

INVESTMENTS

Fourth Edition



Robert W. Kolb



Investments

Fourth Edition

Robert W. Kolb

 **BLACKWELL**
Publishers

*To
Brenda, Kateri, and Kristina*

Copyright © Kolb Publishing Company, Inc., 1995

Copyright © Blackwell Publishers Ltd, 1996

First published 1995

First published by Blackwell Publishers Ltd 1996

Reprinted 1996

Blackwell Publishers Ltd

108 Cowley Road

Oxford OX4 1JF, UK

Blackwell Publishers Inc.

238 Main Street

Cambridge, Massachusetts 02142, USA

All rights reserved. Except for the quotation of short passages for the purposes of criticism and review, no part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher.

Except in the United States of America, this book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form of binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

British Library Cataloguing in Publication Data

A CIP catalogue record for this book is available from the British Library

Library of Congress Cataloging in Publication Data

Library of Congress Catalog Card Number 94-78775

ISBN 1-878975-54-4

Printed and bound in Great Britain by Athenæum Press Ltd, Gateshead, Tyne & Wear

Preface

The Fourth Edition of *Investments* builds on the strength of the first three editions, and it features a number of important refinements. As with the first three editions, *Investments* provides a comprehensive analytical survey of the investments field, including portfolio theory and security analysis. Furthermore, it incorporates an integrated treatment of financial derivatives, with chapters on futures, options, swaps, and financial engineering. The text has been thoroughly revised and updated, and its readability has been improved throughout. As a learning vehicle, this new edition of *Investments* continues the comprehensive approach adopted in the Third Edition. As an integral part of the entire package, *Investments* includes:

- ◆ the text
- ◆ a Student Resource Manual and Software Guide
- ◆ an extensive selection of computer programs and exercises designed to enhance the learning of investments.

These elements are fully integrated, and they are designed to be mutually supportive.

The Text

The *Investments* text has many distinctive features. Capital Market Theory is kept in view throughout. The text is quantitative enough to support analytical rigor, but advanced topics are generally presented without an overly mathematical treatment. For example, *Investments* takes an intuitive approach to such topics as market anomalies, the joint character of tests of the Efficient Markets Hypothesis and the Capital Asset Pricing Model, Roll's critique of the CAPM, and the Arbitrage Pricing Theory.

Every chapter includes a section of questions and problems (to be used with the Instructor's Manual) and a list of Suggested Readings relevant to the chapter. In the Fourth Edition, these student exercises have been greatly strengthened in two ways. First, the text includes more than 100 questions and problems that have been drawn from recent examinations for the Chartered Financial Analyst (CFA) designation. These are reprinted by permission of the Association for Investment Management and Research (AIMR). They are clearly labeled and emphasize to the

student that the material covered in the text has a strong and obvious practical relevance. Second, the end-of-chapter questions and problems include a number of exercises using real-world data that reinforce the material covered in the chapter.

Consistent with changing finance curriculums, this new edition of *Investments* has a higher proportion of international topics than virtually any other text in the market. Most chapters include a treatment of international topics as an integrated feature of the chapter development.

Investments is organized into five parts. Since the book makes no assumptions about previous study or knowledge of investments, Part One examines market fundamentals and organization. After introducing the concepts of risk and return in Chapter 1, the two most prevalent kinds of securities—stocks and bonds—are discussed. Chapter 2 deals with the debt market, and Chapter 3 focuses on the stock market. Chapter 4 examines security issuance, and Chapter 5 lists sources of investment information. Part One closes with a detailed look at regulation and taxation in Chapter 6. While much of this material is descriptive and institutional in character, it provides the necessary background for understanding risks, returns, and their trade-offs.

Part Two explores investing in fixed income securities. Bond pricing and bond portfolio management are examined. In Chapter 7, general principles of bond prices and price behavior are developed and duration is explained. In addition, Chapter 7 includes a discussion of convexity. Chapter 8 discusses bond portfolio management and considers the term structure of interest rates, the risk structure of interest rates, portfolio maturity strategies, and immunization techniques.

Part Three focuses on investing in equities. Traditional fundamental stock analysis is presented by looking at the decision rules for investing in stocks. Chapter 9 develops stock pricing principles through the Dividend Valuation Model. The three traditional phases of stock analysis are then presented in three respective chapters: Chapter 10 covers analysis of the economy, Chapter 11 covers industry analysis, and Chapter 12 focuses on company analysis. Concepts explored in these three chapters include leading economic indicators and forecasting results, demographic factors and social change, and the Fundamental Analyst's Model with the factors that determine the justified P/E ratio.

In a complex and varied security market, the investor must evaluate many different securities and types of securities. It is across these many instruments that the investor must allocate investment funds. The study of the best way to apportion funds to existing investment opportunities is treated in Part Four, portfolio management. Diversification and portfolio formation are treated in Chapter 13. In Chapter 14, the market price of risk is developed through analysis of the capital market line and the security market line. The effect of the efficient markets hypothesis on the performance standard set up in the capital asset pricing model (CAPM) is explored in Chapter 15, as are challenges to the CAPM. Chapter 16 looks at mutual funds, an entire industry which has grown up around the concept of diversification.

Part Five explores financial derivatives, and it consists of separate chapters on futures, options, swaps, and financial engineering. Chapter 17 examines the role of futures contracts in controlling risk in portfolio management, and Chapter 18 does the same for options. Chapter 19 provides an introduction to the swap market. Chapter 20, on financial engineering, shows how futures, options, and swaps can be used together to create new products with special risk and return characteristics.

The Student Resource Manual

This 500-page book is an integral part of the *Investments* learning package. For each chapter, the Manual includes a detailed outline of the chapter contents, numerous multiple-choice study questions, and a review of the chapter's key terms and concepts. In addition, there are study questions and problems with answers and solutions for all of chapters.

Software

As an integral part of the entire learning package, *Investments* includes three different types of software. Most finance texts do not include software. Of those texts accompanied by software, the software is generally an afterthought. In many instances, the software is not specific to the text and it lacks instructions.

Investments is different; it includes three dramatically different computer and software resources to aid in learning investments. The Fourth Edition of *Investments* includes *REALDATA*—a comprehensive resource of real-world data and more than 100 computer exercises that employ the data. Second, the book contains the latest version of the *Investmaster* software that accompanied earlier editions. The third program is *STUDY!*, which is essentially a study guide and self-testing program on a disk. Each of these programs is discussed fully in the software instructions portion of the Student Resource Manual.

REALDATA. *REALDATA* consists of approximately 700 time series of real-world financial and economic data. The types of data range from money supply figures, to interest rate series, to stock returns data, to mutual fund indexes, to price indexes, and beyond. These data are contained in 36 spreadsheet files. The instructions in the *Student Resource Manual* present definitions of each series so that students can find a particular variable easily. The *Student Resource Manual* also contains more than 100 computer exercises using the data provided. For example, one exercise might ask a student to find and interpret the beta of Apple Computer. Another exercise might ask students to compute and explain the correlations among alternative stock market indexes. These exercises are keyed to particular chapters of *Investments* so that students may solve the exercises to build their knowledge of particular concepts they are studying. I have used *REALDATA* in my investment classes, and I have found it to be a powerful tool for helping students extend their understanding.

Investmaster. *Investmaster*, which accompanied earlier editions of this text, has been revised to accompany the Fourth Edition. The program contains ten modules that cover the gamut of the investments course, including: coupon bond analysis, the dividend valuation model, the Black-Scholes option pricing model, portfolio diversification, regression analysis, and statistical analysis.

Where appropriate, each module includes a graphics feature. For example, it is very easy to use *Investmaster* to explore how changing the correlation between the returns of two securities will affect the risk of a two-asset portfolio. *Investmaster* can graph this changing relationship with ease. The user can save and recall data sets

for further analysis. *Investmaster* can save its graphs to a PCX file for printing by most standard word processing programs. In sum, *Investmaster* has become a proven software support item, and this new version includes a number of important improvements and enhancements.

STUDY!. The program *STUDY!* includes a bank of multiple-choice questions created specifically for *Investments*. The student begins the program by selecting any combination of chapters for study. The program loads all available questions for those chapters in a random order and begins to present them to the student. If the student answers correctly, the program updates the student's score on screen and moves to the next question. If the student's answer is wrong, the program gives the correct answer and updates the score. By using the *STUDY!* program, students can cover all of the essential conceptual issues in any set of chapters that they choose.

The Instructor's Package

Investments is supplemented by a complete instructional package. I believe it is the best package to accompany any text. It includes four elements.

- ◆ Instructor's Manual and Test Bank
- ◆ Computerized Test Bank
- ◆ Transparency Masters of tables and figures
- ◆ Lecture Notes presented as transparency masters

The Instructor's Manual and Test Bank contains answers and solutions to all end-of-chapter questions and problems, including the CFA questions and solutions to all *REALDATA* exercises. It also contains a multiple-choice test bank. The Computerized Test Bank is prepared for IBM-PC type computers. It consists of files of multiple-choice questions for each chapter. (These are the same questions printed in the Instructor's Manual and Test Bank.) The Test Bank questions are presented in WordPerfect files. This approach allows the instructor to use his or her familiar word processing software and avoids the need for learning a specialized test-generating software package.

The Instructor's Package also includes a comprehensive set of Transparency Masters of tables and figures from the text. In addition, the Instructor's Package provides a comprehensive set of Lecture Notes to cover all of the key topics in the text. These are presented in large type, so they can be used as easy-to-see lecture notes, or they can be used as transparency masters for outlines of lecture topics.

Acknowledgments

This text required the sustained efforts of many people. A number of colleagues from different universities have contributed to this book through reading and commenting on earlier editions. I would specifically like to thank the following colleagues:

Raj Aggarwal	John Carroll University
Omar M. Benkato	Ball State University
Richard Boebel	Tulane University
Genna Brown	University of Miami
Thor W. Bruce	University of Miami
Thomas Burrows	California State University at Dominguez Hills
Idupeep S. Chhachhi	Western Kentucky University
Pat Clarke	University of Massachusetts
Francis Colella	Simpson College
Martin Engelken	Trinity College
Randy Ferrer	University of Miami
Richard Followill	Radford University
Julian E. Gaspar	Texas A & M University
Gaylon E. Greer	Memphis State University
Jae Ha Lee	University of Oklahoma
Patrick A. Hays	Western Carolina University
Kendall P. Hill	University of Alabama
Eugene Istchenko	University of Miami
Robert K. Jabs	California Baptist College
Steven L. Jones	University of Georgia
Alan Jung	San Francisco State University
Ronie Karanjia	Fordham University
Daniel J. Kaufman	Wright State University
Suk H. Kim	University of Detroit Mercy
Malek K. Lashgari	University of Hartford
Ricardo Leal	Georgetown University
Herman Manakyan	Western Kentucky University
Bala Maniam	Texas A & M International
Robert W. McLeod	University of Alabama
Stuart Michelson	Eastern Illinois University
David B. Milton	Bentley College
Michael Muoghalu	Pittsburgh State University
Akorlie Nyatepe-Coo	University of Wisconsin at La Crosse
Richard T. Nyerges	Southern Illinois University
James E. Owers	Georgia State University
Spuma M. Rao	University of Southwestern Louisiana
Ricardo Rodriguez	University of Miami
Kevin Stephenson	Middlebury College
Max Zavarelli	Stetson University

Here at Kolb Publishing I would like to thank Adam Carlin, who worked long and hard to improve the *Student Resource Manual*, the *Instructor's Manual*, and the accuracy of the text. Randy Ferrer and Eugene Istchenko independently solved all of the *REALDATA* exercises to ensure the accuracy of the solutions in the *Instructor's Manual*. Kateri Davis managed the production process, and Ami Corbett assisted in the typesetting of the ancillaries. Evelyn Gosnell prepared the computer-drawn graphics for the entire text. Andrea Coens edited the text and all of the ancillaries, and Sandi Schroeder prepared the index. Joe Rodriguez designed the cover. Brian Wilson of Ryder Systems prepared much of the *REALDATA* material.

Sharyn Ladner of Richter Library at the University of Miami provided access to materials. The cover photograph shows a detail of a totem pole in Vancouver, British Columbia.

As the long list of acknowledgments indicates, preparing a package such as *Investments* involves many steps and the efforts of many contributors. I am indebted to all of them, for without their efforts this new edition would never have seen the light of day.

Robert W. Kolb
University of Miami

Contents

PART ONE Market Fundamentals and Organization 1

CHAPTER ONE

<i>Introduction</i>	3
Overview	3
Securities Investment	4
The Goals of Investment	4
The Measurement of Return	5
The Wealth Relative (WR)	6
Returns and Yields	6
Annualized WRs and Returns	7
The Measurement of Mean Return	8
Measuring Mean Return for a Single Investment	8
Measuring the Mean Return for a Group of Investments	10
The Measurement of Risk	11
Historical Returns and Risk	14
Measuring Returns on Foreign Investments	16
Risk and Expected Return: The Keys to Investment	17
Organization of the Text	18
Market Fundamentals and Organization	19
Investing in Debt Instruments	20
Investing in Equities	20
Portfolio Management	21
Financial Derivatives and Portfolio Risk Management	22
A Final Note on Risk and Return	24
Summary	24
Questions and Problems	25
CFA Questions	26

CHAPTER TWO

The Debt Market

28

Overview	28
The Bond Pricing Formula	29
Pure Discount Instruments	29
Coupon Bonds	30
Par, Premium, and Discount Bonds	31
Yield Approximations	31
A Yield Approximation Formula	32
Accrued Interest	33
The Bond Market in the United States	36
The Market for U.S. Government Bonds	36
Ownership of U.S. Government Securities and the Burden of Federal Debt	44
The Corporate Bond Market	47
Corporate Bond Quotations	47
The Corporate Bond Over-the-Counter Market	50
History of Corporate Bond Returns	52
High-Yield Corporate Bonds	53
The Municipal Bond Market	56
The Mortgage Market	59
Mortgage Pass-Through Securities	61
The Bond Contract	62
The Money Market	65
Money Market Yield Concepts	65
Major Money Market Instruments	67
Yield Relationships in the Money Market	75
The International Bond Market	76
Straight Bonds	77
Floating Rate Notes	77
Equity-Related Bonds	77
Eurodollar Bonds	77
Composition of the International Bond Market	79
The International Money Market	79
Syndicated Loans	79
Euro-Commercial Paper (ECP)	80
Note-Issuance Facilities	80
Committed Versus Back-Up Facilities	80
Summary	81
Questions and Problems	81

<i>CFA Questions</i>	82
<i>Suggested REALDATA Exercises</i>	84
<i>Suggested Readings</i>	84

CHAPTER THREE

The Stock Market: An Overview

85

Overview	85
Common Stock Rights and Responsibilities	86
General Organization of the Stock Market	91
Organized Exchanges	91
The New York Stock Exchange	98
The American Stock Exchange and the Regional Exchanges	103
The Secondary Market: The Over-the-Counter Market	103
General Organizational Features	104
Flow of Orders	104
Stock Trading on the OTC Market	105
The National Market System	107
Contrasts with Organized Exchanges	107
Trading Procedures and Practices	108
Types of Orders	110
Margin Trading	112
Short Sales	113
The Third and Fourth Markets	115
The Brokerage Industry	116
Transaction Costs and Portfolio Management	117
Commissions	117
The Bid-Asked Spread	118
Price Impacts	120
Transaction Costs and Trading	120
Market Indexes	121
Comparison of the Indexes	125
The Worldwide Stock Market	128
Alternative Trading Procedures	128
World Equity Market Capitalization	129
Dual Listing and American Depositary Receipts	131
Foreign Stock Market Indexes	132
Summary	133
<i>Questions and Problems</i>	134
<i>CFA Questions</i>	135
<i>Suggested REALDATA Exercises</i>	136
<i>Suggested Readings</i>	136

The Primary Market and Investment Banking **138**

Overview	138	
The Primary Market: Size and Scope	138	
Private Placements and Public Offerings	140	
Relative Size of Issuers	141	
The Process of Issuing Securities	143	
The Investment Banker as Consultant	144	
The Distribution Network	145	
The Service and Cost of Risk-Bearing	147	
The Green Shoe Option	149	
Investment Bankers and Investing in New Issues	151	
Initial Public Offerings	151	
Asymmetric Information and the Pricing of IPOs	153	
Are IPOs Underpriced?	153	
Shelf Registration	154	
The Condition of the Investment Banking Industry	155	
The International Primary Market	156	
Major Investment Banking Firms in the International Market	157	
Investment Banking in Great Britain and Japan	157	
Summary	158	
<i>Questions and Problems</i>	159	
<i>CFA Questions</i>	159	
<i>Suggested REALDATA Exercises</i>	160	
<i>Suggested Readings</i>	160	

Sources of Investment Information **161**

Overview	161	
General Business Periodicals	161	
Indexes to Further Information	162	
Federal Government Publications	163	
Information About Specific Industries	166	
Information Prepared by Individual Companies	169	
Standard & Poor's and Moody's	169	
Brokerage Firm Reports	174	
Value Line	175	
Chart Services	175	
Academic Journals	177	
Computerized Data Bases	178	
International Securities Information	179	

Summary	181
Questions and Problems	181

CHAPTER SIX

The Security Market: Regulation and Taxation 182

Overview	182
The Legislation of Regulation	182
Glass-Steagall Act or the Banking Act of 1933	183
Securities Act of 1933	183
Rule 144a	184
Securities Exchange Act of 1934	184
Public Utility Holding Company Act of 1935	186
Maloney Act (1939)	186
Trust Indenture Act of 1939	186
Investment Advisors Act of 1940	187
Securities Investor Protection Act of 1970	187
Employee Retirement Income Security Act of 1974	187
Securities Act Amendments of 1975	188
Insider Trading	188
Insider Trading by Corporate Employees	188
Insider Trading by a Non-Employee	189
Increases in Insider Trading and Increasing SEC Activity	190
Taxation	190
Taxable Income Derived from Securities Investing	191
Taxation of Interest and Dividends	191
Capital Gains and Losses	191
Personal Tax Rates	192
Corporate Tax Rates	193
Double Taxation of Dividends	193
Summary	194
Questions and Problems	194
Suggested Readings	195

PART TWO

Investing in Debt Instruments

197

CHAPTER SEVEN

Bond Pricing Principles

199

Overview	199
The Effect of Time on Bond Price Movements	200

The Effect of Interest Rates on Bond Price Movements	201
The Bond Pricing Principles	202
The Need for a Summary Measure	211
Duration	212
How to Calculate Duration	213
Duration as an Elasticity Measure	213
The Duration Price Change Formula and Modified Duration	214
Applying Duration	215
Duration Tracking Errors	216
Convexity	218
Computing Convexity	219
Estimating Price Changes with Duration and Convexity	220
Convexity and Bond Selection	220
Duration and Convexity: Some Qualifications	222
Focus on Non-Callable Bonds	222
Restriction to Flat Yield Curves	223
Restriction to Parallel Shifts in Yield Curves	223
Restriction to a Single Change in Yields	224
The Level of Interest Rates	224
The Nominal Rate of Interest	224
The Real Rate of Interest and the Expected Inflation Rate	225
Realized Compound Yield to Maturity (RCYTM)	230
Summary	232
<i>Questions and Problems</i>	233
<i>CFA Questions</i>	235
<i>Suggested REALDATA Exercises</i>	238
<i>Suggested Readings</i>	238
Appendix	240

CHAPTER EIGHT

Bond Portfolio Management **244**

Overview	244
The Term Structure of Interest Rates	245
Forward Rates	248
Theories of the Term Structure	250
The Pure Expectations Theory	250
The Liquidity Premium Theory	252
The Market Segmentation Theory	254
How the Three Theories Explain Different Observed Yield Curves	256
Evidence on the Three Theories	258
The Risk Structure of Interest Rates	259
Determinants of the Risk Premium	260
The Risk Premium as a Measure of Default Risk	261

Bond Portfolio Maturity Strategies	264
Interest Rate Forecasting	267
Portfolio Immunization Techniques	269
The Bank Immunization Case	269
The Planning Period Case	272
Contingent Immunization	276
Some Complications with Immunization	278
Duration for Yield Curves with Shape	278
Multiple Shifts in Interest Rates	280
Dedicated Portfolios	280
Summary	284
Questions and Problems	285
CFA Questions	286
Suggested REALDATA Exercises	289
Suggested Readings	289

PART THREE

Investing in Equities

291

CHAPTER NINE

Preferred and Common Stock Valuation **293**

Overview	293
Preferred Stock	293
Financing with Preferred Stock	294
The Valuation of Preferred Stock	295
Common Stock Valuation	296
The Dividend Valuation Model	296
The Dividend Valuation Model and Capital Gains	297
The Indefinite Future of Dividends	299
The Constant Growth Model	299
The Dividend Valuation Model and Irregular Dividend Patterns	301
The Dividend Valuation Model and Earnings	304
The Dividend Valuation Model and the P-E Ratio	306
The Dividend Valuation Model and Constant Payout Policies	307
Dividends and Share Prices in the Economy	309
The Dividend Valuation Model and Equity Investing	312
The Dividend Valuation Model and Stock Analysis	313
Risk and the Required Rate of Return	314
Summary	315
Questions and Problems	316
CFA Questions	317

<i>Suggested REALDATA Exercises</i>	318
<i>Suggested Readings</i>	318

CHAPTER TEN

Economic Analysis and the Stock Market **320**

Overview	320
Tidal Movements	321
The Herd Instinct	322
The Business Cycle	322
Interest Rates and Inflation	324
The Federal Debt	327
Monetary Policy	330
Fiscal Policy	331
Leading Indicators and the Business Cycle	332
Professional Forecasting Techniques	337
Time Series Models	338
Econometric Models	339
Judgmental Forecasts	339
Technical Forecasts	340
Some Recent Forecasting Results	342
Time Series Models vs. Econometric Models	342
Judgmental Forecasts vs. Econometric Models	344
Summary	345
<i>Questions and Problems</i>	346
<i>CFA Questions</i>	347
<i>Suggested REALDATA Exercises</i>	347
<i>Suggested Readings</i>	347

CHAPTER ELEVEN

Industry Analysis **350**

Overview	350
Differences in Growth and Investment Performance Across Industries	352
Demographic Factors and Social Change	353
Aging America	353
Changing Income Distribution	355
The Changing Mix in the United States	358
Regional Employment Patterns	359
The Industry Life Cycle	361
The Federal Government and Industry Analysis	363
Regulation	363