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# **Behavioral Finance & Neuroscience:** ***Rational is as Rational Does***

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*The views expressed herein are those of the author and do not necessarily reflect the views of the author's employer*

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# The Basis for Today's Topic...

***“An investor’s chief problem, even his worst enemy, is likely to be himself”***

Benjamin Graham

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**And...**

***“If you don’t know who you are, the stock market is an expensive place to find out”***

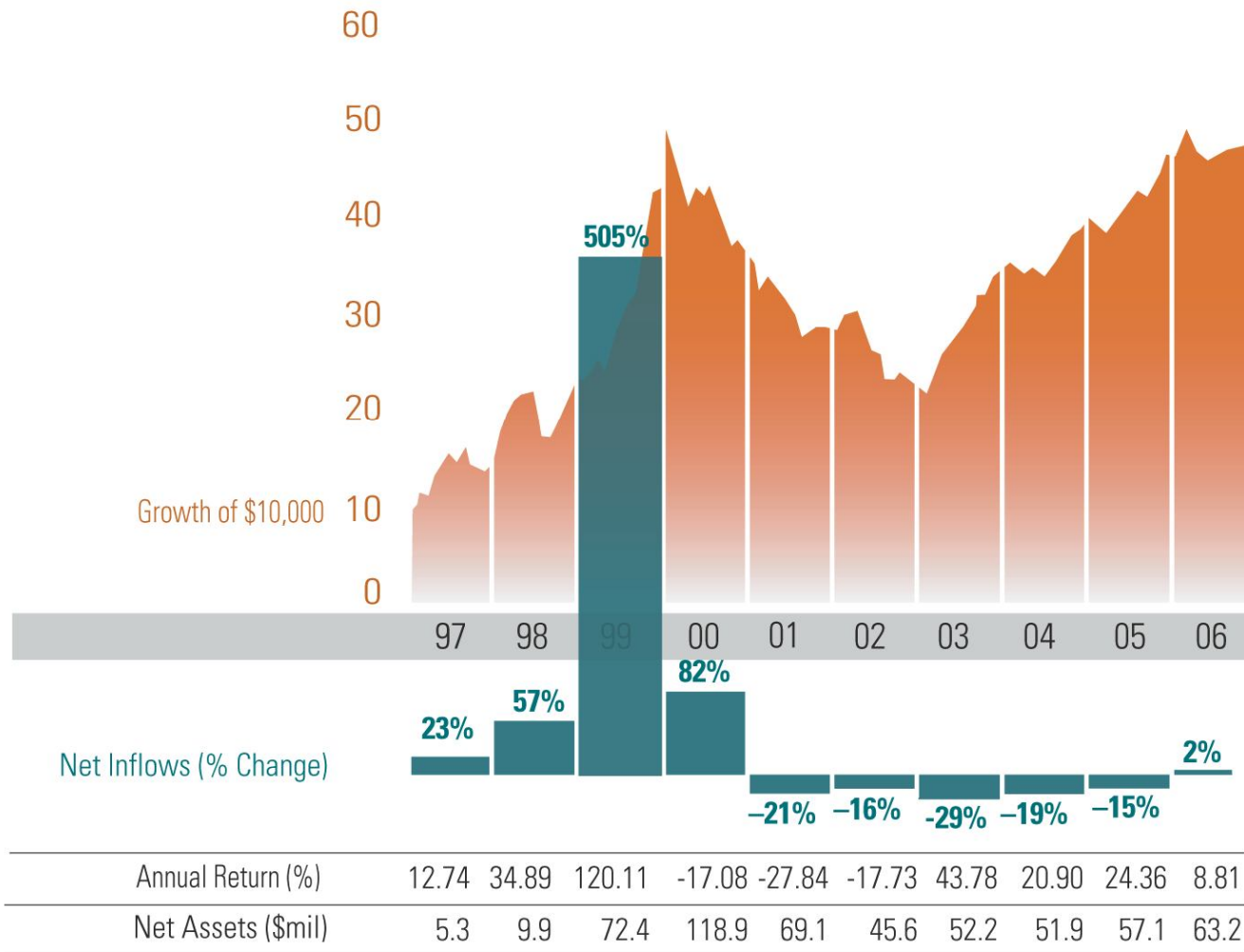
Adam Smith

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# Investors Often Chase Performance

10 Year Total Return: 15.05%  
**10 Year Investor Return: -1.46%**

## Fund A



## Results Differ Between Asset Classes

Fund Group by Asset Class	Investor Return	Total Return	IR-TR Gap
U.S. Equity Funds	7.13	8.84	-1.71
Non-U.S. Equity Funds	8.65	9.75	-1.11
<b>Balanced Funds</b>	<b>8.93</b>	<b>9.12</b>	<b>-0.19</b>
Taxable Bond Funds	5.53	5.90	-0.38
Municipal Bond Funds	5.19	5.25	-0.06
All Funds	7.09	8.27	-1.18

Asset weighted averages, 10 years ending 9/30/06

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# Bounded Rationality

- Humans can only digest 5-7 different things at once... Herbert Simon, Nobel Laureate 1978
    - Heuristics (aka rules of thumb) are used when there's incomplete information; but...
      - there's bias
      - there's pattern searching
      - And we often contradict fundamental probabilities
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# Accounting: Math | Finance:?

- Probability
    - ❑ 2 coin flips, 2 H's = 25%
    - ❑ 5 coin flips, 5 H's = 1/32
    - ❑ 6 consecutive H's... Gambler's fallacy
  - Misunderstood Randomness (20 flips) = "Fatter tails?"
    - ❑ 5 H/T's in a row = 25%
    - ❑ 6 H/T's in a row = 20%
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# Anchoring

- The influence of known (or thought to be known) information
    - Two groups of auditors were asked about the incidence of fraud
      - Was it "> or < 10%"
      - Was it "> or < 1%"
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# Overconfidence (Wobegon Syndrome?)

- Exaggerate skill, deny chance
    - Odean
    - Preston & Harris
  - Confidence to accuracy is un-related to intelligence
  - Confidence ↑ with incentives to be right
  - On most 50/50 bets, overconfidence is ↑ than 50%...
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# Illusion of Control

- Langer (1975)  
expectation of  
personal success  
likelihood  
inappropriately  
higher than  
probability  
warrants...

<u><i>Lottery Tickets</i></u>	<b>Initially said "no sale"</b>	<b>Offering price for sale</b>
<b>Assigned (given)</b>	19%	\$1.96
<b>Selected (chosen)</b>	37%	\$8.96


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# Perception of Skill

- Experiment: Man vs. Pigeon
    - Two randomly flashing lights...
      - **Green** will flash 80% of the time 
      - **Red** will flash 20% of the time 
    - Explanation
      - Man was told the flashes are random
      - The pigeon...
    - Predict the color of the next flash
      - Reward pigeon when correct
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# And the Results...

- Pigeons are correct ~ 80% of the time... select green 100% of the time
    - Is this natural humility?
  - Humans are correct ~ 68% of the time
    - We search for patterns in data even when none exists and we're told so.
    - We would benefit from 
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# Respectability 2002

- Loss Aversion (Not Risk Aversion)
  - Prospect Theory
    - Integrates insights from psychological research into economic science, concerning human judgment and decision-making under uncertainty
    - The model is descriptive: it tries to model real-life choices, rather than optimal decisions.
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# Example: Prospect Theory

## Situation A

- Win \$3,000 or gamble...
- 80% chance of winning \$4,000 + a 20% chance of winning nothing

## Situation B

- Lose \$3,000 or gamble...
  - 80% chance of losing \$4,000 + a 20% chance of losing nothing
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# Empirical Research +

- Trade too much (too little friction?)
    - Think they're right
    - Under-diversify as a result
    - Entertainment^
    - Deaux and Farris
  - Hold onto losing investments - "Get-even-it is"
  - Chase "the action"
    - What's news
    - Extreme price moves
    - Evolutionary psychology
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# Risk Tolerance?

- "...You can take the exact same person and present them with the exact same choice under different circumstances (*frames/moods*), and they will pick completely different outcomes<sup>1</sup>
    - "The definition of insanity is doing the same thing over and over and expecting different results" Benjamin Franklin
  - "Risk tolerance levels, which the tests purport to measure, don't have significant implications for portfolio design"<sup>2</sup>
  - MPT's  $RT \dots = RP$  (Behavioral) +  $RC$  (Utility)
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# Father of MPT

Nobel Laureate Harry Markowitz  
split his retirement account evenly between S/B  
when asked why...

***“My intention was to minimize  
my future regret...”***

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# What Utility, Who's Utility?

## Utility

- Level of wealth
- Objective, probabilistic (underweight small probabilities)
- Frames don't matter
- Always risk averse

## Behavioral

- Changes in wealth
  - Overweight small probabilities<sup>1</sup>
  - Sensitive to frames
  - Risk averse/risk seeking when changes in wealth are perceived as gains/losses
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# Neuroscience 101

Our brains possess the equivalent of a dual-processors\* :

## Reflexive System

Emotional  
Affective – what feels good  
Associative - heuristics  
Fast, very fast  
Automatic/effortless

## Reflective System

Analytical  
Logical  
Deductive  
Slow  
Requires effort and control

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\*The concept of two brains is hotly debated as being a *heuristic* itself

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# The Cost of Everything, and the...

A bat and ball together cost...

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# The Chicken or The Egg

- Epley & Gilovich (2001)
  - Nodders / Shakers to evaluate headphones
  - Nodders gave much more favorable evaluations



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# Enhance Your Returns

- Experiment:
    - 20 rounds of flipping a coin
    - Each player starts with \$20
      - Half are Normal
      - Half are “brain-impaired” (injuries to emotional, fear/anxiety, areas of brain)
    - Either bet \$1.00, or sit out the round
      - Tails wins \$2.50
      - Heads loses \$1.00
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# Results

	<b># of rounds played</b>	<b># of rounds played after a loss (loss aversion)</b>	<b>Total Value</b>
<b>Normal</b>	58%	41%	-
<b>Brain-Impaired</b>	84%	85%	+13%

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# Pleasure

- Neurotransmitter : Dopamine
    - Released in response to unexpected rewards or rewards that exceed expectations. It's...
      - Automatic
      - Positive, motivational, reinforcing, lowers skepticism (gambling)
        - But stopped when signaled/expected and not realized
          - Expectations met but not exceeded feel less positive
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# Anxiety, Depression, Fear...

- Neurotransmitter : Serotonin (mood manager)
    - Unfulfilled expectations depresses production (and also stops dopamine)
      - May trigger negative emotional responses such as <title> and impulsivity, irritability
      - Could this response be a biological protector?
        - Stops the pursuit of risky behavior
          - “Low mood stops you pursuing unreachable goals”^
      - May trigger loss aversion behavior
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# Pain

- Real Pain & Social Pain are felt in exactly the same places in the brain<sup>1</sup>
    - “Get even-it-is”
    - The difficulty with being a contrarian (Baumeister 2003)
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# Consider...

***He who knows others is wise; he who  
knows himself is enlightened***

Lao-tzu, Chinese philosopher

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# Behavior Therapy

- Create/follow an Investment Policy
  - Make fewer decisions, and make them slower
  - Focus on the end not the means
  - Avoid the noise – *“All That Glitters”*
  - Consider broad, passive investments, for at least the portfolio's core
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# What about Markets... Crowd Behavior?

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Benjamin Graham's short-run voting machine  
versus the long-run weighing machine...

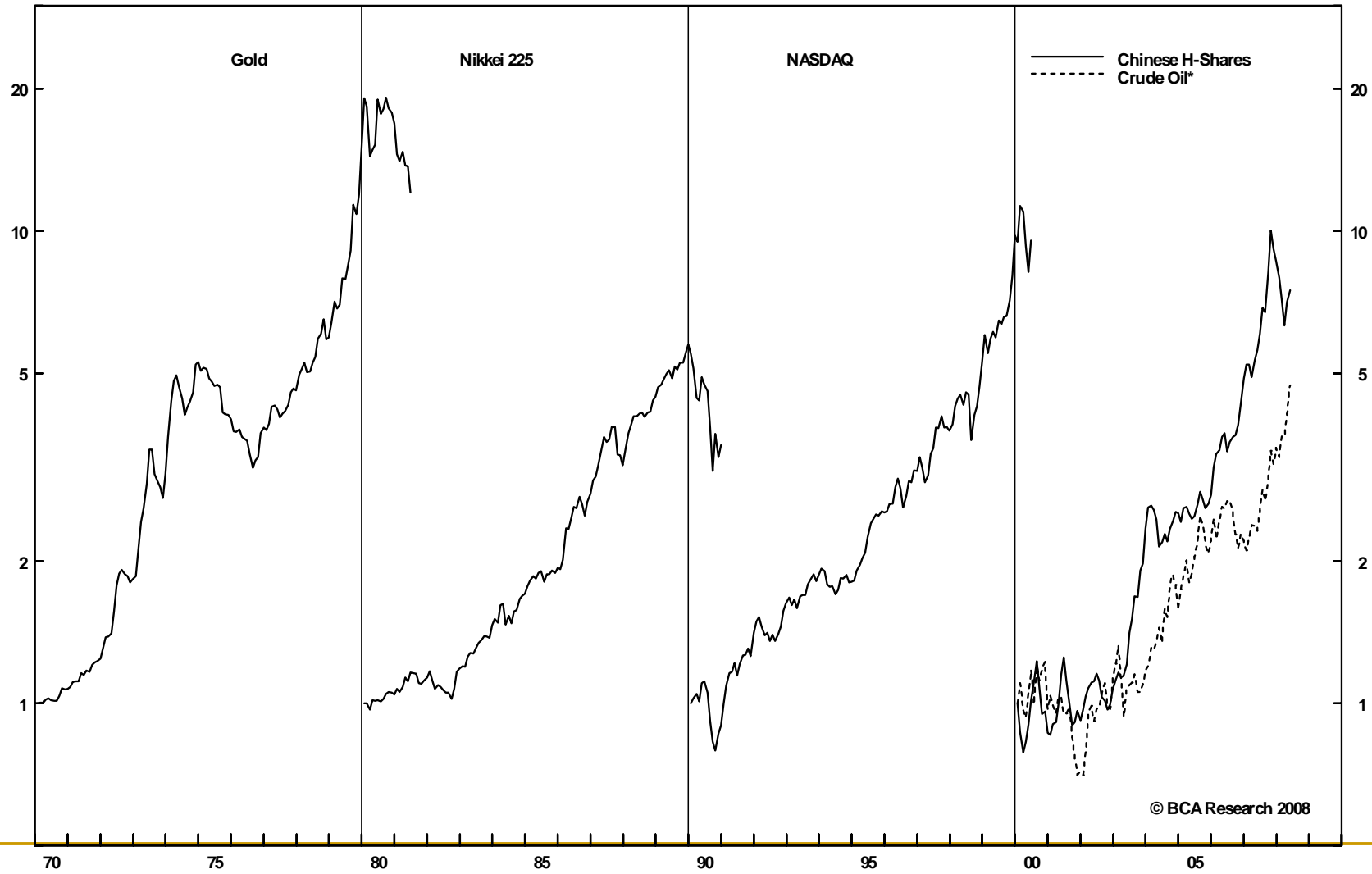
But the long-run is simply "chained" short-runs

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# The Wisdom of Crowds (EMH)

- Better than individual “experts”
  - Four basic requirements:
    - Diversity of opinion
      - Each person should have private information even if it's just an eccentric interpretation of the known facts.
    - Independence
      - People's opinions aren't determined by the opinions of those around them.
    - Decentralization
      - People are able to specialize and draw on local knowledge.
    - Aggregation
      - Some mechanism exists for turning private judgments into a collective decision
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# Predictably Irrational...



\* West Texas Intermediate.  
Note: All series rebased to 1 at beginning of decade.

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# The Madness of Crowds

- Information becomes more public
    - Impacting opinions – conformity, anchoring
      - Beginning an “information cascade”
  - Independence denigrates to herding
    - People see others succeeding
      - Not wanting to be “left behind” – social standing
        - Psychological need to belong
        - Emotional bias sets in and disconnects from fundamentals
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# “Post” Modern Portfolio Theory

- Accepts “rational” bubbles
    - Short-runs matter
  - Reflects on Minsky / critical states
    - Liquidity, leverage and asymmetric correlations matter
  - Expands the definition of financial assets
    - Present values of entitlement and benefit programs, human capital calculations
  - Respects Behavior
    - Designer “cognitive/emotional” portfolios versus altered goals... pharmacological(?)
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Forecasts based on econometric models inevitably miss these secular/structural breaks in historical patterns because **it is impossible to quantify human behavior**, and long-term trends involving risk-taking and in turn de-risking are decidedly human in their origin. Bell-shaped curves with Gaussian/random distributions **fail to anticipate that human beings do not make decisions by chance or independently of each other, but in many cases in reaction to one another**. Humanity's personal and social computers appear to be programmed that way. And so, instead of "normal" distributions, economists and investors must learn to be on the lookout for "black swans," and if not, then certainly "fat tails," which differ from the measurement of natural phenomena accepted in science. "New normals," flatter-shaped bell curves, and structural shifts in previously accepted standards become not only possible, but probable as **human nature reacts to itself and its prior behavior**. *The efficient market hypothesis was always dead from the get-go, but academic tenure and Nobel prizes were food for the unwilling or perhaps unthinking.*

Bon" or "Non" Appétit? 7/1/2009

Bill Gross, Co-CIO  
PIMCO

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Michael S. Falk, Vice President and Chief Investment Officer, ProManage LLC, is responsible for developing and monitoring ProManage's investment policies and procedures. He directs the investment manager research effort, as well as the construction of investment portfolios. He is the Chair of the company's Investment Committee as well as the primary liaison among the Investment Committee, the company and its clients.

Aside from his duties at ProManage, Mr. Falk is part of the CFA Institute's Speaker Retainer Program, a contributing member of the PDDARI group within the Financial Management Association (FMA), an active committee member for the Profit Sharing 401(k) Council of America, and teaches as an adjunct professor at DePaul University in their Certified Financial Planner (CFP) Certificate Program as well as on behalf of the CFA Society of Chicago. He graduated from the University of Illinois with a B.S. in Finance. He is also a CFA Charterholder, a member of the CFA Institute, and holds the Certified Retirement Counselor (CRC) designation.

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