-25
 The Practical Relationship Between EVE and EAR..... 6-26
 EVE and EAR Treatments of New Business 6-28
 Exhibit 6.9: The Impact of Runoff, Rollover, and Growth Over Time 6-28

The Impact of Omitting Rollover and Growth is Often Misunderstood — Two Points of View	6-29
Using Economic Value of Equity Sensitivity Simulation to Achieve Other Management Goals	6-30
FAS 107	6-30
FAS 115	6-31
Product Pricing and Marketing	6-31
Section Review	6-32
Advantages of Eve Sensitivity Simulation	6-32
1. Captures Interest Rate Risk from All Time Periods	6-32
2. Provides a Specific and Understandable Measure of Rate Risk Exposure	6-32
3. Focuses on the Rate Risk in the Bank’s Current Position	6-33
4. Can Readily Be Used to Focus on Changes in Rate Exposure at the Product Level	6-33
5. Can Capture Option Risk	6-33
6. Can Capture Yield Curve Risk	6-33
7. Can Capture Basis Risk	6-34
8. Has the Flexibility to Reflect Rate Sensitivity Over a Wide Range of Rate Scenarios	6-34
9. Can Capture Rate Risk Obscured by Accrual Accounting	6-34
10. EVE Is a Rate Risk Measurement System That Meets Regulatory Expectations	6-34
11. Can Be Integrated with Other Management Information Systems	6-34
Section Review	6-35
Disadvantages of Eve Sensitivity Simulation	6-35
1. Managing EVE Sensitivity Can Increase Earnings Volatility	6-35
2. In Most Applications, EVE Ignores the Impact of Reinvestment and New Business	6-35
3. EVE Does Not Provide Any Information About the Timing of Rate Risk Exposures	6-36
4. Assumptions Require Careful Development, Analysis, Increased Controls, and Testing	6-36
5. Use of Discount Rates Can Introduce Additional Measurement Errors	6-36
6. Requires Accurate Assumptions of Volume Changes Caused by Embedded Options	6-37
7. May Fail to Capture a Material Amount of Interest Rate Risk Exposure	6-37
Section Review	6-38
Value at Risk (VaR)	6-38
Three Different VaRs	6-39
Exhibit 6.10: Strengths and Weakness of VaR Methods	6-40
VaR Problems and Limitations	6-41
Exhibit 6.11: VaR for Three Hypothetical Portfolios	6-42
Exhibit 6.12: Cumulative VaR for Three Hypothetical Portfolios	6-43
Stress Testing	6-43
Converting EVE to VaR	6-44
Section Review	6-45
EVE and VaR Summary	6-46
Chapter 6 Test	6-49

Chapter 7

Measuring the Rate Risk of Indeterminate Maturity, Administered Rate, and Putable Deposits

So, How Important Is Deposit Rate Risk?	7-2
A Summary: The Sensitivity of Measured IRR to Indeterminate Maturity Deposit Assumptions	7-4
Estimating the Maturity and/or Repricing of Indeterminate Maturity Deposits	7-5
Maturity Assumptions Vary Hugely	7-5
An Overview of Quantitative Tools for Calculating Indeterminate Maturity Deposit Runoff Rates and Average Lives.....	7-7
Method One: Decay or Attrition Analysis	7-8
Calculating Deposit Decay or Attrition.....	7-8
Decay Analysis Limitations.....	7-10
The Influence of Changes in Prevailing Interest Rates on Changes in Deposit Volumes: A Digression	7-11
Reasons Why Deposit Balances Are Not Always Rate Sensitive.....	7-14
The Influence of the Exercise of Depositors’ Options on Changes in Deposit Volumes	7-16
Segmented Volume and Replicating Portfolios	7-17
Method Two: Segmented Volume Analysis for Estimating Deposit Maturity	7-18
Using Trend Analysis to Segment Stable and Volatile Indeterminate Maturity Deposit Components — A Simple Application	7-19
Using Trend Analysis to Segment Stable and Volatile Deposit Components — A More Sophisticated Application.....	7-20
Method Three: Simple Regression Analysis — Finding a Floating Rate Bond with the Same Rate Sensitivity.....	7-20
Method Four: Replicating Portfolio Analysis for Estimating Deposit Maturity — The Most Common Method.....	7-21
Combining Segmentation Analysis and Replicating Portfolios	7-22
Method Five: Complex Replicating Portfolio Analysis	7-23
Method Six: Replicating Portfolio Analysis — The Jacobs Method	7-24
Moving Beyond Replicating Portfolios.....	7-26
Method Seven: Structural Models of Aggregate Behavior	7-26
Method Eight: Option Adjusted Spread	7-26
Estimating Deposit Maturities — A Summary	7-28
Estimating Administered Rates for Checking and Savings Accounts	7-30
Five Administered-Rate Variables.....	7-31
Caps and Floors	7-31
Time Lags	7-31
Beta.....	7-31
Administered Rate Sensitivity Summary	7-32
Asymmetrical Rate Changes.....	7-34
Path Dependency of Administered Rates	7-34
Dealing with Administered Rates	7-35
Certificates of Deposit	7-36
Chapter 7 Test	7-41

Chapter 8

Measuring the Rate Risk of Loans and Investments

Residential Mortgage Loan and Mortgage-Backed Security Prepayments	8-1
The Magnitude of Residential Mortgage Loan and Security Cash Flow Uncertainty.....	8-1
Distribution of Cash Flow Composition.....	8-2
Traditional Measures of Mortgage Prepayments	8-4
CPR	8-4
PSA.....	8-5
Disadvantages of the PSA Model	8-6
Predicting the Rate Sensitivity of Prepayments.....	8-6
Projections for Securities.....	8-6
Projection by Coupon Rate.....	8-7
Vector Analysis	8-8
Call Risk and Extension Risk.....	8-9
Call Risk and Extension Risk Are Asymmetrical.....	8-9
Transaction Costs.....	8-10
Modeling Prepayments as the Exercise of Options.....	8-10
Multi-Factor Models	8-10
A Closer Look at Loan Age.....	8-11
Other Factors Affecting Residential Mortgage Loan and Security Cash Flows	8-11
Irrationality	8-11
Path-Dependency.....	8-12
Pulling It All Together — Prepayment Forecasting Models.....	8-14
Other Borrower/Security Options	8-16
Additional Prepayment Options Characteristics to Consider	8-16
Put Options and Lines of Credit.....	8-16
Predicting Prepayments for Business Loans.....	8-17
Loan Rate Caps and Floors	8-17
Default Options and Non-Performing Assets	8-18
Administered Rates on Loans — A Bank Option	8-18
Floating Rates.....	8-19
Fixed Rates	8-20
Chapter 8 Test	8-21

Chapter 9

Rate Changes: Deterministic Scenarios and Stochastic Models

Essential Questions About Rate Changes to Be Modeled.....	9-1
Section Review.....	9-2
Selecting a Deterministic Rate Scenario.....	9-2
Section Review.....	9-4
Other Issues for Deterministic Rate Scenarios.....	9-4
The Size of Possible Rate Changes.....	9-5

Instantaneous Rate Shocks vs. Ramps	9-6
Parallel vs. Nonparallel Rate Changes	9-7
Exhibit 9.1: Parallel Shifts of Yield Curve.....	9-7
Exhibit 9.2: Nonparallel Rate Cycle Shifts (with an inverted yield curve).....	9-8
Exhibit 9.3: Nonparallel Rate Cycle Shifts (without an inverted yield curve).....	9-9
Using Principal Components Analysis to Define Non-Parallel Rate Changes	9-9
Exhibit 9.4: Estimated Net Income at Risk (Amounts in millions)	9-10
Exhibit 9.5: Yield Curve Twist June 30, 2004, and June 30, 2005.....	9-10
Evaluating Multiple Rate Change Scenarios.....	9-11
Exhibit 9.6: Variance in the Yield Curve	9-12
Exhibit 9.7: Level Factor (Shift).....	9-12
Exhibit 9.8: Slope Factor (Twist)	9-13
Section Review.....	9-15
Future Rate Changes, Statistical Tools, and Term Structure Models.....	9-15
Simple (Non-Stochastic) Term Structure Models.....	9-16
Duration, Parallel Shifts, and Implied Forwards.....	9-16
Exhibit 9.9: Implied Forward Yields	9-17
Exhibit 9.10: Distribution of Rate Changes by Size (period of low volatility).....	9-19
Exhibit 9.11: Normal and Fat-Tailed Distributions of Rate Changes	9-20
Introduction to Stochastic Term Structure Models	9-21
Exhibit 9.12: Steps for Stochastic Evaluation.....	9-22
Exhibit 9.13: Selected Term Structure Models	9-23
Section Review.....	9-23
Types of Term Structure Models	9-24
Analytical Solutions	9-24
From Analytical to Numerical Solutions	9-25
Monte Carlo Simulation	9-25
Finite Difference Methods.....	9-27
Binomial Lattices.....	9-27
Exhibit 9.14: A Simple Binomial Lattice.....	9-28
Bushy Trees.....	9-29
Trinomial Lattices.....	9-29
Exhibit 9.15: A Simple Trinomial Lattice	9-29
Section Review.....	9-30
Parameters for Term Structure Model.....	9-31
Volatility.....	9-31
Exhibit 9.16: A Simple Binomial Lattice with 1.5 Percent Volatility	9-31
Drift.....	9-32
Mean Reversion Speed.....	9-32
Arbitrage.....	9-33
Understanding Term Structure Model Parameters.....	9-33
Calibrating Parameters	9-33
Historical Volatility Curve Approach	9-34
Exhibit 9.17: Variance in Canadian Government Interest Rates.....	9-35

Advanced Volatility Curve Approach.....	9-35
Exhibit 9.18: Implied Mean Reversion Speed.....	9-36
Implied Parameters from an Observable Yield Curve.....	9-36
Fitting Parameters to Volatility-Sensitive Instruments	9-37
Parameter Estimation for Multi-Factor Models.....	9-37
Section Review.....	9-37
Choosing a Term Structure Model.....	9-38
Chapter 9 Test	9-40

Chapter 10

Selecting and Installing AL Models

Modeling Process	10-1
Ten Key Features of Asset/Liability Models.....	10-2
1. Extent of Aggregation of Information Concerning the Bank’s Current Position	10-3
2. Manual vs. Automated Input of Information Concerning the Bank’s Current Position	10-4
Transferring Accounting Data into the Simulation Model.....	10-4
Bank Needs and Simulation Model Sophistication	10-4
3. Ability to Capture Product Option and Basis Risk.....	10-5
Simulating the Exercise of Embedded Options.....	10-6
Criteria for Selecting Product Options Capabilities	10-7
Basis Risk.....	10-7
4. Number and Choice of Rate Scenarios.....	10-7
5. Features for Facilitating Realism of Rate Scenarios.....	10-8
6. Level of Output Detail Provided	10-10
Detail Reports	10-10
Comparative Reports	10-10
Management Reports.....	10-11
Deviations from Bank Policy.....	10-11
7. Risk Measurement Methodologies	10-11
8. Regulatory Compliance Issues for Interest Rate Risk Models.....	10-12
Bank Examiner Guidelines	10-13
9. Easy “What-If” Modeling	10-13
10. Applicability to Other Management Goals	10-14
Budgeting	10-14
Investment Portfolio Management	10-14
Required Financial Disclosures.....	10-15
Product Pricing.....	10-15
Using Data from Call Reports	10-15
Option-Adjusted Spreads, Monte Carlo, and Other Advanced Modeling Features.....	10-16
Rate Scenarios: Stochastic and Term Structure Modeling Capabilities	10-17
Capability to Model Prepayments and Other Embedded Options.....	10-19
Option Adjusted Spreads.....	10-19
Prepayment Models	10-19

Advanced Modeling Summary	10-20
Integrating Model Techniques	10-21
Selecting a Rate Risk Model	10-22
Identifying Your Rate Risk Model Requirements	10-22
Evaluating Interest Rate Risk Models	10-23
Installing Interest Rate Risk Models	10-27
Chapter 10 Test	10-29
Exhibit 10.1: A Guide to ALM Software.....	10-33
Exhibit 10.2: ALM Outsourcing and Consulting Vendors	10-36
Exhibit 10.3: Required Model Features, Functions, and Characteristics	10-39

Chapter 11

Using Models and Managing Model Risk

Model Risk.....	11-1
Model Flaws, Model Errors, and Model Obsolescence	11-1
Data and Assumption Inputs	11-2
Data Describing the Bank's Current Position	11-3
The Impact of Data Aggregation	11-4
Common Risk Characteristics.....	11-4
Match to Bank's Risk Exposure Profile	11-4
Information About Future Activity.....	11-5
Incorporating Assumptions for Future Business: The Good, the Bad, and the Surprising	11-5
What Is Best Practice Modeling Methodology?.....	11-6
What Is Best Practice Model Governance?	11-7
Understanding the Accuracy of Model Output.....	11-8
Managing the Integrity of Simulation Models: Benchmarking, Backtesting, and Validation.....	11-8
Three Processes for Model Validation	11-9
What Is Backtesting?.....	11-9
Controlling Data Quality.....	11-10
Controlling, Validating, and Backtesting Assumptions	11-12
Limitations of Interest Rate Risk Models	11-16
Limited or No Capture of External Variables	11-17
Weak Links.....	11-17
Overly Detailed Models.....	11-17
Using Models to Maximize Risk Management Benefits.....	11-18
Creating Logical Scenario Groupings.....	11-18
The Interrelated Components of Scenarios.....	11-19
Scenario Selection	11-19
Improving Model Generated Management Reports.....	11-19
What Is Needed?.....	11-20
What Is Not Needed?	11-20
Improving Management Confidence in IRR Modeling	11-21
Internal Control Checklist For IRR Models.....	11-22

Chapter 11 Test 11-25

Chapter 12
Interest Rate Risk Measurement Summary

The Scope of Typical Rate Risk Measurement: Missing Pieces 12-1

The Rate Sensitivity Noninterest Income and Noninterest Expense: Volume and Value Affects 12-2

The Size of Noninterest Cash Flow Streams Can Be Material 12-2

Some Noninterest Cash Flows Are Highly Rate Sensitive 12-3

The Value of Cash Flows Is Rate Sensitive Even When the Volume Is Not 12-5

Including Both Noninterest Income and Noninterest Expense: The Optimal Solution 12-6

The Second Best Solution 12-7

More Missing Pieces: Franchise Value 12-7

Core Deposits and Core Deposit Intangibles 12-7

Other Sources of Franchise Value 12-8

Summary of Included and Excluded Elements 12-8

The Impact of Credit Risk 12-10

Interest Rate Sensitivity of Credit-Related Expenses 12-10

Counter-Intuitive Impact of Changes in the Bank's Credit Quality on EVE 12-12

Limits to the Science: Inherent Uncertainty in Rate Risk Measurement 12-13

The Imprecision of Position Data and Assumption Errors 12-14

Assumption Sensitivity 12-15

A Case Study 12-16

Measurement Solutions: What Works and When 12-19

Capturing the Four Components of IRR 12-20

Measurement Techniques at a Glance 12-20

Measurement Summary 12-21

Rate Risk Measurement from 10,000 Feet 12-22

Chapter 12 Test 12-24

Volume 2

Chapter 13
ALM Policies, Management Structures, and Risk Limits

An Overview of AL Management 13-1

The Scope of IRR Management 13-1

IRR Management as a Six-Element Process 13-2

IRR Policy 13-4

Why Do We Need a Formal IRR Policy? 13-4

The Elements of an Effective ALM or IRR Policy 13-4

1. Frequency and Method for Monitoring Interest Rate Risk Exposure 13-5

2. Rate Risk Exposure Limits 13-6

3. Clear Identification of Authority/Responsibility 13-9

4. Reporting 13-10

5. Acceptable and Unacceptable Courses of Action for Managing Interest Rate Risk.....	13-12
6. Measures to Take to Monitor Compliance with the IRR Policy.....	13-13
7. Model Risk	13-13
8. Measures to Test the Accuracy of Estimated or Projected Exposure to Changes in Prevailing Interest Rates.....	13-15
9. Measures to Test the Effectiveness of Rate Risk Management Activities.....	13-15
10. Regulatory Compliance.....	13-16
11. Policy Coordination.....	13-17
12. Other Provisions Suitable for ALM or IRR Policies	13-17
Making the IRR Policy Effective.....	13-17
IRR Policy Flaws.....	13-18
Management Structure	13-20
Asset/Liability Management Committee — ALCO.....	13-22
ALCO’s Overall Mission.....	13-22
ALCO Functions and Responsibilities	13-23
ALCO Membership.....	13-25
Making the ALCO Effective.....	13-27
ALCO Meeting Topics	13-29
Setting and Using IRR Exposure Limits.....	13-31
The Independent Variable: Selecting the Rate Change to Analyze.....	13-33
The Dependent Variable: Selecting Management’s Target	13-33
Focus on Income and Equity at Risk — But Not Equally	13-34
Estimating the Bank’s Risk Appetite	13-35
Risk Appetite In Theory — Top-Down Approaches.....	13-36
Bottom-Up Approaches.....	13-37
Synthesis	13-38
Risk Appetite in Practice	13-38
Exception for Liquidity Risk.....	13-40
Risk Appetite Summary.....	13-40
Connecting Risk Appetitive Concepts to Interest Rate Risk Limit Setting	13-40
Set an Interest Rate Loss Limit	13-44
Outliers	13-44
Using VaR for Limits.....	13-44
Multiple Limits	13-44
Tracking Actual Exposures vs. Limits.....	13-45
Using Sublimits.....	13-45
Ineffective IRR Limits	13-48
Chapter 13 Test	13-50
Exhibit 13.1: Guidelines for Drafting Your Rate Risk Policy	13-55
Exhibit 13.2: Sample Rate Risk Management Policy for Placid County Bank	13-59
Exhibit 13.3: Policy Review Worksheet	13-78

Chapter 14

ALM Decision Making, Implementation, and Oversight

Introduction to Rate Risk Management Issues.....	14-1
Decision Making	14-1
Selecting a Risk Management Philosophy: Aggressive vs. Conservative Risk Exposure	14-1
A Framework for Understanding Aggressive vs. Conservative IRR Management.....	14-2
The Influence of Measurement and Management Quality on Decision Making.....	14-4
Understanding What “Risk Neutral” Really Means.....	14-5
The Case for Active Management of Interest Rate Risk	14-7
Recognizing the Time When a Change in the Bank’s Risk Exposure Is Needed.....	14-7
The Risk Continuum.....	14-8
The Impact of Confidence — Risk Targets Are Not the Same as Risk Limits	14-8
The IRR Decision-Making Process	14-9
Determine Your Rate Outlook.....	14-10
What Scenario Should Management Focus On?.....	14-11
Use Multi-Dimensional Scenarios	14-14
Decide on an IRR Position	14-16
Determine the Basic Implementation Strategy and Delegate Implementation Responsibility.....	14-17
Flawed Decision Making.....	14-18
The Non-Decision	14-18
Wishful Thinking	14-19
Delayed Decisions	14-19
Requirements for Good Decision Making.....	14-20
Implementation of Rate Risk Management Decisions	14-21
Flawed Implementation.....	14-21
Requirements for Good Implementation.....	14-22
Be Prepared to Take Chances.....	14-23
Watch Out for Increased Risk Exposures Created in the Course of Reducing Existing Risk Exposures ...	14-23
Implementation Must Include Communication	14-24
Oversight and Testing.....	14-25
IRR Oversight Objectives.....	14-25
Effective Challenge.....	14-25
Internal Controls.....	14-27
Model Validation.....	14-28
Management Reporting.....	14-30
Backtesting	14-30
Objectives of Backtesting and Tracking	14-30
Inherent Limitations of Backtesting.....	14-31
Testing and Tracking Despite the Limitations.....	14-33
Normalized Net Interest Margin	14-35
Rate/Mix/Volume Analysis	14-36
Oversight Challenges	14-37
Lack of Standards to Test Compliance Against	14-38

Lack of Independence in Testing.....	14-40
Regulatory Expectations for Managing Model Risk.....	14-40
Some Perspectives on Managing Interest Rate Risk	14-42
Chapter 14 Test	14-44

Chapter 15

Managing Interest Rate Risk Without Using Off-Balance Sheet Derivatives

Introduction	15-1
Risk Management Strategies	15-1
Risk Minimization Tactics.....	15-1
Four Groups of IRR Management Tactics.....	15-2
IRR Avoidance Tactics	15-3
Strategic Asset and Liability Selection Decisions	15-3
Product Design and Marketing	15-3
Origination for Sale.....	15-4
Limits of IRR Avoidance Tactics	15-4
IRR Reduction Tactics	15-5
Using Securitization for IRR Management	15-7
Limitations on IRR Reduction Tactics.....	15-8
Critical Impact of Customer Preferences on Rate Risk Management Strategies and Tactics	15-8
Isolating Rate Risk by Product Type and Then Managing Rate Risk by Marketing	15-8
Introduction to Hedging	15-11
Two Types of Hedging: Value and Cash Flow	15-12
Hedging Does Not Require Derivatives	15-12
Hedging Without Off-Balance Sheet Derivatives: Concepts and Issues	15-12
Defensive Hedging of IRR from Core Bank Activities.....	15-12
Natural (On-Balance Sheet) Hedges	15-13
Potentially Confusing Differences in Natural Hedge Terminology.....	15-14
Natural Hedging Is Not the Same as Balance Sheet Matching.....	15-15
Risk Reduction Tactics Employing Natural (On-Balance Sheet) Hedges.....	15-16
Flexibility and Diversification.....	15-17
Influencing Customer Preferences to Promote Natural Hedging.....	15-18
Operational Weaknesses Associated with Natural or On-Balance Sheet Hedging	15-19
Summary	15-20
Chapter 15 Test	15-21

Chapter 16

Rate Risk and Investment Portfolio Management

IRR Exposure in Investment Assets.....	16-1
Fixed-Rate Noncallable Securities.....	16-1
Exhibit 16.1: Interest Rate Sensitivity of a 6 Percent Fixed-Rate Security (to a ± 200 basis point rate change).....	16-2

Floating-Rate Securities.....	16-3
Callable Securities, Step-Ups, and Structured Notes.....	16-4
Callable Bonds.....	16-4
Step-Up Bonds.....	16-4
Structured Notes.....	16-4
Exhibit 16.2: Characteristics of ARMs and Floaters.....	16-5
Mortgage-Backed Securities.....	16-6
Exhibit 16.3: Volatility Comparison Between a 10-Year Treasury Bond and a 12-Year Mortgage Pass-Through Bond (before considering the changes in prepayment speeds).....	16-7
Section Review.....	16-7
Measuring Interest Rate Risk in Investments.....	16-8
Gap Reports.....	16-8
Duration Analysis.....	16-8
Income and EVE Sensitivity Simulation.....	16-8
Quantifying MBS Prepayments.....	16-9
Constant Prepayment Rate.....	16-9
Public Securities Association Model.....	16-9
Exhibit 16.4: Sensitivity of Mortgage Prepayments to Changes in Interest Rates.....	16-11
Modeling Investments in the Aggregate.....	16-11
Section Review.....	16-11
Using Investments to Reduce or Change Rate Risk Exposures.....	16-12
Tactics for Using Investment Securities to Reduce Interest Rate Risk.....	16-12
Tactic 1: Own Short-Term Securities.....	16-13
Tactic 2: Purchase Floating-Rate Securities.....	16-13
Tactic 3: Avoid Securities with High Optionality.....	16-14
Tactic 4: Diversify MBS Pool Terms.....	16-15
Tactic 5: Focus MBS Holdings in Short Maturity CMOs.....	16-15
Tactic 6: Focus MBS Holdings on Out-of-the-Money Options.....	16-16
Tactic 7: Diversify Security Coupons.....	16-18
Tactic 8: Select ARMs with High Caps.....	16-18
Tactic 9: Select Indexes That Meet Your Situation.....	16-18
Tactic 10: Diversify Indexes.....	16-19
Tactic 11: Acquire Investments with Offsetting Rate Risk Sensitivity.....	16-19
Tactic 12: Stress the Analysis Aspect of Managing Rate Risk.....	16-20
Using Investments to Manage IRR Elsewhere on the Balance Sheet.....	16-21
Section Review.....	16-23
Constraints on Managing IRR with Investments.....	16-24
Regulatory Constraints.....	16-24
Required Analysis of Investment Risks.....	16-25
Regulatory Restrictions on the Use of Investment/Derivatives Instruments for Hedging.....	16-27
Accounting Constraints.....	16-28
FAS 115.....	16-28
FAS 133.....	16-29
EITF Issue 03-01.....	16-31

Section Review.....	16-31
Problems with Using Derivatives for Interest Risk Management	16-31
Constraints Arising from Conflicting Management Goals	16-33
Section Review.....	16-34
Investment Portfolio Rate Risk Summary.....	16-34
Chapter 16 Test.....	16-36

Chapter 17

Managing Interest Rate Risk: Hedging with Off-Balance Sheet Derivative Instruments

Should You Use Derivative Hedge Instruments to Manage IRR?.....	17-1
Advantages of Using Derivatives.....	17-2
Regulatory Advice for Using Derivatives.....	17-2
Prerequisites for Using Derivatives.....	17-3
Disadvantages of Using Derivatives.....	17-4
Chapter Map	17-4
Key Definitions and Issues	17-5
What Are Derivatives?.....	17-5
Key Facts About Derivatives.....	17-6
Key Accounting and Regulatory Definitions.....	17-6
Use of the Term in an Important Regulation.....	17-6
Use of the Term in an Important Accounting Rule	17-6.1
What Is a Derivative Hedge Instrument?.....	17-7
What Is an End User?.....	17-8
Exchange-Traded vs. Over-the-Counter Derivatives	17-9
Building Block Components of All Financial Instruments	17-9
Differences in Risk vs. Reward Exposures	17-10
Two-Sided Interest Rate Risk.....	17-10
One-Sided Interest Rate Risk.....	17-12
Understanding How the Derivatives Fit Together	17-14
Macro vs. Micro Risk Management.....	17-14
Micro Hedging.....	17-14
Macro Hedging.....	17-15
Major Off-Balance Sheet Derivative Hedge Instruments.....	17-17
Forward Contracts	17-17
Futures Contracts	17-17
Futures Pricing Conventions	17-18
Margin Requirements	17-18
Options	17-18
Defining Option Value.....	17-20
Understanding Changes in Option Prices and Delta	17-21
Options Pricing Conventions	17-22
Option Types.....	17-22

Introducing the Exotic Option	17-23
Interest Rate Swaps.....	17-23
Swap Transaction Structure and Terms.....	17-24
Typical Swap Transactions	17-25
Alternatives to Plain Vanilla Swaps.....	17-28
Swap Market Participants.....	17-29
Swap Market Structure	17-29
Swap Documentation.....	17-30
Advantages of Swaps	17-31
Disadvantages of Swaps	17-31
Caps, Floors, and Collars.....	17-32
Caps.....	17-32
Floors	17-33
Collars.....	17-33
General Characteristics of Caps, Floors, and Collars.....	17-33
Exotic Caps.....	17-34
Hedge Instruments Summary.....	17-34
IRR Management Tactics Using Off-Balance Sheet Derivative Hedge Instruments.....	17-37
Using Interest Rate Swaps to Manage Gap/Mismatch Risk	17-37
Base Case Without a Swap	17-38
Impact of an Interest Rate Change.....	17-38
Base Case with a Swap	17-39
Impact of an Interest Rate Change After the Swap	17-40
Effect of the Swap on the Bank's Gap Position	17-42
Effect of the Swap on the Bank's Economic Value of Equity.....	17-42
Using Caps to Manage Gap/Mismatch Risk.....	17-45
Using Interest Rate Swaps to Manage Basis Risk	17-45
Using Options to Manage Basis Risk.....	17-48
Using Swaps to Manage Yield Curve Risk.....	17-50
Using Caps and Floors to Manage Option Risk.....	17-50
Hedging in an Imperfect World — Adjusting for Reality.....	17-51
Using Broker/Dealers for Derivatives Transactions	17-53
Managing Risks of Off-Balance Sheet Derivative Hedges.....	17-54
Credit Risk.....	17-55
Liquidity Risk.....	17-55
Transaction or Operational Risk.....	17-56
Compliance Risk.....	17-56
Legal Risk	17-57
Derivatives Disclosure Requirements.....	17-57
Requirements of FAS 107 and FAS 119	17-58
Required Disclosures	17-58
Disclosures That Banks Are Encouraged to Make	17-60
Hedge Accounting Requirements Under FAS 133.....	17-60
Applicability of Hedge Accounting.....	17-61

The Simple Essence of Complex Accounting	17-63
Fair Value Hedges.....	17-64
Accounting for Gains and Losses for Fair Value Hedges	17-65
Cash Flow Hedges	17-65
Accounting for Gains and Losses for Cash Flow Hedges.....	17-66
Hedge Effectiveness.....	17-67
Establishing the Method to Be Used.....	17-67
Assessing the Effectiveness of Fair Value Hedges	17-68
Assessing the Effectiveness of Cash Flow Hedges.....	17-68
A Shortcut Method for Swap Hedges	17-69
Hedging Portfolios of Similar Items	17-69
Derivatives Disclosure Requirements.....	17-70
Hedge Accounting Summary.....	17-70
Summary	17-72
Chapter 17 Test.....	17-73

Chapter 18

Liquidity Risk Measurement and Management

Liquidity Ratios	18-1
Loan-to-Deposit Ratio — the Swamp Creature That Will Not Die.....	18-1
The Broader Picture: Liquidity Ratios in a Nutshell.....	18-2
Major Flaws in Liquidity Ratios	18-3
Liquidity Ratio Summary.....	18-5
Stock Measures and Flow Measures.....	18-5
Cash Flow Forecasts Are the Way to Go	18-6
Time Buckets.....	18-7
Contractual Cash Flows and Maturity Transformation	18-8
Once Again, This Time with Behavioral Assumptions	18-8
Format Is Surprisingly Important	18-10
Additional Clarity — FCE and CBC.....	18-14
Building Your Cash Flow Forecast	18-15
Scenario Analysis.....	18-16
Liquidity Risk Is Situation Specific.....	18-16
Liquidity Needs in the Ordinary Course of Business.....	18-17
Bank-Specific Funding Crises.....	18-17
Systemic Liquidity Needs	18-18
Types of Systemic Liquidity Crises.....	18-18
The Impact of Systemic Liquidity Crises.....	18-19
Stress Levels.....	18-20
The Time Continuum	18-20
Liquidity Sources Vary Depending on the Time Available.....	18-20
Amount of Liquidity Varies Depending on Duration of the Need.....	18-21
Buying Time: Liquidity Can Provide Enough Time to Resolve Problems and Survive a Crisis.....	18-21

Applying Stress Tests Results to Risk Management	18-22
Liquidity Buffers	18-23
What Assets Compose Your Buffer?	18-24
How Shiftable Are Those Assets?	18-25
Focus on Systemic Crises and Capital Markets Flights to Quality	18-26
How Much Liquidity Do Buffers Provide?.....	18-27
Numbers for Your Stress Tests: Buffer Assets	18-29
Measuring and Managing Liquidity Risk from Liabilities	18-31
Numbers for Your Stress Tests: Indeterminate Maturity Deposits	18-32
Wrong Method.....	18-33
Wrong Target	18-33
First Required Step: Define Stickiness Attributes	18-33
Second Required Step: Calculate a Stickiness Score.....	18-35
Third Required Step: Calculate a Stickiness Hierarchy	18-36
Fourth Required Step: Generate Estimates for Each Source Type.....	18-36
Numbers for Your Stress Tests: Time Deposits	18-38
Time Deposit or Borrowing?	18-39
Borrowings	18-41
Growing Dependence on Time Deposits and Borrowings.....	18-41
Stickiness Can Be a Problem: Wholesale Funds Can Increase Liquidity Risk.....	18-42
Systemic Disruptions	18-43
Dependence on the Credit Quality of the Bank and Accurate Perceptions of Funds Providers	18-43
Numbers for Your Stress Tests: Borrowings.....	18-44
Can You Rely on FHLB Advances?	18-44
Tactics for Managing Liquidity Risk from Liabilities	18-46
Deposit Retention Programs.....	18-46
Focus on the Term Structure of Liabilities.....	18-47
Controlling Placement of Customer Cash	18-48
Tactics for Managing Capital Markets Access	18-48
Manage to Volatile Liability Dependency or Net Stable Funding.....	18-49
Monitor Your Forecasted Trend	18-50
Diversification of Liquidity Sources.....	18-50
Diversification Does Not Always Reduce Risk.....	18-50
Diversification of Wholesale Funding Sources Does Not Always Reduce Liquidity Risk.....	18-51
Using Diversification Effectively	18-51
Sensitivity Testing	18-52
Matz' Seven Liquidity Risk Rules	18-54
Rule 1: Liquidity Risk Is Unavoidable.....	18-54
Rule 2: Liquidity Risk Is Heterogeneous	18-54
Rule 3: You Always Have More Than You Need Until You Don't	18-54
Rule 4: Scenarios Are the Language of Liquidity Risk.....	18-55
Rule 5: No Financial Institution Can Ever Afford to Hold Enough Liquid Assets Under Normal Conditions to Survive a Severe or Prolonged Funding Disruption.....	18-56

Rule 6: A Dollar Reduction in Funds Needed, Regardless of Where or How the Reduction Is Achieved, Provides Exactly the Same Liquidity Benefit as a Dollar Increase in Funds Available, Regardless of Where or How the Funds Are Obtained 18-56

Rule 7: Rewards from Good Liquidity Risk Management Are Not Directly Observable..... 18-57

Chapter 18 Test 18-58

Chapter 19

Optimizing the Mix of Loans and Investments

Returns from Loans vs. Returns from Investments 19-1

Adjusting Nominal Yields to Approximate Real Yields 19-4

Liquidity from Investments vs. Liquidity from Loans..... 19-7

Amount of Liquidity Available from Bank Investment Portfolios..... 19-8

The Marketability of Bank Investment Securities 19-11

Timing of Securities Purchases 19-11

Reaching for Yield 19-12

Changes in Investor Preferences..... 19-12

Liquidity Summary 19-13

Issues to Consider for Optimizing the Mix Between Loans and Securities 19-14

Is a High Loan-to-Asset Ratio a Requirement for Success?..... 19-15

Contribution to Bank Profitability..... 19-15

Contribution to Bank Failures..... 19-17

The Role of Loan Growth Management 19-18

Implications for Investment Portfolio Management 19-19

Implications for Loan Portfolio Management 19-20

Implications for Loan Pricing..... 19-20

Relationship Banking..... 19-22

Liquidity 19-23

Enhanced Credit Risk Management from Diversification..... 19-23

Influence of Investors and Regulators on the Relative Size of Investment and Loan Holdings..... 19-23

Summary 19-25

Chapter 19 Test 19-26

Chapter 20

Perspectives

Interest Rate Risk in a Nutshell..... 20-2

What Are the Drivers of Interest Rate Risk?..... 20-2

How Much Risk Do We Have? 20-3

How Much Risk Are We Willing to Accept?..... 20-4

What Are We Willing to Do to Lessen Exposure? 20-4

What Constraints on Action Does the Bank Have?..... 20-4

What Degrees of Freedom for Action Does the Bank Have? 20-5

Section Review..... 20-5

Interdependencies: Rate Risk Does Not Stand Alone..... 20-6

IRR and Earnings	20-6
Exhibit 20.1: Mismatch or Gap Profits	20-7
Exhibit 20.2: Option Profits	20-7
Another Issue for Banks Using Funds Transfer Pricing.....	20-8
IRR Management and the Timing of Earnings	20-8
The Impact of GAAP Accounting Rules	20-9
IRR and Credit Risk	20-9
IRR and Liquidity Risk	20-11
Exhibit 20.3: Rate Sensitivity of Asset Cash Flows.....	20-12
Exhibit 20.4: Influences of Discretionary Cash Flows.....	20-12
Exhibit 20.5: The Dynamics of Interest Rate Changes on Liquidity Risk and Interest Rate Risk.....	20-13
IRR and Capital	20-14
IRR and Strategic Planning	20-14
IRR and Multinational Banks	20-14
IRR and Bank Holding Companies.....	20-15
Section Review.....	20-15
Focus on the Big Picture.....	20-15
Exhibit 20.6: Interest Rate Risk Measurement and Management	20-17
It's About Management.....	20-18
Section Review.....	20-19
Chapter 20 Test	20-20

Glossary