
MODERN
FINANCIAL
THEORY:

Perfect and Imperfect
Markets

John J. Hampton

Modern Financial Theory: Perfect and Imperfect Markets

Library of Congress Cataloging in Publication Data

Hampton, John J.
Modern financial theory.

Includes index.

1. Corporations—Finance.

HG4026.H28 658.1'5

ISBN 0-8359-4553-7

I. Title.

81-19212

AACR2

© 1982 BY RESTON PUBLISHING COMPANY, INC.

A Prentice-Hall Company

Reston, Virginia 22090

All rights reserved. No part of this book may be reproduced in any way,
or by any means, without permission in writing from the publisher.

1 3 5 7 9 10 8 6 4 2

Printed in the United States of America

PREFACE

The principles of corporate finance are quite simple, if you think about it. The firm should earn a sufficient return to justify the risk of the investment. In pursuing the appropriate rate of return, the firm should secure its funds from the correct debt and equity sources. And the owners should benefit, either from increases in the market value of the common stock or from cash dividends paid by the firm.

If the principles are simple, the concepts and techniques to carry them out are not quite so simple, as you will see from this book. To make correct financial decisions, we must understand economics, statistics, and logic. The manager must master the concepts of risk, return, and the relationships between them. Specific techniques are needed to measure critical variables. And concepts and techniques must be brought together in a systematic and orderly fashion in the decision-making process.

Modern Financial Theory is designed to follow a step-by-step pathway through the three most important areas of financial theory and policy, namely (1) investment policy, (2) capital structure and cost of capital, and (3) dividend policy. The book begins with the measurement of return, first conceptually and then using the techniques of uneven cash flow streams. Next, we cover the concept of risk, beginning with basic quantitative approaches and moving into beta analysis. Then, the concepts of risk and return are brought together so we may determine the required return from an investment. This is done first in efficient markets, so we can examine the contributions of recent theorists on the nature of risk and return. It is done second in imperfect markets, where most of us actually spend our working days. The last chapter on investment policy covers special applications and theoretical concepts.

After mastering the decision to commit capital funds, we examine the sources of the funds. The traditional literature on cost of capital is reviewed and updated under the capital asset framework. The development of capital structure theory is covered, with special attention to the concept of an optimal capital structure and selecting a mix of debt and equity securities in imperfect markets. The role of dividends is considered, first in perfect markets and then in imperfect markets. When the entire process is finished, the reader will have received an orderly and logical orientation to cost of capital, capital structure management, and dividend policy.

It is the author's premise that the financial literature is highly developed with respect to concepts of investment policy, cost of capital, capital structure management, and dividend decisions. By understanding the theory and application of financial principles, a management will recognize the pressures and indications for courses of actions. A management that incorporates financial knowledge at a sophisticated level will make better decisions on investing the firm's resources, securing financing for investment opportunities, and declaring cash dividends.

The reader can follow this book by working only with the chapter materials. Additional richness can be obtained by reading the appendices or by referring to the literature outlined in the final chapter. By placing more complex math in the appendices and avoiding some issues covered in the literature, the book can focus on mainstream principles, concepts, and techniques. Even so, the chapters are not light reading. Some of the most important contributions to finance involve difficult concepts. This book represents the author's best effort to make those concepts understandable.

Many people have contributed to the three drafts and five years of testing of this book. Many people at Seton Hall University were instrumental in the development of the book and I thank them all, particularly John Dall, Frank Tinari, and R. Gordon Dippel on the faculty. Thanks also to over a dozen reviewers, particularly Jim Jackson, C. Farrell, and Fred Banda. And, finally, thanks to the M.B.A. students at Seton Hall, whose good spirits and strong motivation were instrumental in the successful completion of this project.

BERNARDSVILLE, N. J.

J. J. H.

TABLE OF CONTENTS

Preface xi

Chapter 1

Environment of Modern Finance 1

Emerging Role of Financial Management 1 Decision Areas 3

Decision Parameters 6 Conclusion 16

Key Terms 16 Questions 16

Chapter 2

Measuring Return—Basic Concepts 18

Introduction 18 Calculating Rate of Return 20 Major Concepts of
Return 23 Conclusion 26

Key Terms 26 Key Formulas 26 Questions 26

APPENDIX 2-A: Time Value of Money 28

APPENDIX 2-B: Applications for Time-Value-of-Money Calculators 40

Chapter 3

Measuring Return—Uneven Cash Flow Streams 44

Introduction 44 Capital Budgeting 45 Nature of Cash Flows 49

Developing a Cash Flow Stream 58 Evaluation of Investment

Returns 68 Conclusion 74

Key Terms 75 *Key Formulas* 76 *Questions* 76

APPENDIX 3-A: Miscellaneous Return Concepts 80

APPENDIX 3-B: Orange Chemist Case—Calculating a Rate of Return 89

APPENDIX 3-C: Inflation in the Capital Budget 97

Chapter 4

Measuring Risk—Basic Concepts 104

Introduction 104 The Nature of Risk 104 Standard Deviation 107

Conclusion 114

Key Terms 114 *Key Formula* 115 *Questions* 115

APPENDIX 4-A: Subjective Probabilities 116

APPENDIX 4-B: Measuring Risk—Additional Techniques 123

APPENDIX 4-C: Simulation Models 132

Chapter 5

Measuring Risk—Beta Analysis 139

Portfolio Theory 139 Sharpe Model 146 Conclusion 151

Key Terms 152 *Key Formulas* 152 *Questions* 152

APPENDIX 5-A: Calculating the Correlation Coefficient 154

APPENDIX 5-B: Covariance and Beta Analysis 156

Chapter 6

Required Return—Efficient Markets 159

Assumption of Efficient Markets 160 Security Market Line with

Beta 165 Capital Market Line 170 Selecting the Optimal

Portfolio 173 Conclusion 174

Key Terms 175 *Key Formulas* 176 *Questions* 176

APPENDIX 6-A: Comparing Sharpe and Capital Asset Models 178

Chapter 7

Required Return—Imperfect Markets 181

A Capital Asset Foundation 182 Modifications to the Model 184

Required Return—An Application 194 Conclusion 202

Key Terms 202 *Questions* 202

APPENDIX 7-A: Union Foundry Inc. Case—Capital Investment in Imperfect Markets 204

Chapter 8

Selected Investment Models 220

Abandonment—Robichek and Van Horne 220 Capital Rationing—Lorie and Savage 223 Mean-Standard Deviation Model 227

Correlation of Cash Flows 232

Key Terms 238 *Key Formulas* 239 *Questions* 240

APPENDIX 8-A: Certainty Equivalents 243

APPENDIX 8-B: Risk-Return Tradeoff Approach 249

APPENDIX 8-C: Sensitivity Analysis 255

Chapter 9

Cost of Capital—Traditional Concepts 259

Goals of Capital Structure Management 259 Weighted Average Cost of Capital 262 Calculation of Marginal Cost of Capital 273

Strengths and Weaknesses of Weighted Average Model 277

Key Terms 280 *Key Formulas* 280 *Questions* 281

APPENDIX 9-A: Cost of Equity Capital—Nonperpetual Growth 283

Chapter 10

Cost of Capital—Capital Asset Approach 286

Conceptual Framework 286 Capital Asset Approach to Components 290 Impact of Capital Asset Approach 300 Conclusion 303

Key Terms 304 *Key Formulas* 304 *Questions* 305

APPENDIX 10-A: A Beta Approach to Cost of Capital 307

Chapter 11

Capital Structure Theory 312

Three Major Theories 312 Contribution of Miller and Modigliani 323

Miller-Modigliani after Taxes 330 Conclusion 333

Key Terms 334 *Key Formulas* 334 *Questions* 335

*Chapter 12***Managing the Capital Structure 337**

Optimal Capital Structure—Traditional Theories 338 Analyzing
 Leverage in the Capital Structure 345 Conclusion—A Capital Asset
 View 354

Key Terms 358 Key Formulas 358 Questions 359

*Chapter 13***Dividend Policy—The Theory 361**

Dividend Policy, Perfect Markets 362 Dividend Policy, Inefficient
 Markets 369 Conclusion 376

Key Terms 376 Key Formulas 377 Questions 378

*Chapter 14***Dividend Policy—Imperfect Markets 379**

Historical Overview of Dividend Policies 379 Investor Preference—
 Dividends or Capital Gains? 386 Dividend Policies in Imperfect
 Markets 394 Conclusion 398

Key Terms 399 Key Formulas 399 Questions 400

*Chapter 15***Summation and Appendices of Selected Readings 402**

Investment Policy 402 Capital Structure Management 403
 Dividend Policy 404 Conclusion 405

APPENDIX 15-A: Selected Financial Textbooks 406

APPENDIX 15-B: Selected Articles 409

Index 425

CHAPTER 1

Environment of Modern Finance

EMERGING ROLE OF FINANCIAL MANAGEMENT

Shortly before the turn of the twentieth century, business finance began to emerge as a separate functional discipline. Its roots were firmly planted in classical economics, but it was soon to be recognized as an applied area of business in the same sense as marketing and production. Where economics would provide the theory for the actions of the firm in the marketplace, finance would focus on the sources of funds available to the firm. Economics explained why firms behave as they do, while finance examined this behavior from the viewpoint of the external creditor.

This limited role of the financial manager persisted through the midpoint of the twentieth century. It is true that a managerial school of financial theorists began to develop in the frenzied business activity of the 1920s; but this group focused on the daily problems of cash management, control of receivables and inventory, cost measurement and control, and the forecasting of revenues and profits. These financial management advocates did not gain wide acceptance either in the conservative atmosphere of the 1930s or the strong economic growth of the 1940s.

The beginning of the rapid development of finance as a decision science can be traced to the 1950s, particularly to the book *Capital Budgeting* by Joel Dean, which appeared in 1951. The emphasis shifted from operational areas, such as sources of funds, working capital management, and budgeting, to theoretical areas, such as cost of capital, optimal capital structure, investment policy, and valuation of the firm. These areas occupied the financial literature through the 1960s, with increasingly sophisticated theoretical techniques spurred by advances in quantitative modeling and data processing.

The 1970s brought another turn to the direction of managerial finance. The harsh economic downturn in 1969, with its accompanying damage to the value of publicly traded securities, encouraged a renewed examination of the fundamental nature of risk and return. Borrowing from existing portfolio theory concepts developed by Markowitz, Sharpe, Lintner, and others in the 1950s and 1960s, theorists found fertile ground in what is generally known as the capital asset pricing model. Ideas, such as the efficient frontier, capital market line, and beta coefficient were brought together to offer increasingly clear concepts of the essential relationships of risk and return. Developments and refinements in the capital asset approach to financial decisions are continuing today.

Overall, finance has emerged from a primarily descriptive study of external financing, through a managerial approach to business operations, to a theoretical effort to understand a firm's and the market's behavior in an environment of risks and returns. As you will see in this book, financial management retains the richness of its heritage even as it tries to push into the frontiers of corporate decision making.

THEORY VERSUS APPLICATION

To some financial managers, there is a distinct conflict between the theory and application of finance. The theory provides the framework and conceptual foundation. With its underlying relationships and linkages, it is the explanation, if you will, for why we do things and why certain phenomena occur. The applications provide the opportunity to use our understanding of basic theoretical principles in a complex real world environment. They allow us to demonstrate that we understand which concepts or relationships are at work in our particular situation, and to show that we have the ability to make logical and effective decisions based on our knowledge.

Part of the reason for perceived conflicts between theory and application is that the theory develops in a framework of certain simplifying assumptions. This allows the theorist to focus his efforts on understanding the fundamental nature of risk and return and the factors affecting them. Once the theory is developed, some of the simplifying assumptions can be removed and it can be tested in the real world. In some cases, as with the capital asset pricing model, the testing is performed by the theorists themselves. In other cases, practitioners attempt to use the model to improve their abilities to deal with real world situations. In both cases, an effort is made to reduce the conflicts between theory and application.

This book is grounded in the belief that theory and application are complementing forces. They should be blended for maximum utility and effectiveness. We will develop in some detail the basic theory of risk and return in the capital asset pricing model. Then we will attempt to apply it in real world situations. We will recognize that no theory can supply all the answers

for specific business settings. If one could, it would not be much fun to work in the area of finance. It is the fact that financial decision making is not routine that makes it all worthwhile. But the theory can help. By knowing the theoretical basis for risk and return, we know what pressures are at work and what relationships are significant. From this knowledge base, we can move into a business setting, formulate our own judgments and assessments, take actions and make decisions, and be held accountable for the results of our skills and efforts. In this sense, the theory and application of finance are fully compatible.

DECISION AREAS

As a result of specialized training and skills, the modern financial manager is deeply involved in the major decisions of the firm. The chief financial officer participates as a member of top management in formulating policy and resolving issues in four decision-making areas. These are (1) the decision to invest capital; (2) the decision to raise funds; (3) the decision to pay dividends; (4) the decisions related to the control of operations.

INVESTMENT DECISION

The decision to invest capital is probably the most important single action of most firms. As a general statement, the industrialized nations of the world are engaged in capital-intensive business activities. To succeed, a firm must decide in advance of any return to commit sizable amounts of money to projects with service lives extending well into the future. It is not uncommon to invest millions of dollars (or hundreds of millions of dollars) in a capital investment that will require 3 to 7 years for construction and will operate for 15 to 25 years after completion.

The investment decision is drawn from a number of components. First, we must recognize that money has a time value that must be considered in spending today for future returns. Next, we must develop the cash flows, both positive and negative, that will be associated with any capital budgeting proposal. Then, we must determine the rate of return offered by the proposal considering both the time value of money and the timing of cash receipts and disbursements.

No process of evaluating an investment proposal is complete without considering the risk in the project. How likely is it that demand, supply, or other factors will interfere with forecasted cash flows? Is the likely level of return adequate, considering the risks? The answers to these and similar questions should be incorporated in the investment decision.

This book will cover the decision to invest capital in some detail. We will begin on a foundation of the time value of money (Chapter 2), will develop procedures for capital budgeting (Chapters 3 and 4), and will examine the risk

factors that influence the required return on an investment (Chapters 5 through 7).

FINANCING DECISION

A second major decision area involves the selection of the mix of funds that will be used to finance the firm's activities. Modern finance recognizes the interdependency of sources of funds in the firm's capital structure and strives for techniques to calculate an optimal structure. It is also concerned with the firm's cost of capital, both in relation to the capital structure and with respect to the cutoff point for selecting capital budgeting projects. Finally, attention is given to the characteristics of debt financing so that novel financing vehicles can be selected to meet the firm's need for funds.

This book will cover several approaches to the firm's cost of capital (Chapters 9 through 11). It will investigate current thoughts on managing the firm's capital structure (Chapter 12). Throughout this process, we will work from historical perspectives to reach current views that incorporate risk and return considerations in the financing decision.

DIVIDEND DECISION

A third major decision area is the declaration and payment of cash dividends to common shareholders. Management must consider the percentage of earnings to be paid, the stability of dividends over time, and the value of dividends to shareholders versus the value of retaining earnings to finance growth. The dividend decision is properly viewed in the context of the relationship between dividends and the value of common stock. This book will cover it both in terms of the individual factors affecting dividend policy and the role of dividends in valuation of the firm (Chapters 13 to 14).

OPERATIONAL DECISIONS

The fourth major decision area concerns the operations and activities of the firm. Is it profitable and liquid? Does the firm employ efficient procedures in production, administration, and use of working capital? Are the operational areas growing more or less risky? These and similar questions must be answered and steps should be taken to deal with answers that are not acceptable.

This book will not cover the operational areas that fall under the scope of managerial finance. Operational decisions must be built heavily upon an understanding of the details of accounting data and financial statements. Working capital decisions require considerable knowledge of the nature and flows of cash related to accounts receivable, inventory, and production activities. In effect, operational decisions deal with the management of assets

in the near term while investment policy, financing decisions, and dividend decisions deal with the management of long-term assets. This book is concerned with the management of long-term assets and will not cover the operational or short-term aspects of financial management.

A POLICY ORIENTATION

It may seem unusual for a book on finance to omit a major decision area; in our case, the operational decisions facing the financial manager. This situation may be more easily understood if we analyze the field of finance as it is presently viewed by large corporations.

A classification system that is currently emerging in large companies employs 3 titles to identify top financial managers. These are:

VICE-PRESIDENT FINANCE. This title is given to the chief financial officer who reports directly to the chief operating or executive officer of the company. In many cases, a firm will have a finance committee as a subcommittee of its board of directors. The vice-president finance normally serves as a member of the finance committee and may even report directly to it.

The vice-president finance has both line and staff responsibilities. He monitors and is held accountable for all of the firm's financial activities, including the control of funds, decision making, management, and planning. He will work closely with marketing, personnel, and other members of the top-management group to develop policies, make decisions, and advise the board of directors. He supervises the members of his own staff, including the treasurer and controller, to assess the financial impacts of all the firm's operations.

TREASURER. This title is given to the individual who is charged with managing the firm's funds and cash flow. The principal responsibilities normally deal with borrowing, spending, transferring and safeguarding funds, and related duties. The treasurer plays major roles in forecasting financial needs and maintaining relations with banks and other financial institutions.

CONTROLLER. This title identifies the person who manages and controls the firm's operating assets. He is responsible for the financial results from day to day activities, including profit planning, cost control, and working capital management. In addition, the controller generally supervises the corporate accounting department and is responsible for payroll functions and possibly data processing.

In preparing oneself to assume any of the three positions just identified, an individual would emphasize differing issues depending upon the position desired. Figure 1-1 shows the major areas of interest for each financial

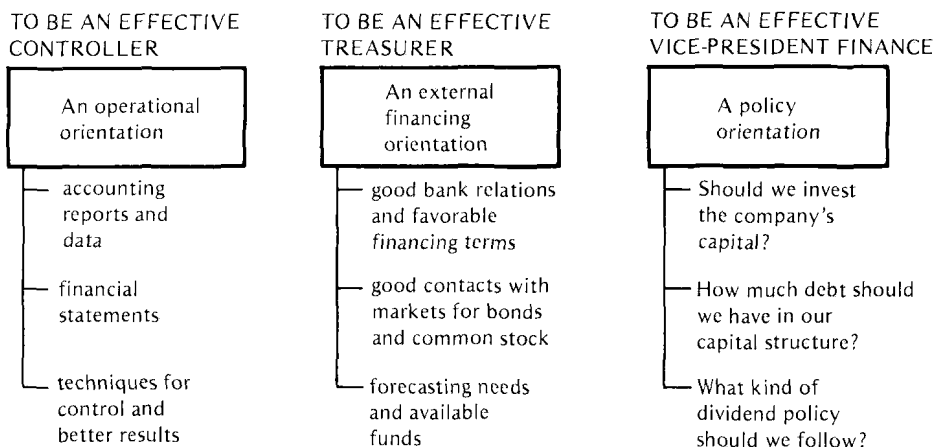


Figure 1-1 Major Areas of Interest for Financial Officers

officer. Note that the vice-president finance is largely concerned with issues that must be discussed and then approved by the board of directors. The issues can be effectively handled only by a vice-president who understands the activities of the treasurer and controller; the issues are, however, really somewhat different because they have a policy orientation. This is the orientation of this book. We will restrict our study to those questions that tend to be of greatest interest to the board of directors.

In limiting our scope to a policy orientation dealing with investment policy, capital structure, and valuation of the firm, we are not overlooking the importance of the treasurer and controller functions. The problem is that we cannot cover all the important areas of finance in detail in a single book. This book provides a policy approach to the field of managerial finance; other books can be used to study the specifics of the controller and treasurer functional areas.

DECISION PARAMETERS

As part of the foundation for financial decision making, the manager must recognize a framework or context for financial theory and applications. We might begin this process by introducing the concept of a *decision parameter*, which is a property of a system that helps determine the characteristics or behavior of the system or its components. Stated differently, decision parameters provide both the framework and the constraints for financial decision making. In this section, we will examine some of the parameters that characterize the environment of investment, financing, and dividend decisions.

MAXIMIZATION OF WEALTH

The first characteristic of the environment of financial decision making is that business enterprises have specific profit goals. By setting an overall goal for the firm, management provides direction to the different operating units who then develop their own goals. Such a goal structure is the key to moving the business from its present position to a desired future position.

Two statements of the objectives of the firm are commonly encountered: maximization of profits and maximization of wealth.

MAXIMIZATION OF PROFITS. Many businessmen believe that the firm's goal is to earn as much as possible. This has the benefit of being clear, easily understood, and accepted as a reasonable goal, and it focuses the firm's efforts on making money.

While profit maximization is widely professed, it has several weaknesses. In the first place, it is vague in its definition of profits which can have different short-term and long-term meanings. If a firm, for example, operates a machine without proper maintenance, it may be able to lower current operating expenditures and thus increase current profits. But the firm will pay dearly in future years when the machine can no longer operate because of prior neglect. Clearly, *maximizing profits should not mean ignoring the future in favor of short-range considerations.*

A second problem with maximization of profits is that it ignores timing. If a firm is maximizing profits, should it select a 3-year project with a 20 percent annual return, or a 7-year project with a 17 percent annual return? *The latter project could result in greater total profits if the firm could not immediately reinvest its profits when they are received from the 3-year project.*

A third weakness is that it ignores risk. If a firm achieves high profits, the firm's management may feel that congratulations are in order. This would not be appropriate if, in achieving the high profits, the firm took excessive risks. Such a management philosophy could produce disastrous results in the next period if the firm continued a path of maximizing its profits.

MAXIMIZATION OF WEALTH. A better goal for a firm is the maximization of wealth, which is defined as the net present worth of the firm. Instead of focusing directly on profits, this goal emphasizes the impact of profit, risks, and growth on the market value of the firm's securities. The firm must take steps in all of its financing and operational areas so that its stock sells at a respectable price in the market. The value of the common stock is the present value or worth of the firm's ownership rights; this is the value to be maximized.

Maximizing the value of common stock in the market implies factors

in addition to profits. For example, a firm should avoid high levels of risk; accepting high-risk projects over the long term means that a single major failure might jeopardize the firm's continued operation. No one wants to buy and hold the common stock of a firm that might fail at any time as a result of a single setback. Maximizing wealth also implies such factors as paying dividends, seeking growth, and taking positive steps to maintain the market price of the firm's common stock. In other words, the long-range profit prospects are balanced with related goals such as growth, stability, risk avoidance, and dividend payment, which help maintain the present worth of the firm.

RISK AND RETURN RELATIONSHIP

A key decision parameter is that the expected return from an investment proposal will be linked in a fundamental relationship to the degree of risk in the proposal. In order to be acceptable, a higher-risk proposal must offer a higher expected return than a lower-risk proposal. This relationship is shown in Figure 1-2.

The nature of the risk-return relationship will depend upon the degree of efficiency that exists in the capital or securities market being evaluated. An *efficient capital market* exists when financial securities and capital assets, are bought and sold in a highly competitive market where information on the likely risks and expected returns is freely available and is known to all participants. Under such conditions, also called a *perfect market*, the price of an individual asset will reflect its real or "intrinsic value," since market prices will adjust quickly to the receipt of new information. An *inefficient* or *imperfect market* exists for all other markets. The degree of inefficiency will be determined by the degree to which risk and return relationships are not known to buyers and sellers of assets.

The best approach to risk and return in an inefficient market was formalized in the 1950s by Harry Markowitz.¹ He began by identifying a *portfolio*,

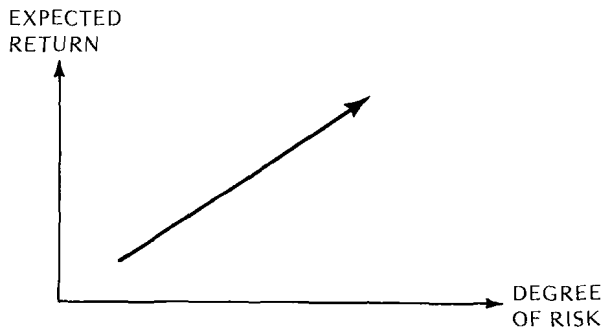


Figure 1-2 General Pattern of Risk and Return

¹Harry Markowitz, "Portfolio Selection," *Journal of Finance*, March 1952.