Behavioral Finance and Equity Investing

Why Believe in Active Management

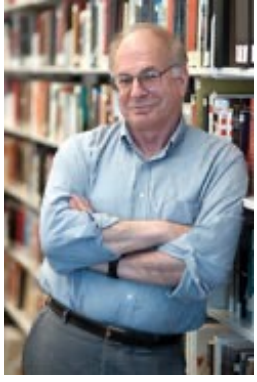
- Shiller's excess volatility
  - "the aggregate stock market in the United States in the last century has been driven primarily by psychology and fads, that it has shown massive excessive volatility."*
- Informational Inefficiencies (Grossman-Stiglitz)
- Risk Premia (Arbitrage Pricing Theory)
- Investor Constraints
- Opportunistic Trades
- **Behavioral Finance**
  - Investors not only behave irrationally, but their irrationalities are systematic and predictable, not random.

*Robert J. Shiller, *The New Financial Order: Risk in the 21st Century*, Princeton University Press, 2003.

Finance pre-Kahneman & Tversky

- Economic man
  - Rational, utility-maximizing
  - Obviously not correct, but errors assumed to be mean zero random.
- Efficient markets theory
  - Strong: all information fully reflected in securities prices. Even insider information is of no use.
  - Semi-strong: all publicly available information fully reflected in securities prices. Fundamental analysis of no use.
  - Weak: all past market prices and data fully reflected in securities prices. Technical analysis of no use.
- The Prime Directive (according to Rubinstein)
  - "Explain asset prices by rational models. Only if all attempts fail, resort to irrational investor models."

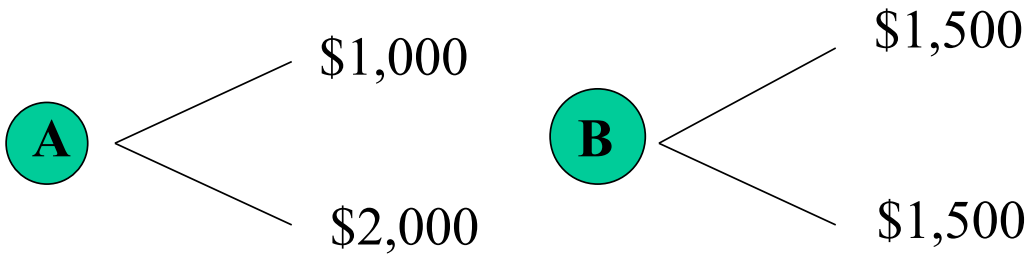
Kahneman & Tversky



- Psychologists whose work has greatly impacted economics. Kahneman shared the 2002 Nobel Prize in economics. (Tversky died in 1996). You can read about them in *The Undoing Project* by Michael Lewis.
- Prospect Theory (1979) described how people choose among risky prospects.
- We already knew that rational economic man wasn't exactly right.
- They showed that decisions under uncertainty are irrational in systematic and predictable ways.

Psych Experiments

- Given $1,000, would you prefer:
  - A) 50% (+$0), 50% (+$1,000)
  - B) 100% (+$500)
- Given $2,000, would you prefer
  - A) 50% (+$0), 50% (-$1,000)
  - B) 100% (-$500)



Psych Experiments

- In the first case, 84% choose B. In the second case, 69% choose A.
- People feel different about gaining and losing, even though A and B are identical. Framing matters.

Self-test of Overconfidence*

For each question, provide a low and high estimate to set a 90% confidence band. If you set the bands correctly, 9 of 10 answers should fall within the bands.

Question	Low	High	
1. Martin Luther King's age at death			39
2. Length of the Nile River in miles			4187
3. Number of countries that are members of OPEC			12
4. Number of books in the old testament			39
5. Diameter of the moon in miles			2160
6. Weight in pounds of an empty Boeing 747			390,000
7. Year in which Mozart was born			1756
8. Gestation period in days of an Asian elephant			645
9. Air distance from London to Tokyo in miles			5959
10. Deepest point in the ocean, in feet			36,198

*http://tim-richardson.net/misc/estimation_quiz.html

Mental Accounting

- "A major thesis of investment management is the need to consider individual investments as components of an overall investment plan…It is essential that every security be viewed in a portfolio context."
  - William F. Sharpe, *Investments*, 3rd Edition.
- Mental accounting: Process by which individuals divide their assets into separate accounts, and assign different utility functions to each.

Examples of Mental Accounting

- Theater tickets
  - As you arrive at the theater, you realize you have lost the $20 ticket which you had purchased ahead of time. Do you buy another ticket?
  - As you arrive at the theater, you realize you dropped a $20 bill on BART. Do you still buy a ticket?
- Finding a taxi in the rain
- Investment implications: loss aversion (treating gains and losses separately)

Systematic Irrationality*

- Social interactions (conforming, follow-the-crowd behavior
- Heuristic simplification (generalizing from personal experience and recent events)
- Self-deception (over-confidence, attributing positive outcomes to skill, negative outcomes to luck)

*David Hirshleifer, *Investor Psychology and Asset Pricing*, presentation to the AFA annual meeting, New Orleans, January 2001. See also Nicholas Barberis, "Thirty Years of Prospect Theory in Economics," *Journal of Economic Perspectives*, Vol. 27, #1, Winter 2013, pp. 173-196.

Alternative Classification*

Reference points and loss aversion (not necessarily inconsistent with rationality):

- Endowment effect: what you start with matters.
- Status quo bias: more to lose than gain by departing from current situation.
- House money effect: nouveau riche are not very risk averse.

Overconfidence:

- Overconfidence about precision of private information.
- Biased self-attribution (perhaps leading to overconfidence)
- Illusion of knowledge: overconfidence arising from being given partial information.
- Disposition effect: want to hold losers but sell winners.
- Illusion of control: unfounded belief of being able to influence events.

Statistical Errors:

- Gambler's fallacy: need to see patterns when in fact there are none.
- Very rare events assigned probabilities much too high or too low.
- Ellsberg Paradox: perceiving differences between risk and uncertainty.
- Extrapolation bias: failure to correct for regression to the mean and sample size.
- Excessive weight given to personal or antidotal experiences over large sample statistics.
- Overreaction: excessive weight placed on recent over historical evidence.
- Failure to adjust probabilities for hindsight and selection bias.

*Mark Rubinstein, "Rational Markets: Yes or No? The Affirmative Case," *Financial Analysts Journal*, 2000.

Even more:

Miscellaneous errors in reasoning:

- Violations of basic Savage axioms: sure-thing principle, dominance, transitivity.
- Sunk costs influence decisions
- Preferences not independent of elicitation methods.
- Compartmentalization and mental accounting.
- "Magical" thinking: believing you can influence the outcome when you can't.
- Dynamic inconsistency: negative discount rates, "debt aversion."
- Tendency to gamble and take on unnecessary risks.
- Overpricing long-shots.
- Selective attention and herding (fads and fashions)
- Poor self-control.
- Selective recall.
- Anchoring and framing biases.
- Cognitive dissonance and minimizing regret ("confirmation trap.")
- Disjunction effect: wait for information even if not important to decision.
- Time-diversification.
- Tendency of experts to overweight the results of models and theories.
- Conjunction fallacy: probability of two co-occurring more probable than a single one.

And why not add while we are at it…

- Confusion of probabilities with preferences (religion, money management)
- Freudian defense mechanisms: repression, displacement, reaction formation, isolation of affect, undoing, somatization, conversion.
- Kleinian defense mechanisms: splitting, projective identification, introjection, denial.

This has inspired many experiments

- Undergraduates
- Attendees at behavioral finance seminars.
- MFE students
- Even work on non-human subjects:

M. Keith Chen

Keith Chen is an [redacted] Professor of Economics with tenure at the UCLA Anderson School of Management. His research blurs traditional disciplinary boundaries in both subject and methodology, bringing unorthodox tools to bear on problems at the intersection of Economics, Psychology, and Biology.

In early work examining the evolutionary origins of economic behavior, he has shown that when monkeys are taught to use money, they display many of the hallmark biases of human economic behavior, suggesting that some of our most fundamental biases are evolutionarily ancient. Professor Chen's most recent work focuses on how people's economic choices are influenced by the structure of their language. His work has shown that how a person's language encodes future events influences future-oriented behaviors as diverse as saving, smoking, and safe sex.

Professor Chen also advises numerous companies on topics at the intersection of behavioral economics, business strategy, product design, and dynamic pricing. He currently serves as Head of Economic Research for *Uber*, where among other projects he designed Uber's current "Surge" pricing model.

More recent work: Did Trump shorten Thanksgiving? (2018)
Nursing home staff networks + Covid 19

Behavioral Finance

- These psychological ideas are compelling.
- The experimental evidence is overwhelming.
- There exist plausible evolutionary explanations.
- We even recognize these behaviors in ourselves.

- Behavioral finance represents a major shift in economic thinking.
  - "The difference between us is that you assume people are as smart as you are, where I assume people are as dumb as I am."
    - Behavioral economist Richard Thaler to rational economist Robert Barro, at a National Bureau of Economic Research conference

Finance Examples

- Value investing
  - Behavioral hypotheses: heuristic simplification (extrapolating from recent events) and social interactions (investors avoid value stocks).
- Momentum
  - Stocks under-react to news.
  - Behavioral hypothesis: investors hold on to loser and sell winners.
- Challenges to explaining momentum:
  - Horizon issue: reversion to momentum to reversion.
  - The Japan counterexample.

Lakonishok, Schleifer, Vishny

The Counterargument

"If we discover that asset prices exhibit reversals (surprise of surprises), the behavioralists say the cause is the documented tendency of individuals to over-react to recent events. Of course, that explanation could be true, but to believe it requires that we extrapolate from studies of *individual* decision makers done in narrow and restricted conditions to the complex and subtle environment of the security markets. The explanation also smacks too much of being concocted to explain *ex post* observations—much like medievalists used to suppose that a different angel provided the motive power for each planet. And then, when we discover that price reversals occur in the short run, momentum in the intermediate run, and price reversals again in the long run, behavioralists find some more convoluted way to explain that pattern based on irrational behavior (reminding me of Ptolemaic epicycles)."

Mark Rubinstein

Can Behavioral Finance Help Active Managers?

- "While behaviorists think it is theoretically possible to beat the market, individual investors do not have the time or training to do that on their own."
  - Richard Thaler
- "There are lots of good lessons to be taken from behavioral finance, but what it doesn't do is provide any kind of clear road map for cool sharp-penciled professionals to beat the market."
  - Burton Malkiel
- "They've done well, taking a very old way of solving every valuation problem and calling it behavioral finance."
  - Richard Michaud

Another Example: Accruals

- Sloan 1996: "Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?"*
  - The cash flow component of earnings persists significantly more than the accrual component.

$$\text{Income from operations} = (\text{accruals}) + (\text{cash flow})$$

$$\text{accruals} = \Delta\{\text{current assets and liabilities, cash, ST debt, taxes payable}\} + \text{depreciation}$$

  - Test of hypothesis:

$$e(t+1) = \gamma_0 + \gamma_1 \cdot acc(t) + \gamma_2 \cdot cf(t) + \upsilon(t+1)$$

**The Accounting Review*, Vol. 71, #3, July 1996, pp. 289-315.

Persistence of Accruals

- Sloan result
  - Sample of 40,679 US firm-years from 1962 to 1991.
  - Basic pooled regression:
    - γ_1=0.765 (187), γ_2=0.855 (305)
  - Decile ranking regression:
    - γ_1=0.565 (141), γ_2=0.838 (209)

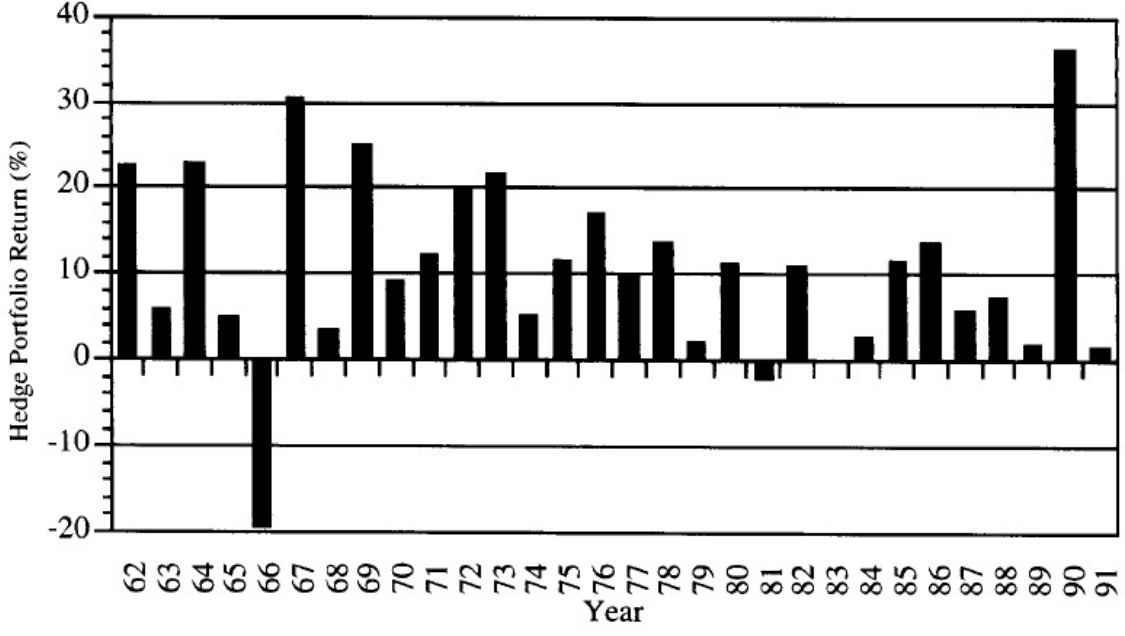
Behavioral Finance

- “Stock prices act as if investors “fixate” on earnings, failing to distinguish fully between the different properties of the accrual and cash flow components”
- Return observation: Accruals/Total Assets predicts significant underperformance.

The market ignores persistence differences

FIGURE 2

Returns by calendar year to a hedge portfolio taking a long position in the stock of firms in the lowest decile of accruals and an equal-sized short position in the stock of firms in the highest decile of accruals. Returns are cumulated over a one-year period beginning four months after the fiscal year end. Accruals is the change in non-cash current assets, less the change in current liabilities (exclusive of short-term debt and taxes payable), less depreciation expense, all divided by average total assets.



An Odd Ball Example?

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FAJ

PERSPECTIVES

What Investors Can Learn from a *Very* Alternative Market

Ronald N. Kahn

Traditional finance assumes that investors are rational—or, if they are not rational, at least that their departures from rationality are random and arbitrary and should wash out on average. But psychologists have demonstrated that investors are irrational in systematic and predictable ways. Understanding these irrationalities—now cataloged by behavioral finance researchers—may lead to exploitable inefficiencies.

Perhaps not surprisingly, psychologists have identified a long list of consistent human foibles. They can be explained by plausible evolutionary reasons. David Hirshleifer, an Ohio State University professor of finance, has described several categories of these effects on our behavior: problems in social interaction, heuristic simplification, and self-deception.[1] Social interaction effects include conforming, following the crowd, and herding. Heuristic simplification arises when "limited attention, memory, and processing capabilities force a focus on subsets of available information." Such effects include generalizing from personal experience and extrapolating from recent events. Self-deception includes biased self-attribution—attributing positive outcomes to our skill and negative outcomes to bad luck. Self-deception results in overconfidence.

Successful active management requires both the existence of market inefficiencies and the analytical skills to find and exploit them. But successful active management tends to eliminate the market anomalies over time, as more active managers learn about them. From the perspective of an active manager, the promise of behavioral finance is that an understanding of behavior will lead to new exploitable inefficiencies. Behavioral finance has not yet delivered on that promise. It has helped explain known market anomalies, but it has not led to the discovery of new ones.

Putting a positive spin on this situation, Richard Thaler, a professor of behavioral science and economics and a principal at Fuller & Thaler Asset Management, has asserted:

> While behaviorists think that it is theoretically possible to beat the market . . . individual investors do not have the time or training to do that on their own. . . .

So, behavioral finance does propose new investment ideas, but only skilled professionals can discern and apply the ideas.

In a more measured assessment, Burton Malkiel, Princeton professor and Vanguard Group board member, said:

> There are lots of good lessons to be taken from behavioral finance. . . . But what it doesn't do is provide any kind of clear road map for cool sharp-penciled professionals to beat the market.[2]

In addition to these two professors, finance academics in general are debating the practical value of behavioral finance (for example, see Rubinstein 2001). So, to date, the practical, *ex ante* usefulness of behavioral finance for active managers in the financial markets is arguable.

But a market does exist whose participants are characterized by

- social interactions that lead to follow-the-crowd behavior,
- heuristic simplification, including generalizing personal experience and extrapolating from recent events, and
- self-deception and overconfidence.

Indeed, these characteristics are pronounced in this market. The professional "investor" who first understood them realized that they should lead to significant, exploitable, and previously unrecognized anomalies, which he did, in fact, subsequently exploit. This market is professional baseball. The professional is Billy Beane, the general manager of the Oakland Athletics.

In a wonderful recent book, Michael Lewis (2003) describes the following fascinating investment scenario. How does one of the poorest teams in baseball consistently outperform much wealthier teams, when the prevailing belief is that money buys baseball success?[3]

Ronald N. Kahn is global head of equity research at Barclays Global Investors, San Francisco.

Active Management Research

- Behavioral finance is a key element of active management research.
  - Identify an investment opportunity.
  - Why does this opportunity exist.
- As behavioral finance has gained acceptance, academic research as increasingly focused on active management ideas.
  - This is a dramatic shift away from empirical tests of market efficiency.

Academic Research

- Examples (SSRN search on “behavioral finance”):

What Kinds of Firms are Overconfident, and Why? Evidences from Management Earnings Forecast

Mutual Fund Disproportionate Portfolio Adjustment

Abnormal Stock Market Returns Around Peaks in VIX: The Evidence of Investor Overreaction?

Who Sold During the Crash of 2008-9? Evidence from Tax-Return Data on Daily Sales of Stock

What Motivates Effort? Evidence and Expert Forecasts

The Audit Pricing of Terrorism

How Word-of-Mouth Transmission Encouragement Affects Consumers’ Transmission Decisions, Receiver Selection, and Diffusion Speed

Has Local Informational Advantage Disappeared?

A Behavioral Model of Investor Sentiment in Limit Order Markets

How Widespread and Predictable is Stock Broker Misconduct?

Inferring Employees’ Social Media Perceptions of Corporate Culture and the Link to Firm Value

A Structural Analysis of the Role of Superstars in Crowdsourcing Contests

'Hot Hand' on the PGA Tour: Does it Exist?

The Neuroeconomics of Financial Decisions and the Stochastic Discount Factor

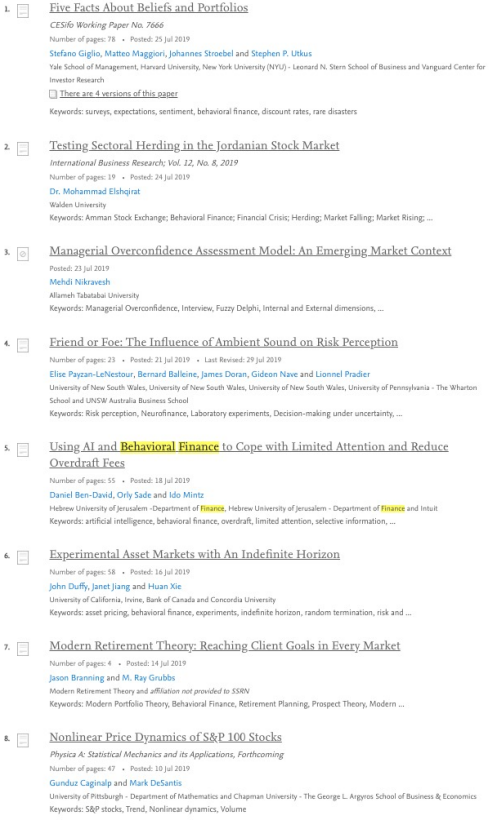
Weather Insurance Savings Accounts

Debiasing on a Roll: Changing Gambling Behavior Through Experiential Learning

The Economics of Natural Disasters: Concepts and Methods

Financing Lifelong Learning

Stock Returns and Investors’ Mood: Good Day Sunshine or Spurious Correlation?



1. Five Facts About Beliefs and Portfolios
CESifo Working Paper No. 7666
Number of pages: 78 • Posted: 25 Jul 2019
Stefano Giglio, Matteo Maggiori, Johannes Stroebel and Stephen P. Utkus
Yale School of Management, Harvard University, New York University (NYU) - Leonard N. Stern School of Business and Vanguard Center for Investor Research
There are 4 versions of this paper
Keywords: surveys, expectations, sentiment, behavioral finance, discount rates, rare disasters

2. Testing Sectoral Herding in the Jordanian Stock Market
International Business Research; Vol. 12, No. 8, 2019
Number of pages: 19 • Posted: 24 Jul 2019
Dr. Mohammad Elshqirat
Walden University
Keywords: Amman Stock Exchange; Behavioral Finance; Financial Crisis; Herding; Market Falling; Market Rising; ...

3. Managerial Overconfidence Assessment Model: An Emerging Market Context
Posted: 23 Jul 2019
Mehdi Nikravesh
Allameh Tabatabai University
Keywords: Managerial Overconfidence, Interview, Fuzzy Delphi, Internal and External dimensions, ...

4. Friend or Foe: The Influence of Ambient Sound on Risk Perception
Number of pages: 23 • Posted: 21 Jul 2019 • Last Revised: 29 Jul 2019
Elise Payzan-LeNestour, Bernard Balleine, James Doran, Gideon Nave and Lionnel Pradier
University of New South Wales, University of New South Wales, University of New South Wales, University of Pennsylvania - The Wharton School and UNSW Australia Business School
Keywords: Risk perception, Neurofinance, Laboratory experiments, Decision-making under uncertainty, ...

5. Using AI and Behavioral Finance to Cope with Limited Attention and Reduce Overdraft Fees
Number of pages: 55 • Posted: 18 Jul 2019
Daniel Ben-David, Orly Sade and Ido Mintz
Hebrew University of Jerusalem -Department of Finance, Hebrew University of Jerusalem - Department of Finance and Intuit
Keywords: artificial intelligence, behavioral finance, overdraft, limited attention, selective information, ...

6. Experimental Asset Markets with An Indefinite Horizon
Number of pages: 58 • Posted: 16 Jul 2019
John Duffy, Janet Jiang and Huan Xie
University of California, Irvine, Bank of Canada and Concordia University
Keywords: asset pricing, behavioral finance, experiments, indefinite horizon, random termination, risk and ...

7. Modern Retirement Theory: Reaching Client Goals in Every Market
Number of pages: 4 • Posted: 14 Jul 2019
Jason Branning and M. Ray Grubbs
Modern Retirement Theory and *affiliation not provided to SSRN*
Keywords: Modern Portfolio Theory, Behavioral Finance, Retirement Planning, Prospect Theory, Modern ...

8. Nonlinear Price Dynamics of S&P 100 Stocks
Physica A: Statistical Mechanics and its Applications, Forthcoming
Number of pages: 47 • Posted: 10 Jul 2019
Gunduz Caginalp and Mark DeSantis
University of Pittsburgh - Department of Mathematics and Chapman University - The George L. Argyros School of Business & Economics
Keywords: S&P stocks, Trend, Nonlinear dynamics, Volume

Active Management

- Behavioral finance has been a positive and negative for active management
  - A positive in helping understand why (and when and where) active management works.
  - A negative in inspiring so much academic work on active management.
  - Remember that active management works when we understand something the market doesn't. Academia is engaged in the quest of reducing ignorance. These can be cross purposes.