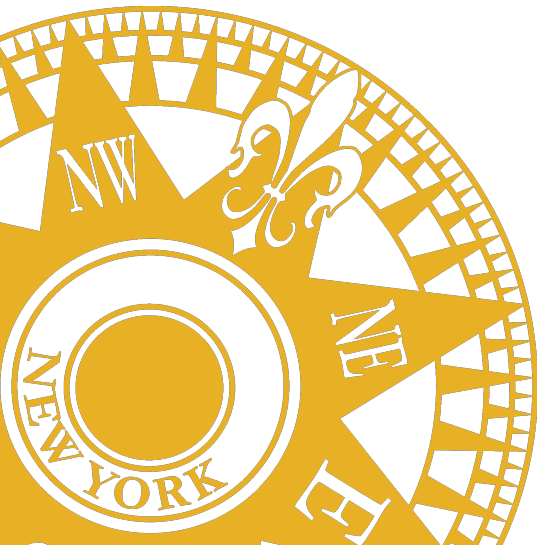


DAHAB ASSOCIATES

Behavioral Finance

David Lee, CFA



DAHAB ASSOCIATES

Understanding Our Wiring

“The investor’s chief problem and even his worst enemy is likely to be himself” – Benjamin Graham

- Our emotion and much of our decision-making process has been hard wired into our brains for survival over the course of 1000’s of years
- We all generally suffer behavioral biases
 - Our brains are refined by the process of evolution – glacial pace
 - We are well designed for the environment we faced thousands of years ago
 - Potentially poorly designed for modern investing created over the past 20 years



Quick Question

How many animals of each kind did Moses take into the ark?



Cognitive Reflection Test (CRT)

- 1) A bat and a ball together costs \$1.10
The bat costs a dollar more than the ball
How much does the ball cost?
- 2) In a lake there is a patch of lily pads. Every day the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long will it take to cover half the lake?
- 3) It takes five minutes for five machines to make five widgets.
How long would it take 100 machines to make 100 widgets?



CRT – How did we do?

- 1) The ball costs \$0.05 – the quick and dirty answer is \$0.10
 - 2) 47 days – the first reaction is to half 48 days to 24, which is quick and easy...but wrong answer
 - 3) 5 minutes – the first gut reaction may have been to say 100 minutes. But it takes each machine 1-minute to make 1-widget
- CRT first introduced by Shane Fredrick in 2005, is designed to measure a person's tendency to override the incorrect gut response
 - Given to 3,500 people, only 17% answered all three correct and 33% answered none right
 - As humans we often trust out initial emotional reaction



Our Brains Systems

- Psychologist Daniel Kahneman in 2011 introduced the idea of our brain utilizing two systems
 - Won the Nobel prize in 2002 based on work from his collaboration with Richard Thaler and Jack Knetsch. Their research centered around Prospect Theory and why investors do not act rationally
- Kahneman describes our brains utilizing two systems
 - System 1 and System 2
- If we understand how our brains work and the inherent biases, we can improve our decision-making process



System 1

- Default part of our brain – Information goes here first
- Gives answers that are approximately (rather than precisely) correct
- Evolutionary older part of our brain
 - See a lion....Run
 - Hear loud sudden noise...turn to it
- System 1 evolves through experiences as long as System 2 signs off on them
 - We can train our initial reaction through experience and deliberate process



System 2

- Lazy part of our brain
 - Requires deliberate engagement
- Seeks to give the right answer, not the approximate
- Attempts to follow a logical approach to information and problem solving
 - See a lion....~~Run~~ – make a weapon to defend ourselves
 - Hear sudden noise....~~turn to it~~ – figure out what made the noise. Should I worry?
- System 2 takes over when things get difficult and it normally has the last word



Example of our Brains System's at Work

- Picture a snake sitting in a glass box on the table in front of you
- I ask you to lean over....and the snake snaps at you
- Your initial reaction is to probably jump back
 - System 1 kicks in to quickly save your life
- Your second reaction is “I’m fine, there is glass between us”
 - System 2 finally shows up after you think about it and it’s the correct response
- We are hardwired to allow emotion to outweigh logic
 - Better to be wrong and safe than right and hurt
 - Tough for modern investing with immediate 24hr news stream

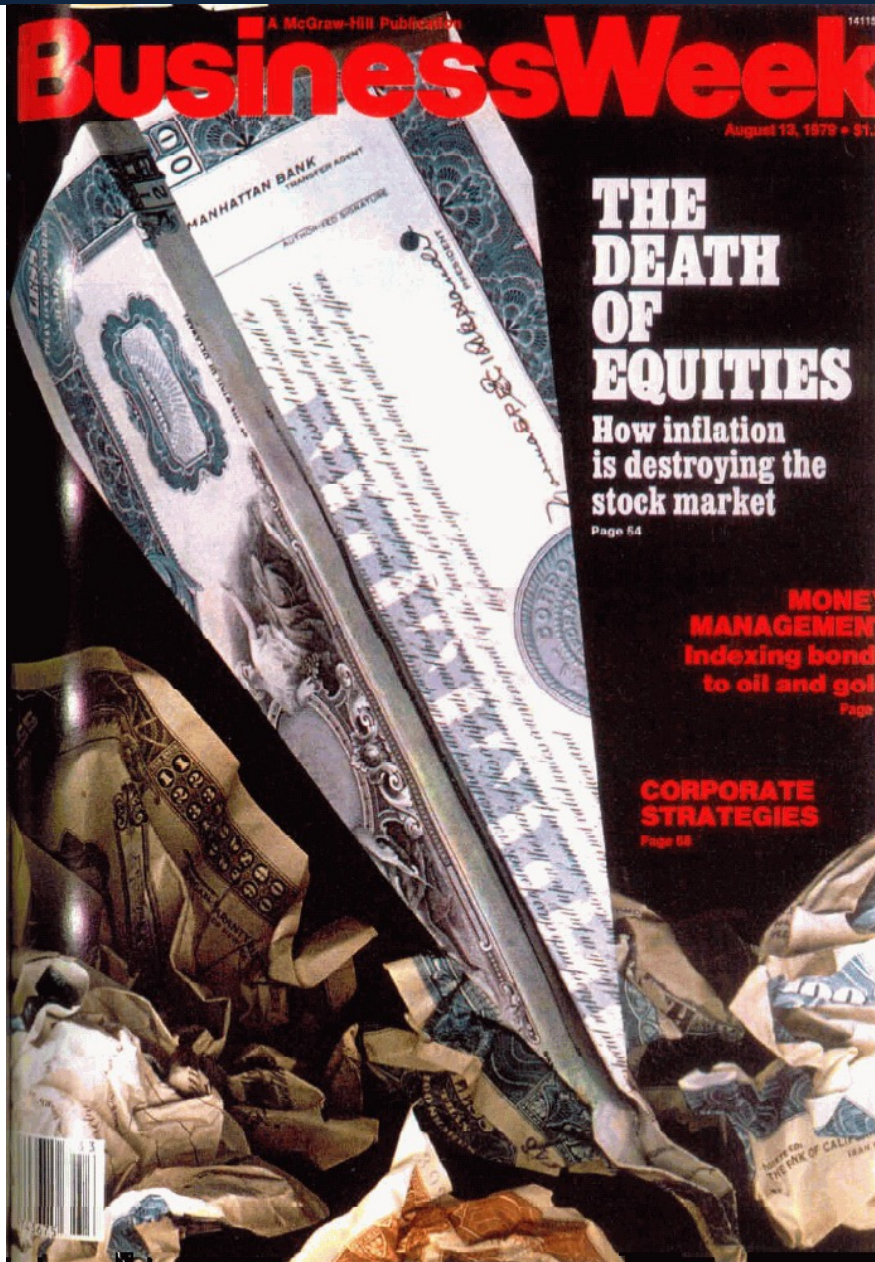


The Brain Systems and Investing

- System 1 – Quick and Instinctive reactions
 - We are our own worst enemies
 - Market is down, we must sell to stop the pain
 - More susceptible to herd mentality – must buy because of FOMO
 - Manager under performed – fire and buy the manager who is outperforming – selling low buying high
- System 2 – Requires deliberate effort...but lazy side of the brain
 - Can take the time and experience to develop this side of the brain and push the ideas to System 1
 - Considers other factors outside of emotion (longer time frame, rational for performance)
- Successful investing often involves striking a balance between the two systems
 - “Investing is simple, but not easy” – Warren Buffett
 - You’ve got to know when to hold’em, know when to walk away, know when to run” – Kenny Rodgers



The Markets and our Bias's



- Business Week Cover
 - August 13, 1979
- Article summary – no one would ever want to invest in stocks again because they have performed so poorly for so long
- S&P 500 return 10yr prior
 - +5.3% (1/1/1969 to 8/1/1979)
- S&P 500 return post
 - 10 years: +239%
 - 45 years: +1,180%



Sitting on the Fat Pitch

- When the knee-jerk reaction is to sell driven by investor panic (System 1), a decision to buy (System 2) maybe called for
 - Overcoming emotion with experience and logic – easier said than done
 - When sentiment fuels emotional selling (or buying) long-term investors should look to take advantage what the market is giving us
- The key lies in understanding prevailing investor psychology
 - The more people have sold
 - The less they have left to sell
 - The more cash they have to buy when they turn less pessimistic



Our Brains and Investing Biases

“Success in investing doesn’t correlate with IQ. Once you have ordinary intelligence, what you need is the temperament to control urges that get other people into trouble in investing” – Warren Buffet

- Humans are all prone to stumble into mental pitfalls
- We tend to have common biases based on our wiring
 - Confirmation bias
 - Overconfidence bias
 - Loss aversion
 - Recency bias
 - Anchoring bias



Confirmation Bias

- Leads investors to seek out information that conforms to their existing beliefs and ignore contradictory information
- How to overcome
 - Actively seek out and consider conflicting information
 - Engage in constructive debates and discussions
 - Practice self-awareness and remain open to changing your mind based on new evidence and rational analysis
 - Challenge your own beliefs



Overconfidence Bias

- Overestimate one's abilities and the accuracy of their information leading to over reacting and poor decision making
 - Attempting to juggle chainsaws after watching a few YouTube tutorials
- How to overcome
 - Seek out diverse viewpoints
 - Set realistic expectations
 - Stay humble and keep an open mind
 - Regularly reassess the investment strategy and portfolio allocation



Loss Aversion

- We are more sensitive to potential losses than we are to equivalent gains, causing us to make risk-averse choices
 - Refusing to throw away worn-out pants because they might become trendy again
- How to overcome
 - Focus on the long-term
 - Portfolio diversification
 - Set a clear Investment Policy Statement (IPS)
 - Be objective and unemotional



Recency Bias

- We tend to give more importance to recent events and extrapolate recent trends into the future
 - The stock market is up (down) and will keep going up (down)
 - The tide can't always come in, trees can't grow forever
- How to overcome
 - Review historical data and trends to gain a broader perspective
 - Stick to a well-defined investment strategy
 - Keep emotions in check, avoid chasing winners or reacting too strongly to losers



Anchoring Bias

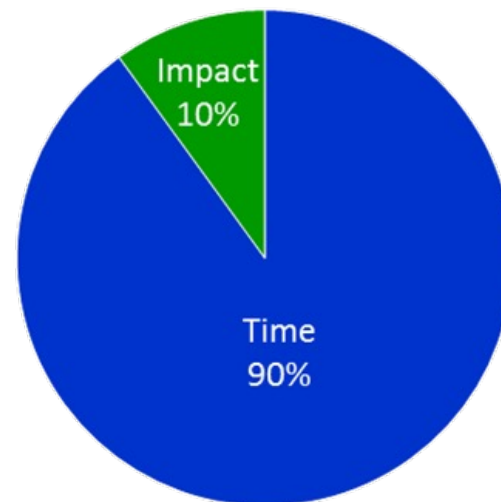
- We tend to make decisions based on the initial piece of information we receive, even when later information suggests otherwise
 - This can also be tied into recency bias and confirmation bias
 - Thinking a \$100 hamburger is a good deal after seeing a \$200 steak
- How to overcome
 - Seek out multiple data points
 - Challenge the initial thought by considering alternative scenarios
 - Consult with peers or professionals



Focus Attention on What Matters

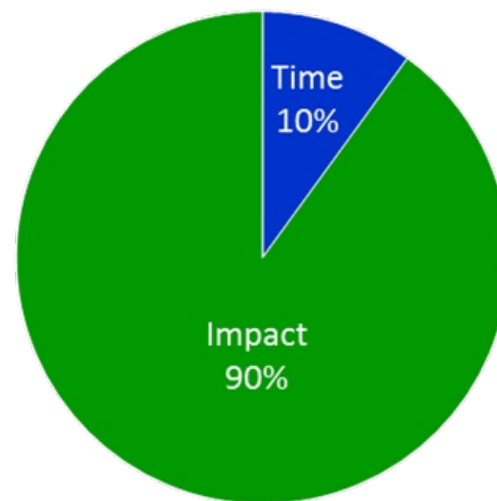
The Little Things

- Active versus Passive
- Hiring & Firing Managers



The Big Things

- Asset Allocation
- Fees
- Verifying Reality
- Avoiding Permanent Loss of Capital



Words of Advice

- Stick to the plan
- Don't get emotional when markets fall
 - The World will not end
 - Markets will recover
 - Do the opposite of what your emotions tell you
- Don't try to "time the market"no one can do that
 - But we can take advantage of what the market give us
 - Lean into the wind in both directions

“In the short run, the market behaves like a voting machine
but in the long-run, it acts like weighing machine”
- Benjamin Graham, The Intelligent Investor 1949



Learning from Experience

- In the short-term (fighting System 1 urges)
 - The markets and active managers will throw us multiple curve balls
- In the long-run (use System 2 to calm our nerves and take advantage of others acting with emotion)
 - Avoid permanent loss of capital
 - Don't get too emotional
 - Stick to the plan

S&P 500: 1926-2023*

Time Frame	Positive	Negative
Daily	54%	46%
Monthly	63%	37%
Quarterly	70%	30%
1 Year	77%	23%
5 Years	92%	8%
10 Years	98%	2%
20 Years	100%	0%

	1 Year	5 Year	10 Year	15 Year	20 Year
Average	12%	11%	11%	11%	11%
Standard Deviation	20%	7%	5%	4%	3%
Maximum Return	52%	20%	18%	16%	15%
Minimum Return	-47%	-17%	-4%	-1%	3%



Periodic Table

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023*
25.9 EM	34.5 EM	32.6 EM	39.8 EM	9.5 Timb	79.0 EM	26.9 SC	16.0 RE	18.6 EM	38.8 SC	13.7 LC	15.0 RE	21.3 SC	37.8 EM	8.3 RE	35.8 Gro	38.3 Gro	28.7 LC	12.9 Timb	28.1 Gro
20.9 AC xUS	21.4 RE	26.9 EAFE	18.4 Timb	5.2 CFIX	58.2 HY	25.5 MC	7.9 CFIX	17.9 EAFE	34.8 MC	13.2 MC	5.1 Gro	18.4 Val	29.6 Gro	3.2 Timb	31.5 LC	19.9 SC	25.8 Gro	7.5 RE	16.9 LC
20.7 EAFE	19.3 Timb	26.6 AC xUS	16.7 AC xUS	-10.0 RE	41.5 AC xUS	19.2 EM	5.0 HY	17.6 Val	34.2 Gro	12.7 Val	5.0 Timb	17.1 HY	27.2 AC xUS	0.0 CFIX	30.5 MC	18.7 EM	25.4 Val	-8.0 Val	12.1 EAFE
20.2 MC	16.6 AC xUS	22.3 Val	16.0 RE	-26.2 HY	40.5 MC	17.7 Gro	2.3 Gro	17.3 MC	32.7 Val	12.5 RE	1.4 LC	13.8 MC	25.6 EAFE	-2.1 HY	26.2 Val	18.4 LC	22.6 MC	-12.7 HY	9.5 AC xUS
18.3 SC	14.0 EAFE	18.4 SC	11.6 EAFE	-33.8 SC	37.0 Gro	16.5 RE	2.1 LC	16.8 AC xUS	32.4 LC	12.4 Gro	0.6 CFIX	12.0 LC	21.8 LC	-2.1 Gro	25.5 SC	17.1 MC	22.2 RE	-13.0 CFIX	9.0 MC
16.9 Val	12.7 MC	16.3 RE	11.4 Gro	-36.3 Val	32.5 EAFE	16.2 Val	1.5 Timb	16.3 SC	23.3 EAFE	10.5 Timb	-0.4 EAFE	11.6 EM	18.5 MC	-4.4 LC	22.7 EAFE	10.7 AC xUS	14.8 SC	-14.0 EAFE	8.1 SC
13.1 RE	6.8 Val	15.8 LC	7.0 CFIX	-37.0 LC	27.2 SC	15.1 HY	-0.1 Val	16.0 LC	15.3 AC xUS	6.0 CFIX	-2.4 MC	8.8 RE	14.6 SC	-8.6 Val	21.5 AC xUS	8.3 EAFE	11.8 EAFE	-16.0 AC xUS	5.4 HY
11.2 Timb	5.2 Gro	15.3 MC	5.6 MC	-38.4 Gro	26.5 LC	14.9 LC	-1.6 MC	15.8 HY	13.9 RE	4.9 SC	-4.1 Val	7.4 Gro	13.2 Val	-9.1 MC	18.9 EM	7.5 CFIX	9.2 Timb	-17.3 MC	5.1 EM
11.1 HY	4.9 LC	13.7 Timb	5.5 LC	-41.5 MC	19.8 Val	11.2 AC xUS	-4.2 SC	15.2 Gro	9.7 Timb	2.5 HY	-4.4 SC	4.5 AC xUS	7.6 RE	-11.0 SC	14.3 HY	7.1 HY	7.8 AC xUS	-18.1 LC	5.0 Val
10.9 LC	4.5 SC	11.9 HY	1.9 HY	-43.1 EAFE	5.9 CFIX	8.2 EAFE	-11.7 EAFE	10.9 RE	7.5 HY	-1.8 EM	-4.5 HY	2.7 CFIX	7.5 HY	-13.4 EAFE	8.7 CFIX	2.9 Val	5.3 HY	-19.7 EM	3.5 Timb
6.9 Gro	2.7 HY	9.5 Gro	-1.0 Val	-45.5 AC xUS	-4.8 Timb	6.6 CFIX	-13.7 AC xUS	7.8 Timb	-2.0 CFIX	-3.9 AC xUS	-5.7 AC xUS	2.6 Timb	3.6 Timb	-14.2 AC xUS	5.3 RE	1.2 RE	-1.5 CFIX	-20.4 SC	2.1 CFIX
4.3 CFIX	2.4 CFIX	4.3 CFIX	-1.6 SC	-53.2 EM	-29.8 RE	-0.1 Timb	-18.2 EM	4.2 CFIX	-2.3 EM	-4.5 EAFE	-14.6 EM	1.5 EAFE	3.5 CFIX	-14.2 EM	1.3 Timb	0.8 Timb	-2.2 EM	-29.0 Gro	-5.8 RE

*As of June 30th, 2023

S&P 500
Russell Mid Cap
Russell 2000
Russell 3000 Growth
Russell 3000 Value

MSCI All Country World ex US Net
MSCI EAFE
MSCI Emerging Markets






NCREIF NFI-ODCE Index
NCREIF Timber Index
Bloomberg Aggregate Index
Bloomberg High Yield



Don't try to time it

- Investment returns are lumpy
- Missing a few large moves can meaningfully hurt a long term investor

Market Timing Can Be Costly

Investor behavior	Hypothetical growth of \$10,000 in S&P 500 from 1/1/80 - 6/30/22*
Invested all days	 \$1,060,000
Missing best 5 days	 655,981
Missing best 10 days	 472,481
Missing best 30 days	 171,261
Missing best 50 days	 75,568

Source: FMRCo, Asset Allocation Team

*Growth reflects dividend reinvestment but not impact of taxes.

