

2026  
FRM<sup>®</sup>  
Exam Prep

# SchweserNotes<sup>™</sup>

Market Risk Measurement and Management

**Part II** | Book 1

KAPLAN<sup>®</sup> SCHWESER

# Kaplan Schweser's Path to Success

FRM® Exam Part II

FRM®

## Welcome

As the head of Advanced Designations at Kaplan Schweser, I am pleased to have the opportunity to help you prepare for the FRM® exam. Kaplan Schweser has decades of experience in delivering the most effective FRM exam prep products in the market and I know you will find them to be invaluable in your studies.

Our products are designed to be an integrated study solution across print and digital media to provide you with the best learning experience, whether you are studying with a physical book, online, or on your mobile device.

Our core product, the SchweserNotes™, addresses all Topic Areas, Readings, and Learning Objectives in the FRM curriculum. Each reading in the SchweserNotes has been broken into smaller, bite-sized modules with Module Quizzes interspersed throughout to help you continually assess your comprehension. Topic Quizzes and Checkpoint Exams appear online to help you gauge your knowledge of the material before you move on to the next section.

All purchasers of the SchweserNotes receive online access to the Kaplan Schweser online platform (our learning management system or LMS) at [www.Schweser.com](http://www.Schweser.com). In the LMS, you will see a dashboard that tracks your overall progress and performance as well as an Activity Feed, which provides structure and organization to the tasks required to prepare for the FRM exam. You also have access to the online versions of the SchweserNotes and Module Quizzes. Look for the icons indicating where Module Quizzes are available online. I strongly encourage you to enter your Module Quiz answers online and use the dashboard to track your progress and stay motivated.

Again, thank you for trusting Kaplan Schweser with your FRM exam preparation. We're here to help you throughout your journey to become a certified Financial Risk Manager.

Regards,



Derek Burkett, CFA, FRM, CAIA  
Vice President (Advanced Designations)

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# Book 1: Market Risk Measurement and Management

**SchweserNotes™ 2026**

FRM Part II

**KAPLAN**  **SCHWESER**

SCHWESERNOTES™ 2026 FRM® PART II BOOK 1: MARKET RISK MEASUREMENT AND MANAGEMENT

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# WELCOME TO THE 2026 SCHWESERNOTES™

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Thank you for trusting Kaplan Schweser to help you reach your career and educational goals. We are very pleased to be able to help you prepare for the FRM Part II exam. In this introduction, I want to explain the resources included with the SchweserNotes, suggest how you can best use Kaplan Schweser materials to prepare for the exam, and direct you toward other educational resources you will find helpful as you study for the exam.

## **SchweserNotes™**

The SchweserNotes consist of five volumes that include complete coverage of all FRM assigned readings and learning objectives (LOs), as well as module quizzes (multiple-choice questions for every reading) to help you master the material and check your retention of key concepts.

## **Practice Questions**

To retain the material, it is important to quiz yourself often. We offer an online version of the SchweserPro™ QBank, which contains hundreds of Part II practice questions and explanations. We also offer Topic Quizzes and Checkpoint Exams online to further help you retain and apply what you have learned.

## **Mock Exams**

Schweser provides four full-length, 4-hour practice exams, each consisting of 80 questions. These online exams are essential tools for building the speed and exam-taking skills needed to pass the FRM exam. Each Mock Exam includes comprehensive answer explanations to help you evaluate your performance.

## **OnDemand Class**

Our OnDemand Class provides comprehensive online instruction for every reading in the FRM curriculum. This video lecture series brings the personal attention of a classroom into your home or office with over 50 hours of instruction. The class offers in-depth coverage of challenging concepts along with discussions of sample exam questions. All videos are available for viewing at any time throughout the season. Candidates enrolled in the OnDemand Class also gain access to the Schweser Community, where they can receive support and interact with fellow candidates throughout their studies.

## **Late-Season Review**

Late-season review and exam practice can make all the difference. Our OnDemand Review Package helps you evaluate your exam readiness with products specifically designed for late-season studying. This study package includes the OnDemand Review (20-hour archived

online workshop covering essential curriculum topics) and Schweser's Secret Sauce® (concise summary of the FRM curriculum).

## Part II Exam Weightings

When preparing for the exam, be familiar with the weightings assigned to each topic area within the curriculum. The Part II exam weights and questions are as follows:

Book	Topic Area	Exam Weight	Exam Questions
1	Market Risk Measurement and Management	20%	16
2	Credit Risk Measurement and Management	20%	16
3	Operational Risk and Resilience	20%	16
4	Liquidity and Treasury Risk Measurement and Management	15%	12
5	Risk Management and Investment Management	15%	12
5	Current Issues in Financial Markets	10%	8

## How to Succeed

The FRM Part II exam is a significant challenge that demands substantial time and effort—there are no shortcuts to success. The curriculum covers 107 assigned readings and almost 600 learning objectives. To be fully prepared, you must learn the material, understand key concepts, and master essential terminology and techniques. The exam consists of 80 multiple-choice questions that you'll need to answer both quickly and accurately. While most candidates spend an average of 300 hours preparing, the actual study time required will depend on your background and professional experience.

Expect the Global Association of Risk Professionals (GARP) to test your understanding in ways that reveal how well you've mastered the Part II curriculum. Begin your preparation early and follow your study plan consistently. Start by reading the SchweserNotes™ and completing the practice questions for each reading. After finishing each book, use the online Topic Quiz questions to see how key concepts may be presented on the exam.

It is recommended that you complete your initial review of the entire curriculum at least two weeks before your exam window (earlier, if possible). This will give you sufficient time for practice and focused review. During the final review period, be sure to take all available Schweser Mock Exams. This stage will provide a clear assessment of your overall readiness and highlight which readings may require additional attention. Practicing with exam-like questions across all topic areas and refining your time management skills will be key determinants of your success on exam day.

Best regards,

*Eric Smith*

Eric Smith, CFA, FRM, FDP

Director, Advanced Designations

Kaplan Schweser

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# Readings and Learning Objectives

## STUDY SESSION 1

### 1. Estimating Market Risk Measures: An Introduction and Overview

Kevin Dowd, *Measuring Market Risk, 2nd Edition* (West Sussex, UK: John Wiley & Sons, 2005). Chapter 3.

After completing this reading, you should be able to:

- estimate VaR using a historical simulation approach.
- estimate VaR using a parametric approach for both normal and lognormal asset price distributions.
- estimate the expected shortfall given profit and loss (P&L) or return data.
- estimate risk measures by estimating quantiles.
- evaluate estimators of risk measures by estimating their standard errors.
- interpret quantile-quantile (QQ) plots to identify the characteristics of a distribution.

### 2. Non-Parametric Approaches

Kevin Dowd, *Measuring Market Risk, 2nd Edition* (West Sussex, UK: John Wiley & Sons, 2005). Chapter 4.

After completing this reading, you should be able to:

- apply the bootstrap historical simulation approach to estimate coherent risk measures.
- describe historical simulation using non-parametric density estimation.
- compare and contrast the age-weighted, the volatility-weighted, the correlation-weighted, and the filtered historical simulation approaches.
- identify advantages and disadvantages of non-parametric estimation methods.

### 3. Parametric Approaches (II): Extreme Value

Kevin Dowd, *Measuring Market Risk, 2nd Edition* (West Sussex, UK: John Wiley & Sons, 2005). Chapter 7.

After completing this reading, you should be able to:

- explain the importance and challenges of extreme values in risk management.
- describe extreme value theory (EVT) and its use in risk management.
- describe the peaks-over-threshold (POT) approach.
- compare and contrast the generalized extreme value (GEV) and POT approaches to estimating extreme risks.
- discuss the application of the generalized Pareto (GP) distribution in the POT approach.
- explain the multivariate EVT for risk management.

### 4. Backtesting VaR

Philippe Jorion, *Value at Risk: The New Benchmark for Managing Financial Risk, 3rd Edition* (New York, NY: McGraw-Hill, 2007). Chapter 6.

After completing this reading, you should be able to:

- describe backtesting and exceptions and explain the importance of backtesting VaR models.
- explain the significant difficulties in backtesting a VaR model.
- evaluate the accuracy of a VaR model based on exceptions or failure rates by using a model verification test.
- identify and describe Type I and Type II errors in the context of a backtesting process.
- explain the need to consider conditional coverage in the backtesting framework.
- describe the Basel rules for backtesting.

## 5. VaR Mapping

**Philippe Jorion, *Value at Risk: The New Benchmark for Managing Financial Risk, 3rd Edition* (New York, NY: McGraw-Hill, 2007). Chapter 11.**

After completing this reading, you should be able to:

- a. explain the principles underlying VaR mapping and describe the mapping process.
- b. explain how the mapping process captures general and specific risks, and calculate these risks in a portfolio given a set of primitive risk factors.
- c. differentiate among the three methods for mapping portfolios of fixed-income securities.
- d. summarize how to map a fixed-income portfolio into positions of standard instruments.
- e. describe how mapping of risk factors can support stress testing.
- f. explain how VaR can be calculated and used relative to a performance benchmark.
- g. describe the method of mapping forwards, forward rate agreements, interest rate swaps, and options.

## 6. Validating Bank Holding Companies' Value-at-Risk Models for Market Risk

**David Lynch (Editor), Iftekhar Hasan (Editor), Akhtar Siddique (Editor), *Validation of Risk Management Models for Financial Institutions* (Cambridge University Press, 2023). Chapter 2.**

After completing this reading, you should be able to:

- a. describe some important considerations for a bank in assessing the conceptual soundness of a VaR model during the validation process.
- b. explain how to conduct sensitivity analysis for a VaR model, and describe the potential benefits and challenges of performing such an analysis.
- c. describe the challenges a financial institution could face when calculating confidence intervals for VaR.
- d. discuss the challenges in benchmarking VaR models and various approaches proposed to overcome them.

## 7. Beyond Exceedance-Based Backtesting of Value-at-Risk Models: Methods for Backtesting the Entire Forecasting Distribution Using Probability Integral Transform

**Diana Iercosan, Alysa Shcherbakova, David McArthur and Rebecca Alper, *Validation of Risk Management Models for Financial Institutions* (Cambridge University Press, 2023). Chapter 4.**

After completing this reading, you should be able to:

- a. identify the properties of an exceedance-based backtest that indicate a VaR model is accurate, and describe how these properties are reflected in a PIT-based backtest.
- b. explain how to derive probability integral transforms (PITs) in the context of validating a VaR model.
- c. describe how the shape of the distribution of PITs can be used as an indicator of the quality of a VaR model.
- d. describe backtesting using PITs, and compare the various goodness-of-fit tests that can be used to evaluate the distribution of PITs: the Kolmogorov-Smirnov test, the Anderson-Darling test, and the Cramér-von Mises test.

## STUDY SESSION 2

### 8. Correlation Basics: Definitions, Applications, and Terminology

**Gunter Meissner, *Correlation Risk Modeling and Management, 2nd Edition* (Risk Books, 2019). Chapter 1.**

After completing this reading, you should be able to:

- a. describe financial correlation risk and the areas in which it appears in finance.
- b. explain how correlation contributed to the global financial crisis of 2007–2009.
- c. describe how correlation impacts the price of quanto options as well as other multi-asset exotic options.

- d. describe the structure, uses, and payoffs of a correlation swap.
- e. estimate the impact of different correlations between assets in the trading book on the VaR capital charge.
- f. explain the role of correlation risk in market risk and credit risk.
- g. explain how correlation risk relates to systemic and concentration risk.

#### 9. Empirical Properties of Correlation: How Do Correlations Behave in the Real World?

**Gunter Meissner, *Correlation Risk Modeling and Management, 2nd Edition* (Risk Books, 2019). Chapter 2.**

After completing this reading, you should be able to:

- a. describe how equity correlations and correlation volatilities behave throughout various economic states.
- b. calculate a mean reversion rate using standard regression and calculate the corresponding autocorrelation.
- c. identify the best-fit distribution for equity, bond, and default correlations.

#### 10. Financial Correlation Modeling—Bottom-Up Approaches

**Gunter Meissner, *Correlation Risk Modeling and Management, 2nd Edition* (Risk Books, 2019). Chapter 5, pages 126–134.**

After completing this reading, you should be able to:

- a. explain the purpose of copula functions and how they are applied in finance.
- b. describe the Gaussian copula and explain how to use it to derive the joint probability of default of two assets.
- c. summarize the process of finding the default time of an asset correlated to all other assets in a portfolio using the Gaussian copula.

### STUDY SESSION 3

#### 11. Regression Hedging and Principal Component Analysis

**Bruce Tuckman and Angel Serrat, *Fixed Income Securities: Tools for Today's Markets, 4th Edition* (Hoboken, NJ: John Wiley & Sons, 2022). Chapter 6.**

After completing this reading, you should be able to:

- a. explain the drawbacks to using a DV01-neutral hedge for a bond position.
- b. describe a regression hedge and explain how it can improve a standard DV01-neutral hedge.
- c. calculate the regression hedge adjustment factor, beta.
- d. calculate the face value of an offsetting position needed to carry out a regression hedge.
- e. calculate the face value of multiple offsetting swap positions needed to carry out a two-variable regression hedge.
- f. compare and contrast level and change regressions.
- g. explain why and how a regression hedge differs from a hedge based on a reverse regression.
- h. describe principal component analysis and explain how it is applied to constructing a hedging portfolio.

#### 12. Arbitrage Pricing with Term Structure Models

**Bruce Tuckman and Angel Serrat, *Fixed Income Securities: Tools for Today's Markets, 4th Edition* (Hoboken, NJ: John Wiley & Sons, 2022). Chapter 7.**

After completing this reading, you should be able to:

- a. calculate the expected discounted value of a zero-coupon security using a binomial tree.

- b. construct and apply an arbitrage argument to price a call option on a zero-coupon security using replicating portfolios.
- c. define risk-neutral pricing and apply it to option pricing.
- d. explain the difference between true and risk-neutral probabilities and apply this difference to interest rate drift.
- e. explain how the principles of arbitrage pricing of derivatives on fixed-income securities can be extended over multiple periods.
- f. define option-adjusted spread (OAS) and apply it to security pricing.
- g. describe the rationale behind the use of recombining trees in option pricing.
- h. calculate the value of a constant-maturity Treasury swap, given an interest rate tree and the risk-neutral probabilities.
- i. evaluate the advantages and disadvantages of reducing the size of the time steps on the pricing of derivatives on fixed-income securities.
- j. evaluate the appropriateness of the Black-Scholes-Merton model when valuing derivatives on fixed-income securities.

### 13. Expectations, Risk Premium, Convexity, and the Shape of the Term Structure

**Bruce Tuckman and Angel Serrat, *Fixed Income Securities: Tools for Today's Markets, 4th Edition* (Hoboken, NJ: John Wiley & Sons, 2022). Chapter 8.**

After completing this reading, you should be able to:

- a. explain the role of interest rate expectations in determining the shape of the term structure.
- b. apply a risk-neutral interest rate tree to assess the effect of volatility on the shape of the term structure.
- c. estimate the convexity effect using Jensen's inequality.
- d. identify the components into which the return on a bond can be decomposed, and calculate the expected return on a bond for a risk-averse investor.

### 14. The Art of Term Structure Models: Drift

**Bruce Tuckman and Angel Serrat, *Fixed Income Securities: Tools for Today's Markets, 3rd Edition* (Hoboken, NJ: John Wiley & Sons, 2011). Chapter 9.**

After completing this reading, you should be able to:

- a. construct and describe the effectiveness of a short-term interest rate tree assuming normally distributed rates, both with and without drift.
- b. calculate the short-term rate change and standard deviation of the rate change using a model with normally distributed rates and no drift.
- c. describe methods for addressing the possibility of negative short-term rates in term structure models.
- d. construct a short-term rate tree under the Ho-Lee Model with time-dependent drift.
- e. describe uses and benefits of the arbitrage-free models and assess the issue of fitting models to market prices.
- f. describe the process of constructing a simple and recombining tree for a short-term rate under the Vasicek Model with mean reversion.
- g. calculate the Vasicek Model rate change, standard deviation of the rate change, expected rate in T years, and half-life.
- h. describe the effectiveness of the Vasicek Model.

### 15. The Art of Term Structure Models: Volatility and Distribution

**Bruce Tuckman and Angel Serrat, *Fixed Income Securities: Tools for Today's Markets, 3rd Edition* (Hoboken, NJ: John Wiley & Sons, 2011). Chapter 10.**

After completing this reading, you should be able to:

- a. describe the short-term rate process under a model with time-dependent volatility.

- b. calculate the short-term rate change and determine the behavior of the standard deviation of the rate change using a model with time-dependent volatility.
- c. assess the efficacy of time-dependent volatility models.
- d. describe the short-term rate process under the Cox-Ingersoll-Ross (CIR) and lognormal models.
- e. calculate the short-term rate change and describe the basis point volatility using the CIR and lognormal models.
- f. describe lognormal models with deterministic drift and mean reversion.

#### 16. The Vasicek and Gauss+ Models

**Bruce Tuckman and Angel Serrat, *Fixed Income Securities: Tools for Today's Markets, 4th Edition* (Hoboken, NJ: John Wiley & Sons, 2022). Chapter 9.**

After completing this reading, you should be able to:

- a. describe the structure of the Gauss+ model and discuss the implications of this structure for the model's ability to replicate empirically observed interest rate dynamics.
- b. compare and contrast the dynamics, features, and applications of the Vasicek model and the Gauss+ model.
- c. calculate changes in the short-term, medium-term, and long-term interest rate factors under the Gauss+ model.
- d. explain how the parameters of the Gauss+ model can be estimated from empirical data.

#### 17. Volatility Smiles and Volatility Surfaces

**John C. Hull, *Options, Futures, and Other Derivatives, 11th Edition* (New York, NY: Pearson, 2022). Chapter 20.**

After completing this reading, you should be able to:

- a. describe a volatility smile and volatility skew.
- b. explain the implications of put-call parity on the implied volatility of call and put options.
- c. compare the shape of the volatility smile (or skew) to the shape of the implied distribution of the underlying asset price and to the pricing of options on the underlying asset.
- d. describe characteristics of foreign exchange rate distributions and their implications on option prices and implied volatility.
- e. describe the volatility smile for equity options and foreign currency options and provide possible explanations for its shape.
- f. describe alternative ways of characterizing the volatility smile.
- g. describe volatility term structures and volatility surfaces and how they may be used to price options.
- h. explain the impact of the volatility smile on the calculation of an option's Greek letter risk measures.
- i. explain the impact of a single asset price jump on a volatility smile.

#### 18. Fundamental Review of the Trading Book

**John C. Hull, *Risk Management and Financial Institutions, 6th Edition* (Hoboken, NJ: John Wiley & Sons, 2023). Chapter 18.**

After completing this reading, you should be able to:

- a. describe the changes to the Basel framework for calculating market risk capital under the Fundamental Review of the Trading Book (FRTB) and the motivations for these changes.
- b. compare the various liquidity horizons proposed by the FRTB for different asset classes and explain how a bank can calculate its expected shortfall using the various horizons.
- c. explain the FRTB revisions to Basel regulations in the following areas:

- Classification of positions in the trading book compared to the banking book.
- Backtesting, profit and loss attribution, credit risk, and securitizations.

The following is a review of the Market Risk Measurement and Management principles designed to address the learning objectives set forth by GARP®. Cross-reference to GARP assigned reading—Dowd, Chapter 3.

## READING 1

# ESTIMATING MARKET RISK MEASURES: AN INTRODUCTION AND OVERVIEW

### Study Session 1

## EXAM FOCUS

In this reading, the focus is on the estimation of market risk measures, such as value at risk (VaR). VaR identifies the probability that losses will be greater than a pre-specified threshold level. For the exam, be prepared to evaluate and calculate VaR using historical simulation and parametric models (both normal and lognormal return distributions). One drawback of VaR is that it does not estimate losses in the tail of the returns distribution. Expected shortfall (ES) does, however, estimate the loss in the tail (i.e., after the VaR threshold has been breached) by averaging loss levels at different confidence levels. Coherent risk measures incorporate personal risk aversion across the entire distribution and are more general than expected shortfall. Quantile-quantile (QQ) plots are used to visually inspect if an empirical distribution matches a theoretical distribution.

## ESTIMATING RETURNS

To better understand the material in this reading, it is helpful to recall the computations of arithmetic and geometric returns. Note that the convention when computing these returns (as well as VaR) is to quote return losses as positive values. For example, if a portfolio is expected to decrease in value by \$1 million, we use the terminology “expected loss is \$1 million” rather than “expected profit is -\$1 million.”

**Profit/loss data:** Change in value of asset/portfolio,  $P_t$ , at the end of period  $t$  plus any interim payments,  $D_t$ .

$$P/L_t = P_t + D_t - P_{t-1}$$

**Arithmetic return data:** The assumption is that interim payments do not earn a return (i.e., no reinvestment). Hence, this approach is not appropriate for long investment horizons.

$$r_t = \frac{P_t + D_t - P_{t-1}}{P_{t-1}} = \frac{P_t + D_t}{P_{t-1}} - 1$$

**Geometric return data:** The assumption is that interim payments are continuously reinvested. Note that this approach ensures that asset price can never be negative.

$$R_t = \ln\left(\frac{P_t + D_t}{P_{t-1}}\right)$$

# MODULE 1.1: HISTORICAL AND PARAMETRIC ESTIMATION APPROACHES

## Historical Simulation Approach

### LO 1.a: Estimate VaR using a historical simulation approach.

Estimating VaR with a historical simulation approach is by far the simplest and most straightforward VaR method. To make this calculation, you simply order return observations from largest to smallest. The observation that follows the threshold loss level denotes the VaR limit. We are essentially searching for the observation that separates the tail from the body of the distribution. More generally, the observation that determines VaR for  $n$  observations at the  $(1 - \alpha)$  confidence level would be:  $(\alpha \times n) + 1$ .

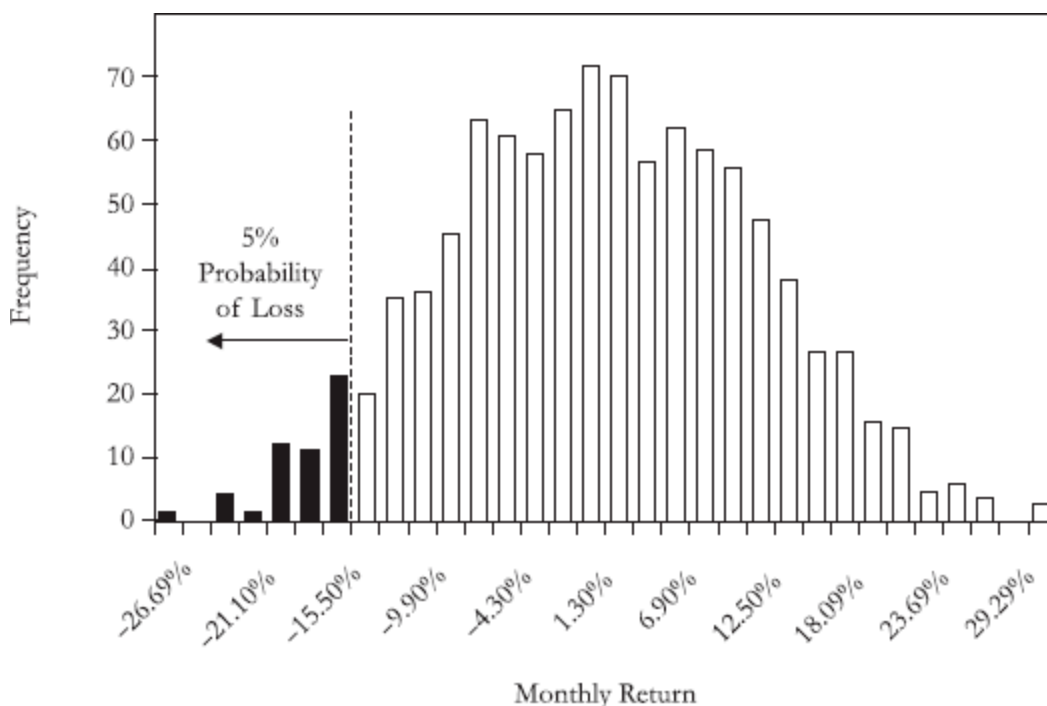


#### PROFESSOR'S NOTE

Recall that the confidence level,  $(1 - \alpha)$ , is typically a large value (e.g., 95%) whereas the significance level, usually denoted as  $\alpha$ , is much smaller (e.g., 5%).

To illustrate this VaR method, assume you have gathered 1,000 monthly returns for a security and produced the distribution shown in Figure 1.1. You decide that you want to compute the monthly VaR for this security at a confidence level of 95%. At a 95% confidence level, the lower tail displays the lowest 5% of the underlying distribution's returns. For this distribution, the value associated with a 95% confidence level is a return of  $-15.5\%$ . If you have  $\$1,000,000$  invested in this security, the one-month VaR is  $\$155,000$  ( $= -15.5\% \times \$1,000,000$ ).

Figure 1.1: Histogram of Monthly Returns



### EXAMPLE: Identifying the VaR limit

**Identify** the ordered observation in a sample of 1,000 data points that corresponds to VaR at a 95% confidence level.

#### Answer:

Since VaR is to be estimated at 95% confidence, this means that 5% (i.e., 50) of the ordered observations would fall in the tail of the distribution. Therefore, the 51st ordered loss observation would separate the 5% of largest losses from the remaining 95% of returns.



#### PROFESSOR'S NOTE

VaR is the quantile that separates the tail from the body of the distribution. With 1,000 observations at a 95% confidence level, there is a certain level of arbitrariness in how the ordered observations relate to VaR. In other words, should VaR be the 50th observation (i.e.,  $\alpha \times n$ ), the 51st observation [i.e.,  $(\alpha \times n) + 1$ ], or some combination of these observations? In this example, using the 51st observation was the approximation for VaR, and the method used in the assigned reading. However, on past FRM exams, VaR using the historical simulation method has been calculated as just:  $(\alpha \times n)$ , in this case, as the 50th observation.

### EXAMPLE: Computing VaR

A long history of profit/loss data closely approximates a standard normal distribution (mean equals zero; standard deviation equals one). **Estimate** the 5% VaR using the historical simulation approach.

#### Answer:

The VaR limit will be at the observation that separates the tail loss with area equal to 5% from the remainder of the distribution. Since the distribution is closely approximated by the standard normal distribution, the VaR is 1.65 (5% critical value from the z-table). Recall that since VaR is a one-tailed test, the entire significance level of 5% is in the left tail of the returns distribution.

From a practical perspective, the historical simulation approach is sensible only if you expect future performance to follow the same return-generating process as in the past. Furthermore, this approach is unable to adjust for changing economic conditions or abrupt shifts in parameter values.

## Parametric Estimation Approaches

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### LO 1.b: Estimate VaR using a parametric approach for both normal and lognormal asset price distributions.

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In contrast with the historical simulation method, the parametric approach (e.g., the delta-normal approach) explicitly assumes a distribution for the underlying observations. In this section, we will analyze two cases: (1) VaR for returns that follow a normal distribution and (2) VaR for returns that follow a lognormal distribution.