Empirical Asset Pricing
Behavioral Finance

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Lecture Outline

- Empirical Facts
  - Empirical facts discussed in the previous classes
  - Investor trading and portfolio choice

- Limits to Arbitrage

- Psychological Biases
  - Models of investor beliefs
    - Overconfidence
    - Extrapolation
    - Experience effect
  - Non-EU preference
    - Prospect Theory
  - Bounded Rationality

- Behavioral Corporate Finance
Overview

- from the 1950s to the 1990s, finance research was dominated by the “traditional” finance paradigm.
  - this framework assumes that:
    - individuals have rational beliefs (update their beliefs according to Bayes’ rule when new information arrives)
    - and make decisions according to Expected Utility (with an increasing, concave utility function defined over consumption outcomes)
- starting in the 1990s, a new paradigm emerged: behavioral finance
  - this field tries to make sense of the behavior of investors, markets, and firms using models that are psychologically more realistic than their predecessors
    - allow for less than fully rational beliefs
    - use more realistic preferences
    - take account of cognitive limits
Rationality:
Imagine that all investors are rational. They adjust their estimates of stock price in a rational way when new information is released.

Independent Deviation from Rationality
Suppose that about as many investors were irrationally optimistic as were irrationally pessimistic. Prices would likely rise in a manner consistent with market efficiency.

Arbitrage
Imagine two types of individuals: the irrational amateurs and the rational professionals. If the arbitrage of professionals dominates the speculation of amateurs, market would still be efficient.

Reference: Andrei Shleifer, Inefficient Markets: An Introduction to Behavioral Finance
Investor Behavior: investment decision

Some well-documented facts in investment decision:

- Non-participation

- Under-diversification:
  - Median number of stocks held by investors in 2001 was four, and 90% of investors held fewer than ten different stocks. [Polkovnichenko RFS2005]
  - Employees invested close to a third of their assets in their employer’s own stock. [Benartzi JF2001]
  - Naïve diversification [Benartzi and Thaler AER2001]

- Familiarity Bias: The tendency to favor investments in companies they are familiar with [Huberman RFS2001]
Investor Behavior: trading

Some well-documented facts in trading decision:

- **Disposition effect:**
  - tendency to hang on to losers and sell winners [Shefrin and Statman JF1985] [Odean JF1998]

- **Excessive trading:**
  - Tendency to trade too much [Barber and Odean JF2000]
Limits to Arbitrage

- When prices deviate from fundamentals, arbitrage forces are not as strong as one might expect due to the following concerns:
  - Fundamental risk: No perfect substitutes to form a risk-free strategy.
  - Noise trader risk: Mispricing may become even worse in the short-run due to noise traders. (De Long et al., 1990; Shleifer and Vishny, 1997)
  - Implementation costs: commissions, bid-ask spreads, short-sale constraints, etc.
Examples

- We have learnt a lot by studying specific empirical phenomena that are widely viewed as mispricings:
  - twin shares (Lamont Thaler, 2003)
  - equity carve-outs (Lamont Thaler, 2003; Mitchell, Pulvino, Stafford, 2002)
  - index inclusions (Shleifer, 1986)

- these studies demonstrate that there are limits to arbitrage
  - and help us understand which limits are more relevant in which settings

Overconfidence

- Overplacement—overestimation of one’s rank in a population
- Overprecision—overestimation of the accuracy of one’s beliefs.
Overconfidence in finance

- **Asset pricing theory:**

- **Empirical evidence (trading activity):**

Prospect Theory: Value function

Notes: The graph plots the value function proposed by Tversky and Kahneman (1992) as part of cumulative prospect theory, namely $v(x) = x^\alpha$ for $x \geq 0$ and $v(x) = -\lambda(-x)^\beta$ for $x < 0$, where $x$ is a dollar gain or loss. The authors estimate $\alpha = 0.88$ and $\lambda = 2.25$ from experimental data. The plot uses $\alpha = 0.5$ and $\lambda = 2.5$ so as to make loss aversion and diminishing sensitivity easier to see.
Prospect Theory: Probability weight function

The Probability Weighting Function

Notes: The graph plots the probability weighting function proposed by Tversky and Kahneman (1992) as part of cumulative prospect theory, namely \( w(P) = P^\delta / (P^\delta + (1 - P)^\delta)^{1/\delta} \), where \( P \) is an objective probability, for two values of \( \delta \). The solid line corresponds to \( \delta = 0.65 \), the value estimated by the authors from experimental data. The dotted line corresponds to \( \delta = 1 \), in other words, to linear probability weighting.
Prospect Theory

Application

The equity premium puzzle:
- Benartzi and Thaler (1995); Barberis, Huang, and Santos (2001)

Assets with Lottery-like features
- Theory: Barberis and Huang (2008)
- Empirical: IPO stocks, distress stocks, MAX return, etc.:
  - Loughran and Ritter (1995); Bali, Cakici, Whitelaw (2011); Green and Hwang (2012); Conrad, Kapadia and Xing (2014)

IPO long-run return
Extrapolation

- Different types of extrapolation:
  - Extrapolate fundamentals
  - Extrapolate returns
  - Extrapolate past experiences

- Early works
  - Representativeness versus Conservatism: People overreact(representativeness)/underreact(conservatism) to patterns in signals. [Edwards 1968; Tversky and Kahneman 1974]
  - Barberis, Shleifer and Vishny (1998); Hong and Stein (1999)

- New round of work
  - Greenwood and Shleifer (2014)
  - Barberis, Greenwood, Jin and Shleifer (2015)
  - Barberis, Greenwood, Jin and Shleifer (2016)
Return Extrapolation

Figure 6
The role of past stock market returns in explaining survey expectations
The dashed line denotes the twelve-month rolling nominal return on the CRSP VW stock index. The solid line marked with circles denotes expectations from the Gallup survey (% optimistic – % pessimistic).

- over-extrapolation: investor expectations are negatively correlated with subsequent realized returns, (Greenwood and Shleifer (2014))
Experience Effects

- Def: similarity-based hypothesis generation based on memory of prior cases.
- Empirical evidence in finance: Experience Effects
  - Lifetime experiences of stock-market returns affect willingness to invest in the stock market (Malmendier and Nagel 2011)
  - Lifetime experience of inflation affects beliefs about future inflation and related financial choices, e.g., mortgage borrowing (Malmendier and Nagel 2016)
Data: Michigan Survey of Consumers

Expectations relative to full-sample mean (4-quarter MA)

Bounded Rationality

Theories:

Limited attention
- Earning announcements on Fridays: DellaVigna and Pollet (2009)

Limited information processing ability
- Forecastable demographic changes and industry return: DellaVigna and Pollet (2007)
Investor attention
Stock Price Reactions to Recommendations on Mad Money
The previous psychological biases can be applied in the corporate setting and explain corporate behavior.

Innovation: Who is irrational?

- Irrational investor, rational manager
  - Capital budgeting: Stein (1996)

- Irrational corporate manager

- Irrationality of other market participants

Survey paper: Malmendier (2018) Behavioral Corporate Finance
Illustration of Differences in Firm Valuation

Valuation vs. Time

- Investors
- Rational CEO
- Overconfident CEO
Irrationality of other market participants

- What about institutional investors, policy makers, institutions?
- Common arguments: professional training, sorting, selection
- Key: study the psychology evidence on who exhibits a given bias; study the theoretical predictions.
Cheat sheet: How to find a research idea

- **What:**
  - All the psychological biases
  - All the frictions in the market

- **Who:**
  - Investors
    - Retail/Households
    - Sophisticated Investors: Mutual funds, Hedge funds, Professional traders
  - Analysts, bankers, financial advisors, etc..
  - Corporate Managers
  - Policy Makers

- **When:**
  - Short-term vs long term..
  - Special period: Friday/holidays/seasonality/sports game, etc.

- **Why:**
  - Genetics, cultural, personal traits, personal experience, etc..

- **Where:**
  - Financial market
    - Price/Returns/bubbles
    - Trading volume/volatility/liquidity
    - Earnings/other fundamentals
    - Different markets: Stocks, bond, commodity, currency, options, real estate, etc.
  - Corporate
    - Capital structure
    - Merger & acquisitions
    - Investment decision
    - Securities issuance
    - Payout policy
    - Innovation
  - Other financial settings
Where is this field going?

- New features of psychological biases
- Application to emerging areas
  - Behavioral macroeconomics
  - Household finance
- Application to markets outside the U.S. stock market
- New data and new technologies
  - Machine learning and fintech
- Real consequences
General suggestions:

- **PhD training consists of two parts:**
  - **Skill:** Ask a research question, and solve it.
  - **Taste:** Cultivate a taste for research topics.

- **Criteria for good research topic:**
  - New, important, interesting
Readings and Online Resources


