

BEHAVIORAL
FINANCE
AND
CAPITAL
MARKETS

ADAM SZYSZKA

How Investor Psychology
Influences Asset Pricing



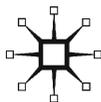
Behavioral Finance and Capital Markets

This page intentionally left blank

Behavioral Finance and
Capital Markets
How Psychology Influences
Investors and Corporations

Adam Szyszka

palgrave
macmillan



BEHAVIORAL FINANCE AND CAPITAL MARKETS

Copyright © Adam Szyszka, 2013.

Softcover reprint of the hardcover 1st edition 2013 978-1-137-33874-7

All rights reserved.

First published in 2013 by
PALGRAVE MACMILLAN®
in the United States—a division of St. Martin's Press LLC,
175 Fifth Avenue, New York, NY 10010.

Where this book is distributed in the UK, Europe and the rest of the world,
this is by Palgrave Macmillan, a division of Macmillan Publishers Limited,
registered in England, company number 785998, of Houndmills,
Basingstoke, Hampshire RG21 6XS.

Palgrave Macmillan is the global academic imprint of the above companies
and has companies and representatives throughout the world.

Palgrave® and Macmillan® are registered trademarks in the United States,
the United Kingdom, Europe and other countries.

Library of Congress Cataloging-in-Publication Data is available from the
Library of Congress.

A catalogue record of the book is available from the British Library.

Design by Newgen Knowledge Works (P) Ltd., Chennai, India.

First edition: September 2013

10 9 8 7 6 5 4 3 2 1

ISBN 978-1-349-46414-2 ISBN 978-1-137-36629-0 (eBook)
DOI 10.1057/9781137366290

*To those who encouraged, motivated, and supported me greatly
in the effort to prepare this book. Your inspiration,
friendship, and love made this possible*

This page intentionally left blank

Contents

<i>List of Figures and Exhibits</i>	ix
Introduction	1
Part I Foundations	
1 Behavioral Approach versus Neoclassical Finance	9
2 Psychological Aspects of Decision Making	37
Part II Investor Behavior and Asset Pricing	
3 Investor Behavior	61
4 Asset-Pricing Anomalies and Investment Strategies	87
Part III Aggregate Market Behavior	
5 Market-wide Consequences of Behavioral Biases	119
6 Behavioral Insights into Financial Crisis	143
Part IV Behavioral Corporate Finance	
7 Rational Corporations in Irrational Markets	171
8 Managerial Biases in Corporate Policy	197
9 Managerial Practice	217
10 Heuristics and Biases among Corporate Managers	241
Concluding Remarks	265

<i>Notes</i>	271
<i>References</i>	277
<i>Name Index</i>	313
<i>Subject Index</i>	323

Figures and Exhibits

Figures

1.1	Risk reduction against the increase in the number of assets in investment portfolio	21
1.2	Efficient frontier	22
2.1	Shape of a hypothetical value function v according to the prospect theory	47
2.2	Shape of a hypothetical weighting function π according to the prospect theory	48
4.1	Size premium (<i>SMB</i>) in the US market in the period 1927–2012	114
4.2	Book-to-market premium (<i>HML</i>) in the US market in the period 1927–2012	115
6.1	Current account deficit, 1992–2010	156
6.2	Consumer prices (year to year percent change), 1992–2010	159
7.1	The percentage of dividend-paying firms from the NYSE, AMEX, and NASDAQ sample between 1981 and 2011	177
10.1	Shape of the value function suggested by Kahneman and Tversky (1979) with a dotted line marking the modification for positive arguments of small value	259

Exhibits

4.1	The relation among asset-pricing anomalies, investor behavior and its psychological background, and implications for investment strategy	90
7.1	The share of dividend-paying firms by industry in the sample of NYSE, AMEX, and NASDAQ stocks in 2011	178
9.1	Rank distribution among items and rank parameters	220
9.2	Results of Friedman and Wilcoxon tests	221
9.3	Rank distribution among items and rank parameters	223
9.4	Results of Friedman test	223
9.5	Conditional distribution and significance tests	224

9.6	Distribution and significance test	225
9.7	Rank value distribution among items and rank parameters	226
9.8	Results of Friedman and Wilcoxon tests	227
9.9	Distribution and significance test	229
9.10	Rank distribution among items and rank parameter	230
9.11	Results of Friedman test	231
9.12	Distribution and significance test	232
9.13	Rank distribution among items and rank parameters	234
9.14	Results of Friedman and Wilcoxon tests	235
9.15	Rank distributions among items and rank parameters	236
9.16	Results of Friedman and Wilcoxon tests	236
9.17	Rank distribution among items and rank parameters	238
9.18	Results of Friedman test	238
9.19	Rank distribution among items and rank parameters	239
9.20	Results of Friedman test	240
10.1	Statistical testing procedure	242
10.2	Self-perception of corporate managers in various areas of life	244
10.3	Self-evaluation of managerial skills	245
10.4	Forecasts of market changes and stock price changes in 3 and 12 months with estimated probability of forecast realization	247
10.5	Managerial predictions about market changes in short and long term	248
10.6	Managerial predictions about their stock price in the short and the long term	249
10.7	Distribution and significance test	250
10.8	Main descriptive statistics of the tested variables	251
10.9	Distribution of answers	253
10.10	Distribution and significance tests	254
10.11	Risk aversion and risk seeking depending on decision context	257
10.12	Personal versus corporate loss aversion	260
10.13	Distribution of answers to the question	263
10.14	Distribution of answers to the question	263
10.15	Distribution of answers to the question	263

Introduction

The neoclassical financial theory made various strong assumptions including decision makers' rationality, common risk aversion, perfect markets with no frictions such as transaction costs or taxes, and easy access to information for all market participants. Although many of the assumptions of the neoclassical theory were unrealistic, financial economists initially accepted it because its predictions seemed to fit reality. It was not until much later that contradictive evidence started to pile up and behavioral finance emerged in response.

First, the neoclassical financial economics assumed that all decision makers, or at least a large majority of them, behave rationally. This means that they know how to interpret incoming information and correctly estimate the probability of future events on that basis. Rational decision makers evaluate different levels of wealth following the subjective utility function, which meets all the axioms suggested by Von Neumann and Morgenstern (1944). Making risky decisions, they will try to maximize the total expected utility, while displaying general risk aversion (Friedman and Savage, 1948).

Markowitz (1952) developed the portfolio theory according to which rational investors should create well-diversified investment portfolios. This reduces the impact specific factors have on total investment value and makes for an optimal relation between the expected return and the level of risk. Hence, in the long run, expected returns on securities should depend only on the level of systemic (market) risk. This was reflected, *inter alia*, in the Capital Asset Pricing Model (CAPM) put forward by Sharpe (1964), Lintner (1965), and Mossin (1966).

The neoclassical theory also assumed that if there are instances of irrationality on the part of some investors resulting in asset mispricing, this is quickly corrected by actions taken by rational market players who may apply efficient and unconstrained arbitrage strategies. Consequently, capital markets is always efficient in that it prices assets correctly and reflects all the available information, offering the best approximation of the intrinsic value of assets (Fama, 1965, 1970).

The main advantage of the neoclassical approach is that it constitutes a consistent and comprehensive system providing normative models. On the other hand, its major disadvantage is that it adopts unrealistic assumptions as the basis for its different component theories. Such assumptions, however, are necessary in order to quantify and simulate different processes and phenomena so that the developed models may be normative. Actually, one of the real-life aspects that the neoclassical financial theory largely ignored is the fact that there might be serious disruptions to decision makers' rationality. The traditional approach dismissed irrational behavior as irrelevant for the asset-pricing process.

Unrealistic assumptions are often a necessary compromise made in order to construct formalized models. They do not depreciate the importance of the theoretical approach, especially when a model is able to explain the reality well. This was initially the case with the cornerstones of the neoclassical financial economics. Early empirical evidence was indeed supportive of the Efficient Market Hypothesis (Fama, 1970) and the CAPM model (Black et al., 1972; Fama and MacBeth, 1973).

It was not until a decade or two later that many studies yielded results that flatly contradicted the traditional paradigm. In response to a growing number of anomalies, behavioral finance emerged. Its key concept is that the behavior of irrational investors may impact asset pricing and will not always be eliminated quickly by rational arbitrageurs. There are limits to arbitrage resulting from additional risks and real-life institutional and organizational context. As a result, markets will not always be efficient and asset pricing may deviate from predictions of traditional market models. Highly intuitive and convincing explanations referring to irrational behavior and psychological biases of investors have gained popularity among professionals and academics.

Yet, behavioral finance is affected by an ailment typical of relatively young and scarcely penetrated areas of knowledge. That is, a plethora of research carried out in an uncoordinated manner produced fragmentary outcomes that are difficult to cohere into a comprehensive theory. Issues related to investors' behavior and the way it affects valuation of assets are complex. Thus, researchers face much difficulty in specifying all the factors and relationships that describe the phenomena taking place in the capital market. However, focusing only on selected aspects of the market leads to behavioral models that appear fragmentary and designed only to fit selected peculiarities. Prevailing in the literature so far are studies identifying some market peculiarity and then attempting to explain it. Alternatively, other works provide evidence for a specific attitude of market participants and try to establish its potential market outcome. Some papers focus on a given irrational behavior and its impact on asset pricing, being less interested in the psychological background of the behavior itself. Other authors concentrate more on the psychology of decision making and risk taking, but to a lesser extent on its inference for aggregated market data. Rare are those works that take a comprehensive look at multidimensional relations between various anomalies. Few authors apply a wider approach to study the whole story starting with psychology, to irrational

behavior of market participants and anomalous results of such behavior in asset pricing, to the implications for real-life practice.

Behavioral corporate finance is one of the newest areas within the behavioral framework. Traditional corporate finance made a general assumption that rational corporate managers operate in efficient markets in order to maximize shareholders' wealth. Incentives shaped by adequate compensation contracts, the market for corporate control, and other governance mechanisms were said to minimize potential agency costs. The CAPM has been typically used to determine the cost of equity, which is of course the same figure as the expected return for investor, just seen from a different perspective. Under the Efficient Market Hypothesis, the cost of firm financing should always be adequate and dependent solely on how risky the company is. When considering an acquisition, managers could take for granted that other assets are also always correctly priced. As behavioral finance changes the way we look at investor behavior and asset pricing in capital markets, it must naturally also have implications for the second group of capital market participants, that is, for corporations. Behavioral corporate finance takes two distinctive approaches. The first one emphasizes the effect of market inefficiency on corporate policies, assuming that executives act as rational professionals. In other words, it focuses on how a smart manager adapts corporate policy in order to exploit investor irrationality and market inefficiency. The second approach replaces the assumption of managers' rationality with evidence-driven psychological foundations. It shows how managerial biases may impact managerial practice, and if particular distortions are actually beneficial or detrimental to shareholders' wealth.

Finally, the behavioral approach is entering macroeconomics. For example, it may be applied to help understand the recent economic turmoil, that is, the credit crunch in the United States in 2008 and the later crisis in Europe. Although, problems in the United States and in the Eurozone were mainly due to vast macroeconomic imbalances, behavioral biases and inclinations of market participants helped to build up the crisis exacerbating its scope and dynamics.

The purpose of this book is to fill in the identified gaps and to address the aforementioned issues in the current state of behavioral financial research. First, the rich polemic between traditional and behavioral finance is presented and systematized. A comprehensive overview of the psychological foundations and their applications to finance is provided in such a way as to demonstrate a three-stage continuity among psychological factors, the behavior of investors who are influenced by them, and asset-pricing anomalies as a result of these irrational attitudes. The book also offers a multidimensional view on relations between various anomalies. This is supplemented by a discussion on practical implications for investment strategies. In the next step, the market-wide consequences of behavioral biases and attempts to model the aggregate market behavior are extensively discussed. The Generalized Behavioral Model (GBM) developed by Szyszka (2007, 2010) is proposed as the one that is able to explain, albeit at a general level and in a descriptive manner, the broadest possible range of market phenomena. The recent economic turbulence in the United States and Europe is discussed in detail both in the framework of macroeconomics

and from the behavioral perspective. The book also includes a comprehensive review of the most recent findings in the field of behavioral corporate finance. It addresses both the cases of rational managers operating in inefficient markets, as well as the possibility of managerial biases. This part is also supplemented with original results of the survey among executives of publicly listed companies.

Such an extensive and multidimensional scope makes the book unique. Its preparation required appropriate methodology and sources. The book drew on over 700 academic papers and books. The collected and systematized literature sources are a digest of the current global state of knowledge on capital markets and corporate finance seen from the behavioral perspective. When necessary, references were also made to older historical sources. The author has used his own previous work as well. Most of the publications cited relate to the American market and, to a lesser extent, the British and Canadian ones. Some papers also refer to other markets in Europe, Australia, and Asia. Systemization, classification, and comparative analysis were all used to develop a deductive and inductive line of argument. Specific problems were most often discussed starting from general statements to reach detailed conclusions, which allowed for a thorough analysis and made it possible to present the issues in an exhaustive, systematic way. Next, wherever it was possible and reasonable, the author tried to combine the different strands of knowledge and synthesize them in order to arrive at generalized conclusions. The empirical part contains a specially designed survey. Adequate statistical methods were used to process the obtained results and reach conclusions where it was possible.

The book consists of four major parts totaling ten chapters altogether. The first part is dedicated to foundations of behavioral finance. Chapter 1 confronts the principles of the neoclassical financial theory and traditional corporate finance. Chapter 2 covers selected elements of psychology financial behaviorists refer to when they explain how people construct their beliefs, how preferences emerge, and how emotions influence the decision-making process. These two chapters constitute the basic framework for further deliberations in later parts of the book.

Part II of the book focuses on investor behavior and anomalies in asset pricing. Chapter 3 describes attitudes investors adopt when making investment decisions. It shows how psychological factors described in the previous chapter may impact investors' beliefs about future price changes, influence the perception of company value and investment selection criteria, as well as determine the way portfolios are managed. Chapter 4 systematizes and thoroughly discusses a number of phenomena observed in the capital market. It also demonstrates how the anomalies are linked with irrational investor behavior and its psychological background. Practical implications and profitability of various investment strategies based on asset-pricing anomalies are also discussed.

Part III takes a comprehensive look at market behavior as a whole. Chapter 5 begins with the discussion of two puzzling anomalies related to aggregated market data—the equity risk premium puzzle and excessive volatility of stock prices. It is followed by an overview of behavioral models developed to explain

various market phenomena that the neoclassical financial theory struggles with. It is shown that the most popular behavioral models account for some peculiarities, but usually are not able to explain all of them. The GBM is proposed as the one that is broad enough to be able to explain the whole range of market phenomena. The model is general and only descriptive, but it can roughly describe when, how, and what kind of psychological factors may distort correct asset pricing and influence returns observed on the market. Chapter 6 is dedicated to behavioral insights into the recent financial crisis. It offers both macroeconomic and behavioral perspective on the credit crunch in the United States in 2008 as well as on the turbulence in the Eurozone.

Part IV deals with corporate behavioral finance. Chapter 7 shows how rational managers may decide to amend their corporate policy in order to take advantage of investors' irrationality and temporary market anomalies. On the other hand, chapter 8 discusses potential psychological biases among managers themselves. As behavioral corporate finance has been studied much less than investor behavior and asset-pricing anomalies, we decided to carry out our own original research in this area based on the survey of top executives of publicly listed companies. Chapter 9 presents results that relate directly to corporate managerial practice. It documents cases of rational managerial behavior attempting to exploit market inefficiency, as well as examples of erroneous managerial practice. Chapter 10 focuses on managerial psychology and verifies if similar heuristics and biases that were earlier documented for investors may be found also among corporate executives.

The book concludes with final remarks that recapitulate its main findings as well as open issues for further discussion and potential research.

This book is unique in that it surveys all facets of behavioral finance and offers exceptional breadth and depth of discussion. Its target audience includes academics, capital market and corporate practitioners, regulators, students, and other people interested in behavioral finance and economic psychology. The book is appropriate as a stand-alone material for undergraduate or graduate courses in behavioral finance, or as supplementary reading for more general courses in areas of financial economics and corporate finance. Given the scope of the work, doctoral students in this field may also find it helpful.

PART I

Foundations

CHAPTER 1

Behavioral Approach versus Neoclassical Finance

This chapter confronts the main foundations of the neoclassical theory of finance with allegations of the behavioral approach. Theoretical models of classical financial economics do not take into account the possibility of decision maker irrationality. It is often assumed that irrational investors are not coordinated and therefore their behavior cancels out. And even if irrationality becomes strong and common among a large group of investors, it will be voided by rational actions of arbitrageurs. However, behavioral finance points out limits to arbitrage. It is argued that irrationality of investors may indeed influence asset pricing. This position challenges the main theoretical foundations of the neoclassical paradigm, including the Markowitz's portfolio theory, traditional asset pricing models, and the Efficient Market Hypothesis. The behavioral approach is of high importance also for the second side of capital market, that is issuers. A discussion on key elements of corporate finance policy in the light of behavioral implications concludes the first chapter.

1. Decision-Maker Rationality and the Expected Utility Theory

One of the key concepts in the neoclassical theory of finance is decision-maker rationality. A rational person correctly interprets the information he receives and knows how to estimate the probability of future events on its basis. He prioritizes various alternatives according to his own utility function and tries to optimize subjective expected utility. It is assumed that rational market participants are so strong and dominant as a group that they are able to quickly and efficiently eliminate any symptoms of irrationality on the part of other traders. As a result, the market will behave as if all participants acted rationally.

Determining decision-maker preferences and the way in which he assesses investment options is a point of departure for any traditional capital asset-pricing model. In the classical approach, these issues were comprehensively described by the expected utility hypothesis commonly believed to have been put forward by John von Neumann and Oscar Morgenstern (1944) although

it could be traced as far back as the eighteenth-century writings of Daniel Bernoulli (1954).

According to the neoclassical theory of finance, a rational decision maker follows two general rules. First, he displays so-called risk aversion in that he is willing to take risk only when it may lead to further benefits, that is, only when he stands a chance of being rewarded with a risk premium (Friedman and Savage, 1948). Risk aversion is a general and common phenomenon even though its degree may vary for each individual decision maker. Second, decision makers always make choices in such a way as to maximize total expected utility, given that the marginal utility of each additional benefit unit is positive.

The behavioral approach challenges both these assumptions on the grounds that risk aversion depends primarily on the context in which decisions are made. Moreover, decision makers attach greater importance to changes in the affluence level when measured against a specific reference point rather than its total value. Many behavioral experiments showed that subjects display risk aversion when they make choices between alternatives leading to lower or higher gains. However, when faced with a decision problem in the domain of losses, they are more prone to take risks. All of these observations lay at the foundation of the prospect theory developed by Kahneman and Tversky (1979).

Von Neumann and Morgenstern (1944) formalized the classical theorem on the existence of the utility function on the basis of a series of assumptions determining preferences of rational decision makers. What follows is a discussion of four fundamental axioms that cause the most controversy among representatives of behavioral finance.

1.1. Axiom of Completeness

The axiom of completeness assumes that a rational decision maker knows how to compare different options and has well-defined preferences. Comparing available information and guided by the constant set of preferences, he either prefers variant A to B, or B to A, or is indifferent between A and B.

However, Tversky and Kahneman (1981, 1986) point to results of experimental studies showing that people are often not able to correctly interpret the problems they face. Because of their limited perception of information, they are not always in a position to recognize repeated decision problems even if they are logically the same, but formulated in a different way. Depending on how the information is framed, decisions makers may exhibit different preferences in the same situations. We focus on mistakes in perception and information processing in greater detail in chapter 2.

1.2. Axiom of Transitivity

According to the axiom of transitivity, if a decision maker prefers variant A to B and rates variant B higher than C, then he will also prefer variant A to C. Even though this rule seems obvious, at least at first glance, it is also undermined by representatives of behavioral finance. The argument goes that,

under real-life economic conditions, decision makers may make intransitive choices because they are motivated by several criteria of variant assessment. For example, depending on the situation in which a decision needs to be made, a decision maker may be motivated by the amount of the reward in one case but the probability of success in another.

Tversky (1969) conducted an experiment where a group of subjects were to choose from several pairs of lotteries, but the expected value of each lottery within a pair was equal. In some games the potential payoff was large but with small probability assigned. In others, the payoff was small, but the probability of winning was very high. Tversky noted that when two lotteries are relatively similar in terms of gain probability (e.g., winning is possible, but very unlikely), decision makers will choose the game offering a higher payoff disregarding the risk criterion. However, when the difference in gain probability between each of the lotteries is considerable (e.g., winning is probable in both cases, but the probability is much higher in one of them), people will choose the lottery that offers higher chances of winning, paying less attention to the actual amount to be won.

So let us imagine three possible investments, I_1, I_2, I_3 , each of which has a different expected return, $E(R)$, and different risk level measured by variance V . Let us also assume the following relations between the expected return and risk of individual investments:

$$E(R)_1 > E(R)_2 > E(R)_3 \quad (1.1)$$

and

$$V_1 > V_2 > V_3 \quad (1.2)$$

If the decision maker believes that differences between risk levels V_1 and V_2 as well as between V_2 and V_3 are relatively small, he will be motivated by the criterion of higher expected return when comparing investments in such pairs. Consequently, he will prefer investment I_1 to I_2 and I_2 to I_3 . According to the axiom of transitivity, the investor should also prefer investment I_1 to I_3 . This does not necessarily have to be the case. The difference between risk levels V_1 and V_3 may be assessed by the investor as much larger than the difference in the level of risk for the two other pairs of investments. In such a case, the investor may make decisions following the criterion of risk reduction instead of trying to maximize the expected return. He will then prefer investment V_3 to V_1 which is plainly against the rule of transitivity.

1.3. Axiom of Continuity

The axiom of continuity says that the choice between two variants should only depend upon differences between them or conditions under which the two variants lead to different results. If both options are changed in the same way, decision maker's preferences should remain as they were. Hence, in accordance