CHAPTER 1

Investor Behavior: An Overview

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INTRODUCTION

In the 1990s, the terms *behavioral finance* and *behavioral economics* started to appear in academic journals for finance professors, practitioner publications for investment professionals, investing magazines for novice investors, and everyday newspapers read by the general public (Ricciardi and Simon 2000). The foundation of behavioral finance and the subtopic of investor behavior, however, can be traced back throughout financial history in events such as the speculative behavior during tulip mania in the 1600s. Books published in the 1800s and early 1900s about psychology and investing marked the beginning of the theoretical basis for today's theories and concepts about investor behavior (Ricciardi 2006). Finance and the role of money are fundamental underpinnings of many important events throughout history (Ferguson 2008) and the development of financial innovations (Goetzmann and Rouwenhorst 2005). For example, Bernstein (1996) provides an extensive time line of risk throughout history and its application in the world of finance. Another important work in this arena is Rubinstein (2006), who depicts a historical anthology of investment theory. In recent times, the Internet stock market bubble of the late 1990s and the financial crisis of 2007 and 2008 demonstrate the importance of understanding investment behavior (Reinhart and Rogoff 2011).

Relevant Books in the History of Finance and Investment Thought

Understanding the history of finance and the development of investment theory is important for all types of investors. Goetzmann and Rouwenhorst (2005), Rubinstein (2006), and Ferguson (2008) offer extensive discussions of books and other publications in financial history and investment theory. The next section provides a discussion of important books in the history of finance and the natural progression of understanding investor theory and behavior. Exhibit 1.1 provides a chronological timeline of a sample of noteworthy books in financial history and investment theory from 1841 to 1978. This list of books is merely illustrative of classic or seminal works.

EXHIBIT 1.1 A Sample of Relevant Books in Financial History and Investment Theory

Original Publication Date	Author(s)/ Editor(s)	Title	Subject Matter
1841	Charles Mackay	*Extraordinary Popular Delusions and the Madness of Crowds*	Crowd psychology, panics, and financial schemes
1895	Gustave Le Bon	*The Crowd: A Study of the Popular Mind*	Group psychology
1903	Edward Meade	*Trust Finance: A Study of the Genesis, Organization, and Management of Industrial Combinations*	The role of trust in finance
1911	Garet Garrett	*Where the Money Grows and Anatomy of the Bubble*	Bubbles
1912	George Selden	*Psychology of the Stock Market*	Investor psychology
1922	William Hamilton	*The Stock Market Barometer*	Dow Jones investment approach
1923	Edwin Lefèvre	*Reminiscences of a Stock Operator*	Trader psychology
1924	Merryle Rukeyser	*The Common Sense of Money and Investments*	Investment and financial issues
1930	Philip Carret	*The Art of Speculation*	Speculative behavior
1931	Frederick Allen	*Only Yesterday: An Informal History of the 1920s*	Historical perspective of the 1920s
1934	Benjamin Graham and David Dodd	*Security Analysis*	Value investing
1935	Gerald M. Loeb	*The Battle for Investment Survival*	Investing in different securities and markets
1938	John B. Williams	*The Theory of Investment Value*	Financial securities valuation
1940	Fred Schwed	*Where Are the Customers' Yachts? or a Good Hard Look at Wall Street*	Financial service issues and practices
1949	Benjamin Graham	*The Intelligent Investor*	Value investing
1951	Donald Cressey	*Other People's Money: A Study in the Social Psychology of Embezzlement*	Violation of financial trust
1954	John Kenneth Galbraith	*The Great Crash of 1929*	Stock market crash of 1929
1954	Humphrey B. Neill	*The Art of Contrary Thinking*	Popular opinion and group behavior

EXHIBIT 1.1 (*Continued*)

Original Publication Date	Author(s)/ Editor(s)	Title	Subject Matter
1957	William Sargeant	*Stock Market Behavior: A Descriptive Guidebook for the New Investor*	Stock market psychology
1958	Philip Fisher	*Common Stocks and Uncommon Profits*	Investing in common stocks
1969	John Brooks	*Once in Golconda: A True Drama of Wall Street 1920–1938*	The investment history of the 1920s
1970	Mark Appleman	*The Winning Habit: How Your Personality Makes You a Winner or a Loser in the Stock Market*	Investor personality and individual behavior
1970	William Scheinman	*Why Most Investors Are Mostly Wrong Most of the Time*	Bad investment decisions by financial advisors
1973	John Brooks	*The Go-Go Years: The Drama and Crashing Finale of Wall Street's Bullish 60s*	The investment history of the 1960s
1973	Burton Malkiel	*A Random Walk Down Wall Street*	Random walk theory of stock prices
1977	David Dreman	*Psychology and the Stock Market Investment Strategy beyond Random Walk*	Investor psychology and group behavior
1978	Charles Kindleberger	*Manias, Panics and Crashes: A History of Financial Crisis*	Historical financial crises

Note: This exhibit provides a chronological timeline of a sample of relevant books in financial history and investment theory from 1841 to 1978. These books cover a wide range of subject matter including: crowd psychology, group behavior, individual behavior panics, bubbles, crashes, speculative behavior, investor psychology, trader psychology, investment strategies and theories, financial mistrust, and investor personality.

Period: 1841 to 1912 Initially published in 1841, *Extraordinary Popular Delusions and the Madness of Crowds* (MacKay 1980) depicts the role of bubbles and panics that is still applicable for investor psychology. Published in the late 1800s, *The Crowd: A Study of the Popular Mind* (Le Bon 1982) describes the role of group behavior in different environments and markets. Published in 1903, *Trust Finance: A Study of the Genesis, Organization, and Management of Industrial Combinations* (Meade 2003) describes the importance of trust in a wide range of areas including corporate finance, financial services, and investments. *Where the Money Grows and Anatomy of the Bubble* (Garrett 1998), published in 1911, presents the role of different stakeholders involved in the investment management process on Wall Street. *The Psychology of the Stock Market* (Selden 1996), published in 1912, represents one of the first books that applied

psychology to the decision-making process of investors. Selden's book describes the behavioral and emotional issues that influence traders and investors in the stock market.

Period: 1922 to 1938 Published in 1922, *The Stock Market Barometer* (Hamilton 1998) discloses the approach known as the *Dow Theory*, which is based on stock price movements as a predictive investment tool. Published in 1923, *Reminiscences of a Stock Operator* (Lefèvre 1994) depicts the life of a Wall Street trader and different approaches to trading in the markets. The author interviews traders to build the portrait of the fictional stock trader in the novel. *The Common Sense of Money and Investments* (Rukeyser 1999), published in 1924, provides a discussion of various personal finance and investment topics that are still relevant. Published in 1930, *The Art of Speculation* (Carret 1997) offers a thorough discussion of the speculation process involving financial markets and investment products. *Only Yesterday: An Informal History of the 1920s* (Allen 2010), first published in 1931, provides a general narrative description of life during the 1920s and also examines that decade's bull market, stock market crash, and the early years of the Great Depression.

In 1934, Graham and Dodd (1996) published *Security Analysis* in which they developed the foundation for value investing by identifying undervalued companies based on accounting information and financial statements. *The Battle for Investment Survival* (Loeb 2010), published in 1935, provides an extensive approach for investing in all types of financial securities and markets. Published in 1938, *The Theory of Investment Value* (Williams 1997) describes how to value financial assets based on accounting data such as cash flow and profits. In particular, this approach uses the distribution of dividends as forecasting the stock price of a company known as *stock valuation*.

Period: 1940 to 1958 First published in 1940, *Where Are the Customers' Yachts? or a Good Hard Look at Wall Street* (Schwed 2006) depicts the questionable investment practices of Wall Street firms toward their clients. In 1949, Graham (2005) published *The Intelligent Investor,* which reveals the approach known as *value investing* (i.e., a method for evaluating and identifying stocks that an investor considers underpriced based on different types of accounting or financial information). Today, value investing is one of the most important investing strategies. Published in 1951, *Other People's Money: A Study in the Social Psychology of Embezzlement* (Cressey 1951) uses psychological theories to explain why individuals commit financial crimes and violate the trust of the public. Galbraith's (2009) *The Great Crash 1929*, published in 1954, serves as a reminder even today of how financial history repeats itself in understanding the financial crisis of 2007 and 2008.

Other notable books during this period include *The Art of Contrary Thinking* (Neill 1992), published in 1954, which describes why consensus investor group decision-making is sometimes wrong and how investors can use contrary strategies or trends to profit in the stock market. Published in 1957, *Stock Market Behavior: A Descriptive Guidebook for the New Investor* (Sargeant 1957) provides a perspective of the psychology underlying the stock market for novice investors. In 1958, Fisher (1997) published *Common Stocks and Uncommon Profits*, in which he reveals how to evaluate a firm's business prospects and financial health based on accounting data and financial statement information.

Period: 1969 to 1970 In the book first published in 1969, *Once in Golconda: A True Drama of Wall Street 1920–1938* (Brooks 1999a) describes the time of economic

expansion of the 1920s, the crash of 1929, and the aftermath of the 1930s Great Depression. *The Winning Habit: How Your Personality Makes You a Winner or a Loser in the Stock Market* (Appleman 1970) discloses an array of different personality types and connects them to how investors make decisions about stock investing. Published in 1970, *Why Most Investors are Mostly Wrong Most of the Time* (Scheinman 1991) describes the author's perspective of crowd psychology and the role of contrary opinions within the stock market during the 1960s.

Period: 1973 to 1978 In 1973, Brooks (1999b) authored *The Go-Go Years: The Drama and Crashing Finale of Wall Street's Bullish 60s,* in which he describes the speculative behavior during the bull market of the 1960s and the stock market crash in 1970. Malkiel (1973) published his highly popular A *Random Walk Down Wall Street* in which he discloses the importance of the *random walk theory*. Malkiel contends that investors cannot outperform stock market indexes on a regular basis because prices are random. Dreman's (1977) *Psychology and the Stock Market: Investment Strategy beyond Random Walk* depicts the importance of crowd psychology and group behavior within the stock market by highlighting topics such as bubbles, the social psychology of groups, groupthink, and herd behavior. This book also offers a counter argument to the random walk theory and efficient market hypothesis. First published in 1978, *Manias, Panics and Crashes: A History of Financial Crisis* (Kindleberger 1996) provides an extensive financial history of bubbles, frauds, crashes, contagions, and crises.

Investor Behavior

What is investor behavior? The field of investor behavior attempts to understand and explain investor decisions by combining the topics of psychology and investing on a micro level (i.e., the decision process of individuals and groups) and a macro perspective (i.e., the role of financial markets). The decision-making process of investors incorporates both a quantitative (objective) and qualitative (subjective) aspect that is based on the specific features of the investment product or financial service. Investor behavior examines the cognitive factors (mental processes) and affective (emotional) issues that individuals, financial experts, and traders reveal during the financial planning and investment management process. In practice, individuals make judgments and decisions that are based on past events, personal beliefs, and preferences.

Since 1995, an increasing number of books on investor behavior have been published in tandem with the emerging research literature within the overall discipline of behavioral finance. Exhibit 1.2 provides a chronological time line of investor behavior books published between 1995 and 2012. This compilation of books covers different subject matter including: stock market inefficiencies (Haugen 1995; Shleifer 2000), stock market psychology (Warneryd 2001; Schindler 2007), speculative behavior (Shiller 2000), anomalies (Zacks 2011), neuroeconomics and neurofinance (Peterson 2007; Zweig 2007), money behaviors (Furnham and Argyle 1998), money disorders (Klontz and Klontz 2009), investor personality (Pompian 2012), behavioral investment management (De Brouwer 2012; Davies and de Servigny 2012), psychological trading strategies (Lifson and Geist 1999), trader psychology (Oberlechner 2004; Fenton-O'Creevy et al. 2005; Shull 2012), investor emotions (Tuckett and Taffler 2012), and investor behavior or psychology (Belsky and Gilovich 1999; Shefrin 2000; Nofsinger 2002; Geist 2003;

Pompian 2006; Montier 2007; Baker and Nofsinger 2010; Wood 2010; Statman 2011). This collection of books and other academic literature, such as published academic papers, working papers, conference presentations, and dissertations, serves as a reference point for developing the current content in this book in order to identify the most important emerging topics in investor behavior and psychology.

The importance of documenting the past and current research is to assist individual investors and their financial advisors about these biases and improve the decision-making process in selecting investment services, products, and strategies. As a result of the financial crisis of 2007 and 2008, the discipline of psychology began to focus even more on the financial decision-making process of individuals. This renewed interest by the social sciences and business disciplines has spurred new research on investor behavior including financial therapy, money counseling, financial psychology, consumer finance, investor personality, and household finance.

EXHIBIT 1.2 A Sample of Investor Behavior Books Since 1995

Original Publication Date	Author(s)/Editor(s)	Title	Subject Matter
1995	Robert Haugen	*The New Finance: The Case Against Efficient Markets*	Stock market inefficiencies
1998	Adrian Furnham and Michael Argyle	*The Psychology of Money*	Money behaviors
1999	Gary Belsky and Thomas Gilovich	*Why Smart People Make Big Money Mistakes and How to Correct Them: Lessons from the New Science of Behavioral Economics*	Various topics of behavioral finance and investor behavior
1999	Lawrence Lifson and Richard Geist	*The Psychology of Investing*	Psychological trading strategies
2000	Hersh Shefrin	*Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing*	Investor psychology
2000	Robert Shiller	*Irrational Exuberance*	Investor speculative bubble of the 1990s
2000	Andrei Shleifer	*Inefficient Markets: An Introduction to Behavioral Finance*	Stock market inefficiencies
2001	Karl-Erik Warneryd	*Stock Market Psychology: How People Value and Trade Stocks*	Psychology of stock investors
2002	John Nofsinger	*The Psychology of Investing*	Investment behavior
2003	Richard Geist	*Investor Therapy: A Psychologist and Investing Guru Tells You How to Out-Psych Wall Street*	Investor psychology

EXHIBIT 1.2 (*Continued*)

Original Publication Date	Author(s)/Editor(s)	Title	Subject Matter
2004	Thomas Oberlechner	*The Psychology of the Foreign Exchange Market*	Trader psychology
2005	Mark Fenton-O'Creevy, Nigel Nicholson, Emma Soane, and Paul Willman	*Traders: Risks, Decisions, and Management in Financial Markets*	Trader psychology
2006	Michael Pompian	*Behavioral Finance and Wealth Management: How to Build Optimal Portfolios that Account for Investor Biases*	Individual investor behavior
2007	James Montier	*Behavioral Investing: A Practitioner's Guide to Applying Behavioral Finance*	Investor psychology
2007	Richard Peterson	*Inside the Investor's Brain: The Power of Mind over Money*	Neurofinance and investor decisions
2007	Mark Schindler	*Rumors in Financial Markets: Insights into Behavioral Finance*	Stock market psychology
2007	Jason Zweig	*Your Money and Your Brain: How the New Science of Neuroeconomics Can Help Make You Rich*	Neuroeconomics and investor psychology
2009	Brad Klontz and Ted Klontz	*Mind over Money: Overcoming the Money Disorders That Threaten Our Financial Health*	Financial trauma, money disorders
2010	H. Kent Baker and John Nofsinger	*Behavioral Finance: Investors, Corporations, and Markets*	Psychological concepts, investor biases, investor behavior, and social influences
2010	Arnold Wood	*Behavioral Finance and Investment Management*	Investor psychology
2011	Meir Statman	*What Investors Really Want: Know What Drives Investor Behavior and Make Smarter Financial Decisions*	Individual investor psychology
2011	Leonard Zacks	*The Handbook of Equity Market Anomalies: Translating Market Inefficiences into Effective Investment Strategies*	Investor anomalies

(*continued*)

EXHIBIT 1.2 (*Continued*)

Original Publication Date	Author(s)/Editor(s)	Title	Subject Matter
2012	Philippe De Brouwer	*Maslowian Portfolio Theory: A Coherent Approach to Strategic Asset Allocation*	Individual psychology and behavioral portfolio decisions
2012	Greg Davies and Arnaud de Servigny	*Behavioral Investment Management: An Efficient Alternative to Modern Portfolio Theory*	Individual investor behavior and decisions
2012	Michael Pompian	*Behavioral Finance and Investor Types: Managing Behavior to Make Better Investment Decisions*	Investor personality
2012	Denise Shull	*Market Mind Games: A Radical Psychology of Investing, Trading and Risk*	Trader psychology
2012	David Tuckett and Richard Taffler	*Fund Management: An Emotional Finance Perspective*	Emotional aspects of investing

Note: This exhibit provides a chronological time line of a sample of investor psychology books for the time period between 1995 and 2012. This collection of books covers different topics including: stock market inefficiencies, investor behavior, speculative behavior, stock market psychology, individual and group psychology, investor personality, money disorders, neurofinance, anomalies, and behavioral investment management.

Purpose of the Book

This book's main purpose is to provide readers with the emerging theoretical trends about investment behavior within the ever-changing and growing financial services and investment management industry. Readers of *Investor Behavior—The Psychology of Financial Planning and Investing* will gain an in-depth understanding of the major types and the latest trends within the field of investor behavior. The book features empirical evidence and current literature about each investment issue. Cited research studies are presented in a straightforward manner focusing on the comprehension of study findings, rather than on the details of mathematical frameworks. Authors contributing chapters consist of a mix of academics and practitioners.

Distinctive Features of the Book

Investor Behavior—The Psychology of Financial Planning and Investing has the following distinctive features.

- The book provides a detailed discussion of investor behavior including empirical evidence and practice within the various topics covered. It attempts not only to

blend the conceptual world of scholars with the pragmatic view of practitioners, but also to synthesize relevant research studies including recent developments in a succinct and clear manner.
- The book contains contributions from numerous authors, which assures a variety of perspectives and a rich interplay of ideas.
- When discussing the results of empirical studies that link theory and practice, the objective is to distill them to their essential content so that they are understandable to readers. Theoretical and mathematical derivations are included to the extent that they may be necessary and useful to readers.
- The end of each chapter contains four to six discussion questions that help to reinforce key concepts with guideline answers presented at the end of the book. This feature should be especially important to faculty and students using the book in classes.

Intended Audience

The book should be of interest to various groups including academics, practitioners, investors, and students. Academics can use this book not only in their undergraduate and graduate investment courses but also to understand the various strands of research emerging from this area. The book can help practitioners navigate through the key areas in investor behavior. Individual and institutional investors can use the book to expand their knowledge base. They can also apply the concepts contained within the book to the management of their portfolios. The book can serve as an introduction to students interested in investor behavior. Finally, *Investor Behavior—The Psychology of Financial Planning and Investing* can be of interest to members of such organizations as the Academy of Behavioral Finance & Economics, Financial Therapy Association, Association for Financial Counseling and Planning Education, Financial Planning Association, The CFA Institute, Academy of Financial Services, Society for the Advancement of Behavioral Economics (SABE), American Accounting Association: Accounting, Behavior, and Organizations Section (Behavioral Accounting Group), International Association for Research in Economic Psychology (IAREP), and Society of Judgment and Decision Making.

ORGANIZATION OF THE BOOK

The remaining 29 chapters are organized into six sections. A brief synopsis of each chapter by section follows.

Part I: Foundations of Investor Behavior

Besides this introduction, Part I consists of two other chapters. Chapter 2 focuses on the basic principles of traditional (standard) finance and behavioral finance. Chapter 3 examines behavioral economic approaches to decision-making.

Chapter 2: Traditional and Behavioral Finance (Lucy F. Ackert) The purpose of this chapter is to compare and contrast traditional and behavioral finance. In traditional finance, which has been the dominant paradigm for several decades, investors make rational

choices leading to maximizing expected utility. The fundamental issues of traditional finance are classical decision theory, rationality, risk aversion, model portfolio theory (MPT), the capital asset pricing model (CAPM), and the efficient market hypothesis (EMH). However, evidence shows that many of the assumptions and findings associated with traditional finance are invalid. Thus, behavioral finance researchers turned to observed behaviors to develop models that describe how investors actually reach their decisions. Behavioral finance uses insights from the social sciences to better understand the investor behavior of individuals, groups, and markets. Among the foundation topics in behavioral finance are behavioral decision theory, bounded rationality, prospect theory, framing, heuristics, overconfidence, regret theory, and mental accounting. The emerging areas of research are behavioral portfolio theory, the behavioral asset pricing model (BAPM), and the adaptive markets hypothesis.

Chapter 3: Behavioral Economics, Thinking Processes, Decision-Making, and Investment Behavior (Morris Altman) This chapter provides a critical review of behavioral economic approaches to decision-making with a focus on the thinking processes of investors. It discusses the bounded rationality approach to decision-making as compared to the errors and biases approach for better understanding decision-making processes and outcomes. The latter focuses on the importance of cognitive illusions and biases whereas the former pays more attention to the optimality of institutional design and the limited information processing capacity of the human brain. Both approaches attempt to make sense of and explain why decision-making outcomes tend to be inconsistent with the predictions of the conventional economics wisdom, especially regarding the efficient market hypothesis. The chapter also extends the analyses of the behavioral understanding of decision-making, especially from the bounded rationality modeling perspective.

Part II: Personal Finance Issues

Part II consists of Chapters 4 through 10. The section explores such important areas as financial literacy and education (Chapter 4) and household investment decisions (Chapter 5). It also examines the role of personality traits (Chapter 6), demographic and socioeconomic factors (Chapter 7), and religion (Chapter 8) on investor behavior. The final two chapters investigate money and happiness (Chapter 9) and motivation and satisfaction (Chapter 10).

Chapter 4: Financial Literacy and Education (Michael S. Finke and Sandra J. Huston) Financial literacy is a form of human capital that includes knowledge and skills related to personal finances including mathematical ability, knowledge of financial instruments and financial theory, and the ability to apply knowledge effectively. This chapter reviews how financial literacy has been conceptualized and measured in the literature. Financial literacy is related to many positive financial outcomes. Newer studies focus on identifying the pathways between financial literacy and asset accumulation, portfolio selection, and credit choice. Evidence shows that financial education can improve financial literacy and decision quality, but also questions whether financial literacy education is effective or socially efficient. Low levels of financial literacy among consumers suggest a need for increased high school financial literacy education and policies that provide simplified disclosure and high quality defaults.

Chapter 5: Household Investment Decisions (Vicki L. Bogan) Within the area of finance, most basic theoretical models do not fully describe true household investment decision-making behavior. This is due in large part to the fact that most traditional finance models are based on the assumptions that financial markets operate without frictions and that all people make perfectly rational decisions. Yet, when considering how academic models are applied in the real world, these fundamental assumptions do not always hold. This chapter discusses how market frictions and specific behavioral biases actually influence household investment behaviors.

Chapter 6: Personality Traits (Lucia Fung and Robert B. Durand) Personality captures a person's essence. Understanding one's personality helps explain and predict the decisions an individual makes and what a person will do. This chapter focuses on the predominant structural model of personality—the Five-Factor Model—which encapsulates personality using five higher-order traits: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience/Intellect. The Five-Factor Model is rooted in biology and is genetically based. Personality traits are a major aspect of risk taking and overconfidence behaviors. Understanding personality can improve decision-making if it helps to regulate and override dispositional tendencies leading to suboptimal outcomes.

Chapter 7: Demographic and Socioeconomic Factors of Investors (James Farrell) Examining the demographic and socioeconomic factors in investor behavior is important to understanding how investors choose their portfolios. The extant literature suggests that men invest more aggressively than women and white investors invest more aggressively than African American investors. The reasons for the differences include income, wealth, age, education, risk preference, and background. Although studies try to explain away the differences attributable to gender and race, these differences persist. The chapter includes theories about how psychological differences help to explain losses and intergenerational transfers of wealth. It also examines recent research on the roles of gender and race in investment preferences. The analysis confirms that white males are the most aggressive investors and African American men take a more active approach to their investments. By contrast, white women tend to default into more conservative investments.

Chapter 8: The Effect of Religion on Financial and Investing Decisions (Walid Mansour and Mouna Jlassi) Religion has a major impact on people's daily life and is closely connected with their economic condition. The purpose of this chapter is to discuss the connection between religion and economic factors and to show how religion affects investment and financing decisions. It focuses on this interplay by emphasizing various corporate and personal facets. For instance, the chapter analyzes the effect of religious beliefs on investors' preferences, risk perception, ethical values, and psychological behavior. This aspect is often missing in academic finance including the behavioral paradigm. Furthermore, the chapter discusses how religious beliefs can conflict with financial theory involving making financial and investing decisions.

Chapter 9: Money and Happiness: Implications for Investor Behavior (Jing Jian Xiao) This chapter provides a synthesis of the research literature on the relationship between money and happiness. Money refers to income and income-related factors. Happiness

is typically measured by life satisfaction, but also by daily happiness and living a meaningful life. Based on research evidence, personal income increases happiness to a certain degree in a nonlinear fashion. In the range from low to middle income, income has a strong positive relationship with happiness. From middle to high income levels, the positive association between income and happiness diminishes. People living in richer countries are happier. Unhappiness results from seeking materialist goals. Most research studies examine whether income increases happiness. The emerging academic literature examines the reverse causality and explores whether happier people make more money, which is gaining empirical support. The chapter provides a discussion of the implications of these research findings for investor behavior.

Chapter 10: Motivation and Satisfaction (Lewis J. Altfest) This chapter attempts to answer the question, "What motivates people and can they be helped to achieve life satisfaction?" It transitions from classical economic theory to behavioral economics, which includes the behavioral life cycle hypothesis, and on to humanistic thoughts. Each theory presents differing views of motivation and satisfaction. The centerpiece of the chapter is Maslow's hierarchy of needs, which ranges from basic needs to highly sophisticated aspirations. Maslow's humanistic emphasis places it in conflict with classical economic beliefs. The chapter presents an approach that strives to integrate classical theory and Maslow-influenced humanism within a personal financial planning framework.

Part III: Financial Planning Concepts

This seven-chapter section begins by discussing policy-based financial planning (Chapter 11). Next, it turns to evolving topics such as financial counseling and coaching (Chapter 12), financial therapy (Chapter 13), and transpersonal economics (Chapter 14). The section then focuses on advising the behavioral investor (Chapter 15) and the contributions of behavioral finance and behavioral economics to retirement planning (Chapter 16). The final chapter in this section discusses how to use a scorecard approach to improve medical and financial outcomes.

Chapter 11: Policy-Based Financial Planning: Decision Rules for a Changing World (Dave Yeske and Elissa Buie) Financial planning policies are compact decision rules that can act as a touchstone for both clients and their advisors and allow for rapid decision-making in the face of a changing environment. Good policies represent the distillation of client goals and values, as well as the relevant financial planning best practices, in a form that can both anchor the client to a consistent course of action and save the advisor from the necessity of "crunching the numbers" every time a question arises. Evidence suggests that the process of developing policies involving the client is largely associated with higher levels of client trust and relationship commitment. Further, trust and commitment are associated with qualities predictive of a successful financial planning engagement, including higher client satisfaction and retention, with a greater propensity to reveal personal and financial information and to implement planning recommendations.

Chapter 12: Financial Counseling and Coaching (John E. Grable and Kristy L. Archuleta) Financial counseling is generally conceptualized as a short-term process concerned with helping

people change their financial behavior through applied education and guidance. Counseling typically involves helping people clarify issues, explore options, assess alternatives, make decisions, develop strategies, and plan courses of action in an effort to change financial attitudes and behavior. Similarly, financial coaching blends aspects of financial counseling, financial planning, and personal coaching to help clients establish and reach long-term financial goals through directed behavioral change. This chapter discusses the history of financial counseling and financial coaching, theoretical approaches commonly used in financial counseling, and the current state and professional directions of counseling and coaching.

Chapter 13: Financial Therapy: De-Biasing and Client Behaviors (Joseph W. Goetz and Jerry E. Gale) This chapter introduces an emerging field of study and practice called financial therapy. Financial therapy has applications in furthering the knowledge base around money psychology and addressing maladaptive financial beliefs and decisions of individuals and families. In contrast to traditional finance, financial therapy assumes individuals and couples often fail to make the rational financial decisions that lead to expected utility maximization. It also assumes that individuals' financial choices are strongly influenced by their financial socialization, cognitive biases, emotional factors, and their past experiences with money within various social systems. Foundational topics in financial therapy covered in this chapter include the concept and history of financial therapy, theoretical and conceptual frameworks that provide a basis for financial therapy practice and research, and the need for evidence-based financial therapy interventions.

Chapter 14: Transpersonal Economics (Renée M. Snow) The need for economic stability has received considerable attention during the past few years as a result of the severity of the global recession. Financial pathology arises from personal, cultural, and transpersonal influences that comprise belief systems. In turn, these belief systems inform thoughts, emotions, and behaviors. Examining the historical roots of Western misidentification with wealth creates awareness and provides space for new choices. The wisdom tradition of Jainism illustrates the ability to be mindful of the ecology while creating economic prosperity. A study of Certified Financial Planners (CFPs) who scored high in transpersonal awareness reveals the same essential practice and soul recognition as Jains employ. These participants experience higher client retention and job satisfaction rates than those who score lower in transpersonal awareness. This research suggests the possibility of improving economic performance through exploring and implementing practices rooted in transpersonal psychology.

Chapter 15: Advising the Behavioral Investor: Lessons from the Real World (Gregg S. Fisher) According to behavioral finance theory, investors are not the rational actors that economic theory describes. Rather, they are human beings whose decision-making can be driven by cognitive and emotional factors. Research evidence shows innumerable examples of investors behaving in ways that are counter to their own best interests. But there is good news about behavioral investors. First, many ways are available in which financial advisors can help their clients stay rational when the markets are not, thus improving their chances of staying with a well devised long-term investment strategy and realizing its ultimate benefits. Second, investment strategies can be constructed that actually profit from the bias-driven decisions of

other market participants. Thus, investors can learn and profit from others' mistakes. The purpose of this chapter is to apply the theory in behavioral finance and economics by exploring the practical, observable manifestations of investor behavior and to quantify their impact on investment results.

Chapter 16: Retirement Planning: Contributions from the Field of Behavioral Finance and Economics (James A. Howard and Rasoul Yazdipour) An important challenge facing employees and societies is saving and investing sufficient funds for a comfortable retirement. Research shows that human financial decision-making behavior is not always rational and that public trust in the economy can be lost. Surprisingly, neither better disclosure of financial services and products nor education has had a discernible effect in motivating individuals to effectively plan and save for transitioning out of the workforce. The fields of cognitive psychology and neuroscience identify many behavioral obstacles individuals face in taking the needed steps to save and invest more for the future. A host of behavioral issues influence an individual's decision-making about retirement including biases, heuristics, framing, hyperbolic discounting, self-awareness, and self-control. The emerging works on trust also add to understanding the retirement planning system. Exploring these findings and strategies for mitigating financial decision-making errors can make a substantive contribution to achieving a more secure retirement.

Chapter 17: Knowing Your Numbers: A Scorecard Approach to Improved Medical and Financial Outcomes (Talya Miron-Shatz and Stephanie Gati) Health literacy is the ability to obtain, process, and understand basic health information needed to make appropriate health decisions and follow instructions for treatment. Financial literacy is its equivalent in the financial domain, facilitating decisions on investments, retirement, health insurance, and more. This chapter proposes to overcome the medical and financial consequences of poor health literacy with a short, simple, and motivating digital scorecard for maintaining health and controlling chronic disease such as diabetes. The scorecard aggregates medical and lifestyle indicators that are easily interpretable without mediation by a physician, thereby informing the public of health-promoting behaviors. A pilot study project and surveys done at Carnegie Mellon University demonstrate the competitive strengths of a scorecard approach versus existing tools. Drawing parallels between health and financial literacy, the chapter illustrates the cost of low financial literacy and proposes that it can be improved through this approach, thereby strengthening financial decision-making.

Part IV: Investor Psychology

Part IV consists of seven chapters involving investor psychology. The section begins by examining risk perception and risk tolerance (Chapter 18). Next, it examines the important topics of emotions (Chapter 19), human psychology and market seasonality (Chapter 20), and neurofinance (Chapter 21). The remaining three chapters investigate diversification and asset allocation puzzles (Chapter 22), behavioral portfolio theory and investment management (Chapter 23), and post crisis investor behavior (Chapter 24).

Chapter 18: Risk Perception and Risk Tolerance (Victor Ricciardi and Douglas Rice) This chapter provides an overview of the research literature and the important issues

regarding risk perception and risk tolerance. The academic literature reveals that various disciplines provide an assortment of perspectives in terms of how to define, describe, and analyze risk. The behavioral finance perspective encompasses the subjective and objective factors of risk within the domains of risk perception and risk tolerance. *Risk perception* is the subjective decision-making process that an investor uses when evaluating risk and the amount of uncertainty. *Risk tolerance* is the degree of risk that an investor is willing to endure in the pursuit of a financial objective. A major problem within the risk tolerance literature is the lack of general agreement about issues such as a standard definition, a uniform theory or model, measurement discrepancies, and the growing number of questionnaires. Academic researchers and practitioners are only now starting to study and understand the long-term effects of the financial crisis in 2007 and 2008 on investor risk-taking behavior.

Chapter 19: Emotions in the Financial Markets (Richard Fairchild) Standard or traditional finance research is based on the rational choice model that assumes market participants are fully rational, unbiased, emotionless, self-interested maximizers of expected utility. Recent research in behavioral finance recognizes that real-world investors and managers are not fully rational because they are affected by psychological biases and subject to conscious emotions in their decision-making. In a paradigm shift, emotional finance considers the effect of investors' and managers' unconscious emotions and infantile phantasies on market behavior employing a Freudian psychoanalytical framework. This chapter reviews this research and considers a formal modeling framework for emotional finance.

Chapter 20: Human Psychology and Market Seasonality (Lisa A. Kramer) Evidence suggests that human psychology plays a role in individuals' financial decisions, with economically meaningful consequences observed even at the aggregate market level. This chapter considers many instances whereby human mood induced by exogenous factors is associated with economically large, statistically significant effects in financial markets. Some regularities covered by this chapter arise due to environmental factors. For instance, a relationship appears between seasonal length of day and stock returns, working through seasonal changes in depression and risk aversion. This chapter also considers financial market regularities that are consistent with mood changes due to events in the news, such as terrorist attacks, and forms of entertainment such as sporting events. In most cases, authors of the original studies apply extensive robustness checks to explore alternate hypotheses, namely that the phenomenon may arise for non-psychological reasons. The body of research builds a compelling case that human mood can markedly affect markets.

Chapter 21: Neurofinance (Richard L. Peterson) Biology can have both constructive and damaging effects on investment decision-making. Both research and clinical evidence confirm that subtle shifts in neurochemistry affect financial decision-making. These alternations in brain functioning are driven by events as mundane as the weather and as intense as images from a riot. Despite the individual nature of financial decision making, an understanding of neurobiology can also be applied at the group level. Exogenous shocks and the endogenous environment affect both individuals and the crowds of financial decision makers of which they are a small part. The decisions of such crowds shift global asset prices. This chapter explores research into the biology

of financial decision-making and demonstrates how many of the most successful financiers have built decision processes that strengthen vulnerabilities identified by neurofinance researchers.

Chapter 22: Diversification and Asset Allocation Puzzles (Dimitris Georgarakos) Asset allocation and portfolio diversification decisions have important welfare and policy implications. This chapter reviews studies that examine three key aspects of financial investing: participation in stock markets, portfolio diversification, and trading behavior. Standard finance theory predicts the optimal investment behavior of rational agents with reference to each of these three aspects. Yet, empirical studies document that observed behavior of investors largely deviates from theory predictions. The chapter also provides a discussion of empirical regularities that point to these deviations such as the limited stock market participation, the poor diversification and preference for domestic securities, and the contrast between excess trading activity of a few wealthy investors and considerable trading inertia exhibited by the majority of the population. These issues become increasingly topical as investors face a richer menu of complex financial instruments and gradually assume higher responsibility for retirement financing.

Chapter 23: Behavioral Portfolio Theory and Investment Management (Erick W. Rengifo, Rossen Trendafilov, and Emanuela Trifan) This chapter focuses on the attitude of investors toward financial gains and losses and their decisions on wealth allocation, and how these changes are subject to behavioral factors. The focal point is the integration of behavioral elements into the classic portfolio optimization. Individual perceptions are modeled according to four separate frameworks that build on each other: prospect theory, safety-first portfolio theory, security-potential/aspiration (SP/A) theory, and behavioral portfolio theory. SP/A theory evolves from safety-first portfolio theory and the introduction of aspiration level. The behavioral portfolio theory integrates the idea of mental accounts from prospect theory with the portfolio optimization framework of the SP/A theory and in this way it creates a unified model. The last part of the discussion addresses the behavioral asset pricing model (BAPM).

Chapter 24: Post-Crisis Investor Behavior: Experience Matters (Joseph V. Rizzi) The historic financial crisis in 2007 and 2008 seriously affected investors. In general, stock market values declined by about 50 percent but largely recovered from pre-crisis levels by the end of 2012 due in part to unprecedented stimulus efforts. Nonetheless, the cumulative return on stocks over the five-year period was close to zero. Investors are likely to learn from this experience and may adjust their investment behavior. Both individual experience and the collective behavior of groups sharing the same historical event influence risk tolerance. Recent studies highlighting a collective memory effect support this notion, which has important implications on investor asset allocation decisions. This chapter illustrates how a lingering generational effect influences the risk appetite and equity allocations of younger investors.

Part V: Trading and Investing Psychology and Strategies

Part V consists of three chapters. The first two chapters deal with various aspects of trading and investing psychology (Chapters 25 and 26) and the third chapter examines strategies (Chapter 27).

Chapter 25: The Psychology of Trading and Investing (Julia Pitters and Thomas Oberlechner) In contrast to the assumption of standard economic theories, human beings cannot always make rational investment and trading decisions. Thus, psychological explanations are needed to shed light on the complexity of actual decision-making processes. The purpose of this chapter is to provide an overview of relevant psychological perspectives to explain trading and investment decisions. Starting on the individual level, the chapter examines how personality, mood, affect, and cognitive biases shape investment and trading decisions. Next, the chapter moves to the societal level and discusses how herding, social norms, cultural norms, and ethics play a role in financial decisions. Finally, the chapter shows how news, rumors, and market mood influence trading behavior on the macro level.

Chapter 26: The Surprising Real World of Traders' Psychology (Denise K. Shull, Ken Celiano, and Andres Manaker) Trading psychology offers a unique look at unexpected factors in risk decisions made in uncertain circumstances. Traders, by definition, constantly make judgment calls and face a roller coaster of positive and negative feedback via the authority figure of price. Emanating from the historically dominant theories of efficient markets, human rationality, and the cognitive-behavioral school of psychology, conventional wisdom teaches that success emerges from accurate quantitative analyses. Multidisciplinary research in perception, judgment, and decision-making under uncertainty combined with qualitative evidence from hundreds of client interviews and coaching sessions with traders about investment performance reveal a different story. Unconscious affective contexts stemming from historical and current social milieus and revealed in what today's brain scientists call "embodied cognition" paint a more accurate picture.

Chapter 27: Trading and Investment Strategies in Behavioral Finance (John M. Longo) The chapter describes investment and trading strategies rooted in behavioral finance that historically have generated superior profits. The failure of traditional finance models, such as those based on purely rational behavior, to explain how markets work has enabled behavioral finance to move into the foreground among practitioners. Most investors are fraught with behavioral biases and their investment performance reflects this unfortunate fact. However, hope exists for those seeking to improve investment performance. Investment analysts will become akin to doctors analyzing the vast complexity of the human genome. An individual may be susceptible to a specific disease based on his or her genetic makeup, but something, such as an environmental trigger, must activate it. Similarly, successful investment analysts should examine not only the fundamental and technical aspects of securities but also the behavioral factors that ultimately influence their market prices.

Part VI: Special Investment Topics

The final section presents a discussion of three diverse but highly relevant topics. The first topic involves an engaging discussion of ethical and socially responsible investing (Chapter 28). The next topic is an examination of behavioral issues involving mutual funds and individual investors (Chapter 29). The final topic deals with psychological biases involving investing in real estate (Chapter 30).

Chapter 28: Ethical and Socially Responsible Investing (Julia M. Puaschunder) The chapter describes the various forms and emergence of ethical investing and discusses investor

motives to engage in socially responsible investment (SRI). Ethical investing and SRI are derived from historical incidents, legislative compulsion, and stakeholder pressure in response to social, environmental, and political deficiencies as well as humanitarian crises in recent decades. Private investors choose socially conscious screenings, shareholder advocacy, community investing, and social venture capital funding for efficiency and long-term competitive considerations coupled with altruistic and personal social responsibility, entrepreneurial endeavors, and self-expression. The chapter also provides a synthesis of research on the performance of SRI funds relative to conventional stock mutual funds. Finally, the chapter provides a discussion of international financial social responsibility practices and standardization attempts throughout the international arena as well as the potential of SRI to avert future financial market downfalls in the aftermath of the global financial crisis.

Chapter 29: Mutual Funds and Individual Investors: Advertising and Behavioral Issues (John A. Haslem) The chapter reviews important interactions between mutual funds and individual investors in choosing equity mutual funds. An important question is why both sophisticated and unsophisticated investors continue to invest in actively managed funds that generally underperform. Actively managed funds have histories of high levels of spending on advertising because they know it works in increasing assets under management. Fund managers have learned that investors chase past performance in the mistaken belief that the past predicts future performance. Funds further take advantage of investors by increasing advertising when current past performance is high. Advertising encourages individual investors to make fund choices in specific funds because they are generally unsophisticated, uninformed, and have low financial literacy, including a lack of knowledge of both transparent and opaque fund expenses and fees. Any persistence in high fund performance is also much more likely due to luck than portfolio manager skill. The Securities and Exchange Commission (SEC) has also failed to prohibit performance advertising or to require it to be unambiguous.

Chapter 30: Real Estate Investment Decision-Making in Behavioral Finance (Eli Beracha and Hilla Skiba) The real estate market displays many of the behavioral biases documented in the traditional financial markets. During bull markets, investor overconfidence, optimism, representativeness, and self-attribution bias among others drive prices far above their fundamental values. Conversely, during bear markets, loss aversion, false reference points and anchoring, and familiarity bias drive prices below their fair values. Combining these behavioral biases with severe limits to arbitrage including the illiquid nature of the market, high transaction costs, and short sale constraints can magnify the effect of psychological biases on real estate valuations. As a result, real estate prices in the short and medium time horizon often deviate from their fundamental values and price adjustments are slow. This chapter reviews common psychological biases in the context of real estate and the consequences of these biases to markets.

SUMMARY

Although traditional finance has been the recognized theory of academic finance since the 1960s, the field of behavioral finance offers a new perspective of investment

psychology for finance professors, financial practitioners, individual investors, and finance students. In the early to mid-1990s, the academic literature on investor behavior began to emerge that questioned many of the tenets and theories of traditional finance. The foundation for this new body of knowledge has developed over the past 150 years as demonstrated with the publication of books and other academic literature on financial history and investment theory. In the aftermath of the financial crisis of 2007 and 2008, behavioral finance has a wider acceptance among financial practitioners and individual investors. However, a strong level of resistance to behavioral finance still exists within academic finance among those trained in and proponents of traditional finance.

A unique aspect of this book is that many of the emerging topics in the forthcoming chapters focus on the psychologically oriented subject matter of the individual decision maker, also known as *microbehavioral finance*. This perspective is especially important for understanding and improving the client-advisor relationship between individual investors (clients) and investment professionals (advisors). Although financial planners, investors, and others can't change the past, they can learn from it and move forward. This book provides guidance on leaving old, well-trodden paths and venturing forward to follow new ones. Enjoy the journey!

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CHAPTER 2

Traditional and Behavioral Finance

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INTRODUCTION

Psychologists and other social scientists have made great strides in understanding how individual and group behavior, as well as brain function, shape the decisions people make. Throughout history, financial commentators and scholars recognized the impact of human psychology on financial decision-making and market outcomes. For example, the prominent economist John Maynard Keynes (1964) notes that people's decisions about the future could not depend only on mathematical expectations because the world is fraught with uncertainty. Instead, Keynes contends that human decisions are often based on whim, sentiment, or simple chance. Despite the recognition that human psychology has an important role in determining economic and financial decisions, traditional finance theory reflects the abrupt and overwhelming movement of economists toward the mathematical modeling tools used in the hard sciences. In hindsight, finance theorists apparently fell prey to "physics envy," the desire to mathematize the study of financial behavior.

Certainly, mathematical paradigms are useful in numerous applications, but empirical evidence contradicting traditional finance models mounted over recent years. Even very simple choices in controlled environments were inconsistent with the theories that dominated just a few decades ago. Thus, behavioral finance theorists moved toward incorporating what has been learned from the social sciences more formally into models of financial behavior.

This chapter provides an overview of how the theory of investment behavior has evolved in recent times. Researchers have accumulated much knowledge relating to the forces shaping investment decisions. The chapter is organized as follows. The first half focuses on the traditional view of how people make investment choices. This section of the chapter reviews classical decision theory, rationality, and utility theory, with particular attention to risk preferences. With this background the section proceeds to review modern portfolio theory, asset pricing models, and a dominant paradigm in finance, the efficient market hypothesis (EMH). The second half of the chapter shifts focus to behavioral finance. This second section begins with a review of behavioral decision theory and prospect theory, the most widely used alternative to the classical theory. Special attention is given to the issues of framing, heuristics, overconfidence, and regret. The next section provides discussion of some

important behavioral finance contributions offering new emerging research topics to offer alternatives to traditional finance theory. The final section of the chapter provides concluding remarks.

TRADITIONAL FINANCE

Classical decision theory, which assumes that rational decision makers evaluate all possible outcomes, serves as the basis for developing the traditional view in finance. The optimal choice is determined by finding the highest possible expected utility. Finance theorists then assume that these rational people are averse to risk, so that investors must receive compensation if they are going to take on risk. With this basis, theorists can provide models of important financial decisions including portfolio composition and asset pricing.

Classical Decision Theory

Decision-making requires humans to evaluate choices under conditions of uncertainty. The classical approach takes a normative view of decision-making in that it attempts to identify the best or optimal decision. Classical decision theory assumes that people are rational decision makers who are self-interested and optimize in the presence of constraints. Many conceptualizations are available of what it means to be rational, as is discussed later.

Unfortunately, uncertainty greatly complicates financial decision-making. Assessing the probabilities of outcomes is generally difficult and people may be unaware of all the possible outcomes. In contrast to an uncertain situation, the probabilities of the possible outcomes are known in a risky environment. While the world is best characterized as uncertain, theory is usually developed to describe risk rather than uncertainty.

Classical decision theory models how people make choices when faced with a variety of potential actions. People are able to evaluate their preferences over possible outcomes and are also able to associate probabilities with each potential outcome. These preferences satisfy certain conditions if they are rational. For example, classical decision theory assumes that people know what they like and are consistent in these preferences. If someone prefers Coke to Pepsi, that individual consistently picks Coke when offered the choice between the two.

Rationality and Utility

In classical decision theory, a rational person has consistent preferences, even in complex situations. Deciding on a course of action is not always easy even in conditions of certainty. But when risk is added, how does a rational person choose the best course of action? Von Neumann and Morgenstern (1944) developed expected utility theory (EUT) to describe choices that are made in risky states of the world. Assuming rational preferences and that people prefer more to less, EUT defines rational choices under uncertainty.

A utility function converts alternatives into measurable rankings of preferences. Utility functions assign higher numbers to preferred outcomes and can be used to rank combinations of risky alternatives. Each person's utility function is unique to

that person and, while outcomes can be compared for an individual, preferences cannot be compared across people. Exhibit 2.1 illustrates a typical utility function. The horizontal axis represents wealth and utility is mapped on the vertical axis. Notice that utility increases with wealth but at a decreasing rate. In other words, an additional $1 increases an individual's utility less when wealth is high than when wealth is low. Expected utility is computed by evaluating the utility of each outcome and weighting the assigned number by the outcome probability. When choosing among a set of possible outcomes, the rational person picks the outcome with highest expected utility.

Risk Aversion

The trade-off between risk and return is fundamental for investment choices. A basic finance tenet is that an investor's required return will increase with risk. Regarding their wealth, most investors are risk averse. One of the many benefits of the expected utility framework is that it permits establishing what is meant by risk aversion.

Consider again Exhibit 2.1. The shape of this utility function suggests risk aversion. A person with such preferences would rather have the expected value of a gamble than the gamble itself. For a risk averter, the expected utility of an uncertain outcome is less than the utility of the expected value of the possible outcomes.

This framework also allows measuring an individual's risk premium. The *risk premium* is the amount of wealth the investor is willing to give up in order to avoid taking a gamble. Suppose someone is offered a bet on the flip of a fair coin. Suppose further that the person wins $2 if the coin flip results in heads and zero if tails. The expected value of this bet is $1. If the person was offered this bet or $1 with certainty, she would surely take the $1 if she is risk averse. If the person is indifferent between $0.75 and taking the bet, her risk premium is $0.25. She would be willing to give up a quarter to avoid taking this bet.

Modern Portfolio Theory

Finance theory assumes that people are risk averse regarding their wealth. By definition, the future payoff associated with a risky asset is uncertain. A positive risk premium must exist if there is any risk or investors will refuse to hold the asset. In the coin flip example, the risk-averse gambler would not take the bet at a price of $1 or more. The asset price will fall due to supply and demand factors until the asset's price in equilibrium reflects the appropriate risk premium. But how is risk measured?

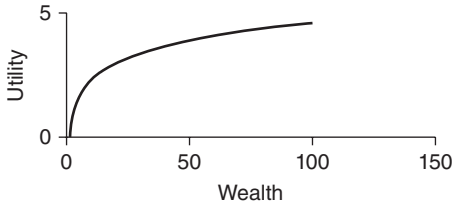

EXHIBIT 2.1 The Traditional Finance Viewpoint: The Utility Function for a Risk Averter

Note: This exhibit illustrates the utility function for a person who is averse to risk.

The asset's return variability provides a first measure of risk. The standard deviation of returns can be easily measured with a sample of historical data. A higher standard deviation suggests greater dispersion and thus greater absolute risk. An investor can evaluate the risk and return trade-offs across assets by comparing means and standard deviations across investment opportunities. History shows that assets with higher risk generally provide higher returns over the long run. For example, stocks generate higher risk and return than corporate bonds and the yield on corporate bonds is higher than on U.S. government bonds.

An investor evaluating assets naturally asks if an optimal way is available to allocate wealth in a portfolio. An important contribution of modern finance is providing direction to investors on how to form optimal portfolios. Harry Markowitz received the Nobel Prize in Economics in 1990 for developing the theory of portfolio choice. The advice is simple based on the adage "Don't put all your eggs in one basket." While the basic idea underlying Markowitz's (1952) work may seem like common advice, it provides the basis for modern finance theory. Markowitz recognizes that while the return for a combination of securities is the average of the return for each asset in the portfolio (properly weighted by its contribution to the portfolio), the risk is not the simple average. Putting securities together in a portfolio can eliminate some variability. Portfolio risk will depend critically on the correlation between the assets' returns. If the assets' returns do not move together, when one asset does poorly, the other does well so that a combination has less variability than either asset alone. If the assets tend to move very closely together, less benefit occurs when combining them in a portfolio. When one asset does well, so will the other asset, and when one performs poorly, so will the other. As long as the securities are not perfectly positively correlated, benefits from diversification occur.

Investors have literally thousands of opportunities to consider. As assets are added to a portfolio, some risk, called *diversifiable* or *unsystematic risk*, is diversified away. The goal is to create a portfolio with the maximum return for a given level of risk. To do so, the investor will evaluate the expected returns and standard deviations for all investment opportunities, as well as the correlation between each investment pair. The efficient set represents the portfolios with the highest return at each value of the portfolio standard deviation. While this process may seem burdensome, with today's easy access to data and fast computing systems, it is now possible but, as is discussed subsequently, may not be necessary.

To choose the best portfolio from the efficient set, add a risk-free asset, often proxied by U.S. Treasury bills. The risk-free asset allows the investor to identify which risky portfolio offers the best return for the risk taken. This is referred to as the *optimal risky portfolio*. All investors should hold this single, optimal portfolio regardless of their preferences. However, their portfolios are different in that those who are more risk averse will put a greater proportion of wealth in the risk-free asset and those who are more tolerant to risk will allocate more to the risky portfolio. This result is referred to as *portfolio separation*, first introduced by Tobin (1958). The investor's portfolio choice can be made after completing two separate tasks. First, the investor (or his or her financial advisor) identifies the optimal risky portfolio using historical returns data. Second, the investor determines his or her level of risk tolerance, which depends on individual preferences and life situation. After following these two steps, the investor can identify his or her optimal portfolio.

The optimal risky portfolio is also the market portfolio. The optimal risky portfolio is identified by combining risky assets into portfolios using estimates of the average and standard deviations of returns, along with return correlations. These estimates could differ across investors, but if no reason exists to expect anyone to have superior information, investors will have similar expectations. This means that all will hold the market portfolio as the best efficient portfolio.

Capital Asset Pricing Model and the Trade-Off between Risk and Return

From the discussion of optimal portfolio selection, investors have learned that the risk of an asset cannot be evaluated in isolation. Instead, the risk of the asset has to be based on its contribution to the risk of the portfolio. Further, the risk of the asset is defined in relation to the market portfolio. As noted previously, some risks are diversifiable. Other risks are not diversifiable because they affect the entire market, that is, they are systematic risks. Risk-averse investors should only take risk if they are appropriately compensated. In response to the advancements made by early finance researchers, theorists searched for a way to quantify the trade-off between risk and return. They understood that investors would not be compensated for risks they could avoid through diversification by adding diversifiable or unsystematic risk.

The result is the capital asset pricing model (CAPM). The CAPM provides a measure of risk of a security called *beta* (β). Beta quantifies the sensitivity of a security's return to the market. Of course, each asset has its own beta. The beta of the market is 1.0 and the beta of the risk-free asset is zero, as it is, by definition, risk free. Operationally, the beta for an asset is computed by dividing the covariance of the security's return and the market by the variance of market returns.

In 1990, William Sharpe received the Nobel Prize in Economics, in part for his work on the trade-off between risk and return. Sharpe (1964) provides a simple, yet powerful model of returns. Equation 2.1 shows the CAPM as:

$$E(R_i) = R_f + \beta_i(E(R_m) - R_f) \tag{2.1}$$

so that the expected return for asset i ($E(R_i)$) varies directly with the measure of risk (β_i). R_f denotes the risk-free interest rate and $E(R_m)$ is the expected return for the market. Note that the market risk premium ($E(R_m) - R_f$) must be positive because, if it were not, no investor would invest in risky assets. According to this model, the expected return of the asset increases with increases in risk.

Although initial tests show that the CAPM appears to work well (Fama, 1991), later evidence suggests that returns depend on other factors in addition to the market. Theorists proposed alternatives to the CAPM and one example is the three-factor model proposed by Fama and French (1996). The idea is that the CAPM does not pick up other risk factors. For example, Fama and French identify two other factors: firm size and the book-to-market ratio. Fama and French model these factors because evidence indicates that the CAPM apparently does not perform well in explaining the cross-section of returns across stocks. Small firms and those with high book values relative to market values have high returns. As the CAPM, a cornerstone of modern finance, was called into question, another fundamental theory based on the efficiency of financial markets was also revealing evidence of flaws in the academic

literature. The following section describes the dominant view of the functioning of markets, the efficient market hypothesis (EMH).

Efficient Market Hypothesis

The CAPM and other asset pricing models gave investors models they could use to try to evaluate how stocks and other assets are priced. Even casual market observers would note that investors compete vigorously to identify mispriced assets. Mispricing must be evaluated based on a model of returns. For the CAPM, for example, abnormal return is measured by taking the difference between an asset's actual return and the expected return predicted by the model in Equation 2.1. If the model is descriptive of pricing and investors actively compete to identify mispriced assets, few opportunities should be available to generate abnormal returns.

Before financial economists presented the CAPM, a British statistician named Maurice Kendall provided some startling evidence on stock and commodity prices that received considerable attention from finance academics and professionals (Kendall 1953). Kendall's evidence suggests that past price information is not useful in predicting future prices. According to Kendall (p. 13), "it seems that the change in price from one week to the next is practically independent of the change from that week to the week after. This alone is enough to show that it is impossible to predict the price from week to week from the series itself." This means that prices follow a random walk so that future price changes are unpredictable. This is not welcome news to a profession that devotes time and resources to giving investment advice! Perhaps even more surprising is that in 1900 a French doctoral student named Louis Bachelier made similar arguments. In his study of the properties of option prices, Bachelier (1900) concludes that "the mathematical expectation of the speculator is zero" (Davis, Etheridge, and Samuelson 2006, p. 28). While his work was not fully appreciated at the time, Bachelier is known as the father of mathematical finance.

Suppose that Bachelier and Kendall were wrong and that the price of a share of stock is predictable based on current information. If information is useful in generating profitable trading opportunities, investors would be encouraged to spend more time seeking out information. They would actively compete to gain the advantage. Will this competition lead to market prices that reflect all available information?

This is the essence of the EMH, a dominant paradigm in finance for the last several decades. In competitive markets, prices reflect all available information so that no investor can consistently generate abnormal returns. New information arrives randomly so that price changes in response to new information are unpredictable. As Bachelier (1900) and Kendall (1953) document, price changes follow a random walk.

Fama (1970) distinguishes three versions on the EMH to clarify what he means by "all information." *Weak form efficiency* asserts that prices reflect any information in their history. Thus, technical analysis of past price data will not be fruitful. Under *semi-strong form efficiency*, prices reflect any public information in addition to past price data. This form of the EMH suggests that investors cannot generate abnormal returns using information releases such as earnings statements or media reports. The strictest form of the EMH is the *strong form*, which asserts that prices reflect even private information. Thus, even company insiders cannot devise a strategy to consistently generate abnormal returns.

A flood of academic research tested the EMH with the initial evidence supporting the hypothesis (Fama 1991). Although some studies reject the EMH, researchers correctly recognize the joint hypothesis problem. A test of the EMH requires using a model of expected returns such as the CAPM. If the EMH is rejected, it could be because the market is not efficient or due to the assumed model of expected returns. Despite this recognition of a joint hypothesis problem, evidence against the EMH continued to mount. Researchers report numerous *anomalies*, which are results that are surprising and inconsistent with the EMH. This new tide in research was a driving force in the birth and growth of behavioral finance.

Before leaving the EMH, a few aspects of the theory are important to highlight. In an efficient market, stock analysis provides no benefits because prices already reflect all information. This does not mean that investors should avoid stocks or other assets. Although investors cannot consistently generate abnormal returns in an efficient market, the return should be warranted based on the risk associated with the investment. Furthermore, financial advisors have a role even in a very efficient market. The benefits to diversification do not evaporate in an efficient market nor do the benefits from wise tax and retirement planning. Investors have different risk preferences and goals for the future.

BEHAVIORAL FINANCE

Expected utility theory provides the basis for much of modern finance theory. Underlying assumptions of this theory are that people have complete information about possible outcomes and their likelihoods, and can evaluate their preferences across different expected options. People put these figures together and choose the outcome that maximizes expected utility. Although the traditional approach provides many useful insights, something seemingly is missing. For example, people consistently suffer from particular behavioral biases and the reigning traditional models do not provide satisfactory explanations. In other words, the models cannot describe actual, observed behavior. Of course, these normative models may fail because people are irrational or because the models rest on false assumptions.

Behavioral finance uses insights from other sciences and business disciplines to understand the decisions investors make. Psychologists and other social scientists have been studying human behavior for a long time and have accumulated considerable evidence on how people make decisions. With advanced technologies, neuroscientists now can show how brain functioning can impact financial decisions in the field of neuroeconomics (neurofinance). Instead of focusing on the outcome, scientists in these other disciplines focus on how decision makers reach outcomes. Traditional finance theory is normative because it indicates how investors should make decisions. By contrast, the behavioral finance approach is to understand why investors make the observed decision.

Behavioral Decision Theory and Bounded Rationality

Behavioral decision theory incorporates evidence on how people actually behave into models of decision-making. Nobel laureate Herbert Simon proposed one of the early alternatives to expected utility theory. Simon (1955, p. 99) notes that "the task is to replace the global rationality of economic man with a kind of rational behavior

that is compatible with the access to information and the computational capacities that are actually posed by organisms, including man, in the kinds of environments in which organisms lived." Although this was not an easy task, Simon and other decision researchers realized that the traditional paradigm did not describe the behavior of real people. According to Simon, people "satisfice," rather than "optimize," meaning that they choose the course of action that satisfies their most important needs, but the choice may not be optimal. For example, a car buyer may not exhaustively search out every bit of information about all the cars on the market. Instead, this consumer may search until the person identifies the car that fits his or her tastes and preferences.

Decision researchers document a long list of judgment biases and cognitive imperfections, leading to additional calls for alternatives to expected utility theory. For example, Slovic, Fischoff, and Lichtenstein (1977) provide a review of the decision theory literature. Behavioral theorists are not arguing that people are irrational when behavior does not fit expected utility predictions. People want to make rational choices but they are simply limited by constraints on their ability and resources. Simon's (1978) theory of bounded rationality describes the view that optimal decision-making is limited because of cognitive constraints and information availability. People only have so much time to devote to making a decision. Simon's ideas provide the basis for much of the theory of decision-making that followed. Einhorn and Hogarth (1981) provide a review of this literature.

Prospect Theory and Loss Aversion

Prospect theory is the most widely accepted alternative to expected utility theory. Kahneman and Tversky developed this descriptive model of decision-making under risk to describe observed human behavior (Kahneman and Tversky 1979; Tversky and Kahneman 1992). Although prospect theory has some similarities to expected utility theory, it differs in several key ways.

Financial economists developed expected utility theory as a normative model to describe how people should behave, whereas actual behavior provides the basis for prospect theory. According to psychologists and other decision researchers, people often make inconsistent choices. Consider, for example, the following problem from Tversky and Kahneman (1981):

> Problem 1: Imagine that you face the following pair of concurrent decisions. First examine both decisions, and then indicate the options you prefer.
>
> - Decision 1. Choose between A, a sure gain of $240, and B, a 25 percent chance to gain $1,000 and 75 percent chance to gain nothing.
> - Decision 2. Choose between C, a sure loss of $750, and D, a 75 percent chance to lose $l,000 and a 25 percent chance to lose nothing.

What did you choose? When making decision 1, the majority of Kahneman and Tversky's respondents choose A (84%), whereas when making decision 2, the majority choose D (87%). This choice pattern is inconsistent with expected utility theory because choosing A in decision 1 indicates risk aversion and choosing D in decision 2 indicates risk taking. In decision 1, A has an expected gain of $240 and B's expected gain is larger ($250) but riskier, so choosing A suggests risk aversion. In

decision 2, C has a sure expected loss of $750 and D's expected loss is the same but risky. A risk-averse person would pick A and C because he prefers a riskless action to one that is risky and has equal or smaller expected value. Expected utility theory (i.e., the standard finance view) cannot explain why a person would have a shift in preferences like this but prospect theory (i.e., the behavioral finance perspective) includes this behavior as one of its key precepts.

Exhibit 2.2 illustrates a typical prospect theory value function. Instead of maximizing expected utility, prospect theory posits that people maximize value. A critical feature of the theory is that people evaluate outcomes based on changes in wealth, rather than final position. Thus, in Exhibit 2.2 the horizontal axis represents changes in wealth from a reference point and the vertical axis represents value, which is the evaluation of an outcome analogous to utility. The reference point is typically taken to be the person's initial position or starting wealth. Notice that the value function is convex in the loss domain but concave for gains. This reflects the observation that people's choices reflect risk taking when their decision involves losses, but risk aversion for gains, as in problem 1 above.

The value function in Exhibit 2.2 reflects another key aspect of prospect theory. The choices people make reflect a strong aversion to losses, referred to as *loss aversion*. In other words, the pain experienced from a loss of $100 is felt more sharply than the pleasure experienced from a gain of $100. According to Kahneman and Tversky (1979, p. 279), "losses loom larger than gains." In Exhibit 2.2 the value function is steeper for losses than for gains because a negative change in wealth causes a stronger change in value than a positive change of equivalent size.

Taken together, the prospect theory value function reflects three important properties that distinguish it from the traditional utility function. First, value is measured in terms of changes in wealth from a reference point. Second, the value function is convex for losses reflecting risk taking and concave for gains reflecting

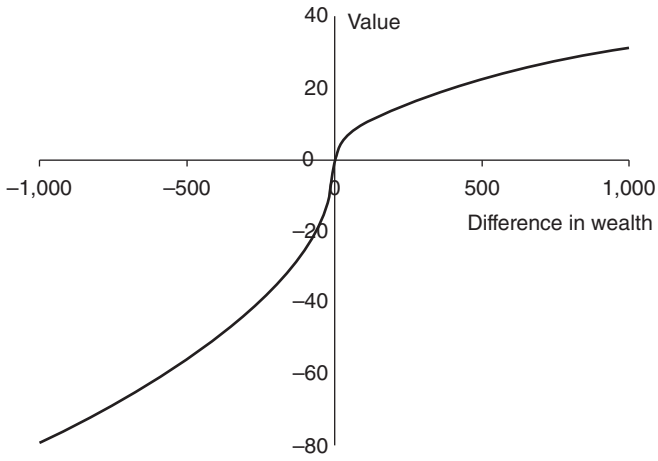

EXHIBIT 2.2 The Behavioral Finance Perspective: The Prospect Theory Value Function for a Loss Averter

Note: This exhibit illustrates prospect theory's value function, which replaces the utility function of expected utility theory.

risk aversion. Third, the value function is steeper for losses than for gains due to loss aversion.

With the value function, people can determine preferred actions by maximizing expected value, similar to the process used when maximizing expected utility. The evaluation is somewhat more complicated with prospect theory, however, in that value weights are not simple probabilities as in expected utility theory. In prospect theory probabilities are transformed into decision weights. A typical weighting function reflects another aspect of behavior reported by Kahneman and Tversky (1979). People tend to overweight low probability events. This can explain why people buy lottery tickets and insurance, both of which have negative expected values. People tend to overestimate the probability that they will win the lottery, which is an extremely low probability event. At the same time, people overestimate the probability of a bad outcome and purchase insurance. Both choices seem at first to be inconsistent with prospect theory, which predicts risk aversion for gains (avoidance of lotteries) and risk seeking for losses (avoidance of insurance), but these choices are consistent with the theory when incorporating the overweighting of low probabilities.

The foregoing discussion notes the important differences between the traditional approach and its most popular alternative. While prospect theory is a powerful approach that can describe many of the decisions people make, the theory cannot rectify some anomalies. One area that is particularly important for financial decision-making is what happens with *path dependence*. Path dependent decisions depend on previous decisions so that the current position results from active choice. Many theories consider one-shot decisions, but the situation gets much more complicated when people make several decisions sequentially. If the decision maker chooses the starting point, will he integrate the results of prior decisions or will he segregate? For example, if the decision maker is evaluating the performance of a stock, what is the starting point? What if the person bought, sold, and later repurchased a stock? While theory has certainly made progress, much work still needs to be done.

Framing

An important observation on which Kahneman and Tversky (1979) relied in developing their theory is that people's choices are inconsistent across different presentations of a choice. Recall that expected utility theory requires that preferences be consistent so that the presentation should be irrelevant. The decision frame refers to how a decision maker views a problem. The perception of a problem depends not only on the presentation but also on the characteristics of the decision maker. Researchers document framing effects across a variety of problems. Here is a well-known example from Tversky and Kahneman (1981).

> Problem 2: Imagine that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs is as follows:
>
> - If Program A is adopted, 200 people will be saved.
> - If Program B is adopted, a 1/3 probability exists that 600 people will be saved, and a 2/3 probability that no people will be saved.

Which of the two programs would you favor?

A second group of people is given the same problem but asked to choose between two different programs, as follows:

- If Program C is adopted, 400 people will die.
- If Program D is adopted, a 1/3 probability exists that nobody will die, and a 2/3 probability that 600 people will die.

Which of the two programs would you favor?

What did you choose this time? When given the choice between programs A and B, the majority of Kahneman and Tversky's respondents choose A (72%), whereas when choosing between C and D, the majority choose D (78%). Based on the behavioral finance perspective, the responses suggest that when a problem is presented in terms of gains, the majority is risk averse but when a problem is presented in terms of losses, the majority is risk taking. According to the traditional finance viewpoint, the two choices are identical and expected utility theory would predict that a rational economic decision maker would consistently choose A and C if risk averse and B and D if risk taking. In terms of the outcomes, A and C are equivalent, as are B and D.

Kahneman and Tversky's (1979) observation that the decision frame depends on how a problem is formulated and the individual characteristics of the decision maker has powerful implications for financial decision-making. An investor's perception of a choice may change by manipulating the presentation of information. Of course, this idea may not seem particularly surprising to anyone involved in designing sales marketing programs, but remember that in the traditional (standard) finance paradigm a rational decision maker should see through the frame.

Heuristics

A rational decision maker should also base decisions on available information. Recall Simon's (1955, 1978) theory of bounded rationality. People face both cognitive and environmental constraints. A *heuristic* is a useful rule-of-thumb that people can use for problem solving. While some view heuristics narrowly as the result of cognitive error, they are more broadly viewed as useful tools for people who make decisions with limits on cognition in complex environments. In some cases, the full evaluation of information and construction of probabilities are overly burdensome or perhaps even impossible because of information overload. The world is full of uncertainty and a person's time is limited. A decision needs to be made and a heuristic can promote appropriate decision-making under certain conditions.

Heuristic-based decision-making can be efficient and optimal depending on the environment. A heuristic can be ecologically rational when is takes advantage of the structure of information in the decision maker's environment (Gigerenzer, Todd, and ABC Research Group 1999). Take, for example, a simple heuristic such as familiarity. When choosing a stock to add to his portfolio, suppose the investor chooses the one from the opportunity set that he knows or thinks he knows. This strategy is wise if he is more likely to be familiar with stocks that will perform well in the future. Although some research concludes that heuristic-based decision-making can lead to suboptimal outcomes (Huberman 2001), others contend that these decisions can lead to good outcomes in particular environments (Todd and Gigerenzer 2003).

Overconfidence

When people are asked about their driving ability, most will say it is above average. People tend to be overconfident about their skills, abilities, and knowledge. In finance, overconfidence has garnered particular attention because researchers show this bias to have an important impact on financial decisions for both investors and managers. For example, researchers report that overconfident traders trade too much and incur inferior returns (Barber and Odean 2000, 2001). Regarding managerial decisions, hubris can lead to excess entry into markets and may explain the high rate of failure among business start-ups (Camerer and Lovallo 1999).

One challenge for researchers is measuring the level of confidence. With market data, researchers use proxies for overconfidence such as gender or trading intensity so that the evidence can only indirectly link overconfidence with poor outcomes (Barber and Odean 2000, 2001). Researchers report that men and those who trade frequently are overconfident. In experimental laboratories, survey techniques provide a more direct way of measuring confidence, but even here different views of what confidence is complicate measuring confidence (Ackert and Deaves 2010). Overconfidence could manifest as a view of superiority, possessing greater skill and knowledge than others, or being better than average. Overconfidence could be revealed by expectations that are overly optimistic. Overconfidence could also result from an illusion of control wherein a decision maker believes she can control chance events. Finally, overconfidence can reveal itself through miscalibration or overestimation of the precision of knowledge. In an uncertain information environment, confident people tend to believe their information is more accurate than that of others.

In laboratory experiments, researchers often use a calibration test to measure overconfidence. For example, a researcher may give respondents a survey with 10 questions with numerical answers. The researcher asks the subjects to provide upper and lower bounds on their estimated answer so that they are, say, 90 percent confident that their bounds contain the correct answer. The researcher will observe that 9 or 10 intervals will contain the correct answer for a calibrated respondent. Miscalibration occurs when many of the intervals fail to contain the true answer. The idea is that a person who understands the precision of his knowledge will set a wide interval to reflect doubt about the quantity.

Financial advisors understand that knowing their clients is important and widely use questionnaires to evaluate various financial and investment behaviors. To determine the basic financial preferences of the individual and also assess who may be prone to bias, a first step is to have a client fill out a survey instrument. This questionnaire can be designed to measure a client's risk tolerance, personal investment history, spending habits, and money personality attributes. With this knowledge, an advisor is better able to provide appropriate counsel to clients.

Regret Theory

A widely documented investor bias is the disposition effect. The *disposition effect* is the tendency to hold onto losing investments too long, while selling winners too soon. With a proprietary database including more than 10,000 discount brokerage accounts and nearly 100,000 transactions, Odean (1998) reports that investors are hesitant to realize losses but quick to realize gains.

Emotion is one possible explanation for the disposition effect. Emotions can be differentiated from other mental states because they are associated with observable features (Elster 1998). For example, *a bad mood* is a general sour feeling, whereas a negative emotion can be associated with a particular person or object, such as a poor-performing stock. Two emotions have received particular attention in behavioral finance: regret and pride. Like people in general, investors dislike wishing they had made a different decision. This dislike is so strong that behavior is actually affected before the emotion is even experienced, in other words, by fear of regret. For example, investors do not want to miss out on "the next big thing," particularly if their friends, colleagues, and neighbors are happily relaying their success. Pride and regret are flip sides of each other, but the negative emotion evokes a stronger reaction, consistent with prospect theory's loss aversion.

Behavioral researchers have developed models that incorporate a role for these important emotions. Loomes and Sugden (1982) propose regret theory as an alternative to prospect theory. This theory rests on the assumptions that people experience pride and regret and also make decisions in conditions of uncertainty that take into account these emotions. Fear of regret may underlie the disposition effect if it leads investors to hold onto losers to avoid having to acknowledge their loss and experience regret, while at the same time selling stocks that have performed well and feeling prideful. Experimental studies of the disposition effect provide support for both prospect theory and regret as important drivers on the decision-making process (Weber and Camerer 1998; Summers and Duxbury 2012)

Advances in Behavioral Finance

Thus far, this section has reviewed the foundations of behavioral finance. Behavioral finance researchers have made great progress in building on this base to provide more satisfactory explanations of observed individual and market behavior. While complete coverage of this burgeoning field requires more than a single chapter, this subsection describes a few important contributions to illustrate the directions taken in the literature. Baker and Nofsinger (2010) provide extensive coverage of behavioral finance.

This chapter previously discussed how the framing of a question can affect decision-making. Behavioral researchers find that in addition to the importance of the frame, people seem to use particular cognitive operations in keeping track of their financial situation. They use certain rules to define how to categorize activities and to monitor the frequency of an activity. *Mental accounting* is the term used to describe this process. Thaler (1999) provides a review of how mental accounting can help us understand a wide variety of financial behaviors. For example, a persistent question in finance is why firms pay dividends. Mental accounting can explain why an investor might prefer cash dividend payments to capital gains even with similar tax treatment. An investor who uses mental accounting might keep dividend payments in a "current income" account and capital gains in a separate account, perhaps labeled "long-term savings." The investor might feel free to spend current income but not savings.

In addition to alternatives to the traditional approach to individual decision-making, researchers have made progress on models to describe pricing in markets. Hirshleifer (2001) provides a review of investor psychology and behavioral asset pricing models. An example of a proposed alternative to the CAPM is Shefrin and Statman's (1994) behavioral capital asset pricing model (BAPM). This model incorporates

two types of traders: some who make cognitive errors and others who do not. In their model, information sometimes efficiently drives pricing, but other times pricing may be inefficient because uninformed traders move markets. Shefrin (2008) presents detailed development of behavioral asset pricing with different trader types.

In the CAPM or its three-factor extension, a trade-off occurs between risk and return. The BAPM assumes that beta is not a sufficient measure of risk and that risk is not the only factor that determines returns. Statman, Fisher, and Anginer (2008) recognize that personal evaluations of an asset will affect its price. For example, investors will pay a higher price for stock in a "good" company. In fact, how investors feel about a stock, referred to as *affect*, actually underlies the factors that traditional models employ to measure risk. Statman (2010) posits that other behavioral variables, such as a firm's display of social responsibility or social status derived from an association, affect pricing. In the CAPM, return is a function of risk as measured by beta, as expressed in Equation 2.1, and shown in a modified form here:

$$E(R_i) = f(\text{market risk factor}) \tag{2.2}$$

The three-factor model also models return as a function of risk factors as:

$$E(R_i) = f(\text{market, book-to-market, and size risk factors}) \tag{2.3}$$

The BAPM recognizes that other factors affect pricing and is expressed as:

$$E(R_i) = f(\text{risk factors, affect, social responsibility, status, etc.}) \tag{2.4}$$

Behavioral theorists also contribute practical descriptions of how investors form portfolios. Shefrin and Statman (2000) use mental accounting as a basis for their behavioral portfolio theory (BPT) in which some investors segregate assets into layers, or mental accounts, depending on their investment goals. For example, one investment goal might be to provide for retirement, while another is to try to improve the standard of living (i.e., move to a higher level of wealth). An investor with these two goals is risk averse with the retirement account but risk seeking with the "get rich" account. Traditional models do not allow for such goals, but BPT recognizes that investors have subportfolios with disparate aspirations. More recently, Das, Markowitz, Scheid, and Statman (2010) develop a theory of portfolio optimization with mental accounting that brings together important features of traditional mean-variance portfolio theory and BPT. This model combines the two frameworks to connect investors' goals and portfolio construction.

Behavioral finance researchers also propose alternatives to the widely accepted EMH. In particular, Andrew Lo develops the adaptive markets hypothesis (AMH). Lo (2004, 2005, 2012) maintains that the EMH is not wrong, but simply incomplete because human biology cannot be ignored. Markets reflect changes through evolution, just as human behavior is shaped by evolutionary forces. In this view, market efficiency is not absolute, but measured on a continuum. If market participants are well-adapted to the environment, the market will function more efficiently. In a new market or one with a shift in fundamentals, less efficiency can be expected.

Recent studies examine whether market behavior is consistent with the predictions of the AMH. Markets are prone to cycles of efficiency because natural selection encourages learning as new information arrives and as traders compete

over resources and profits. Neely, Weller, and Ulrich (2009) examine profit opportunities in foreign exchange markets and find that the observed patterns are consistent with the AMH. Profit opportunities declined too slowly over time to be consistent with the traditional EMH. Instead, the market behaves adaptively and is subject to evolutionary pressures. Similarly, Kim, Shamsuddin, and Lim (2011) report that changing market conditions drive time-varying predictability in returns for the Dow Jones Industrial Average, which is consistent with the AMH.

SUMMARY

Although policy makers, researchers, investment professionals, and investors may continue to debate whether markets are efficient and investors are rational, behavioral finance has made great strides in understanding observed behavior. Just a few short decades ago, questioning the efficiency of market prices was akin to heresy. Today, many recognize that persistent deviations from the predictions of theory provide useful information about how and why people make decisions. Observation of actual behavior informs the development of good theory.

The theory of investment behavior has evolved in recent times. Starting with research in the social sciences, behavioral researchers have accumulated much knowledge relating to the forces shaping investment decisions. Today, few accept the notion that market outcomes are always efficient or that *homo economicus*, or rational man, is the only financial decision maker of interest.

Moving forward, this direction will benefit both policy makers whose goal is to develop appropriate procedure and investors who strive to maximize wealth with limited time and resources in an increasingly complicated world. Behavioral finance seeks to describe the choices not of rational or irrational man, but of real people. The benefits of these insights are already being observed.

DISCUSSION QUESTIONS

1. Describe the primary differences in the measurement of risk between the utility function used in expected utility theory by traditional finance and the value function posited by prospect theory in behavioral finance.
2. What is the difference between risk aversion and loss aversion?
3. What does modern portfolio theory (i.e., traditional finance) say about how an investor should form an optimal stock portfolio?
4. How does Simon's concept of satisficing differ from the traditional approach in which investors maximize expected utility?
5. Describe a heuristic that can be used in decision-making and whether it is ecologically rational.

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CHAPTER 3

Behavioral Economics, Thinking Processes, Decision Making, and Investment Behavior

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INTRODUCTION

According to traditional economic theory embodied in the efficient market hypothesis (EMH), investor behavior should be rational in terms of incorporating all relevant information into the decision-making process, as well as being calculating, forward looking, and not subject to regret. Such behavior also is ideally bereft of emotions because emotions are assumed to bias decisions away from calculating, forward-looking, and maximizing outcomes. In other words, traditional economics assumes decisions result in optimal financial outcomes. What it assumes to be rational behavior should generate the highest possible returns compared to less rational or irrational behavior. Moreover, rational investor outcomes should be efficient such that, on average, market prices reflect the fundamentals of investment choices and therefore incorporate all relevant information about investment prospects.

This chapter addresses the empirical reality that investor behavior often does not generate outcomes that are efficient, yielding suboptimal financial returns, and market prices often deviate from their fundamental values (e.g., resulting in bubbles and busts) (Shiller 2000). Moreover, the evidence indicates that the returns of active market traders or investors are typically below those generated by passive (or systematic) investors (Malkiel 1973, 2003). This suggests that active decision-making strategies, using modern knowledge technology, including sophisticated financial data gathering and analyses typically do not beat less calculating behavior that relies on decision-making shortcuts. Thus, what many would deem to be more rational behavior often generates subpar economic and financial outcomes.

This chapter examines the contradictions between empirical reality and traditional economic theory through the lenses of behavioral economics. Behavioral economists and behavioral finance researchers play an important role in identifying these various mismatches between reality and theory. Many behavioral economists