

Overcoming Behavioral Biases to Improve Financial Decisions

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Outline

- Definition of behavioral finance, why it is important, and proof
- Biases
 - Representativeness
 - Availability
 - Overconfidence
 - Anchoring
 - Confirmation
 - Loss aversion
 - Herding
- Ways to overcome biases
- Appendix
 - Additional models, examples, and current market data

Definition and why behavioral finance is important

- Behavioral finance = “application of psychology to financial behavior”*
- Why is this important?
 - Behavioral finance: $r = \text{fundamentals} + x$, where x is psychology

Why behavioral finance is important

- Finance is the study of risk and returns
 - It helps evaluate the success of business
 - It helps determine how to allocate capital from investors (investment managers and corporations) to the best projects
 - It is quantitative, right?

Stock return = 10%

\$1 bil capital spend Standard deviation 20%

FCF falls 12% ROE = 15%, ROIC = 8%

Credit spread falls to 1% Benchmark down 1%

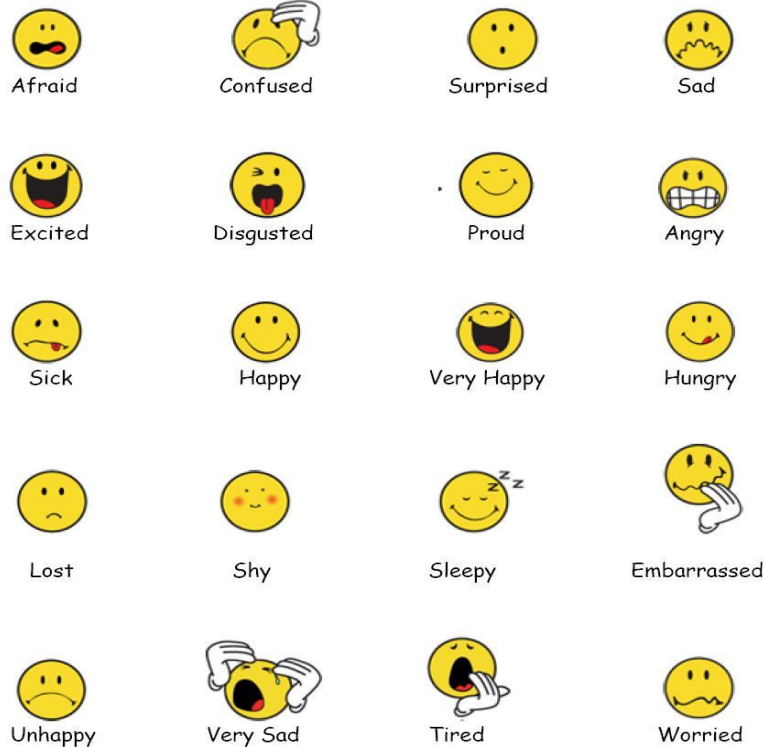
EPS growth -10% Beta 0.90, and WACC 7%

Debt rose 20%, but only 10% debt/equity

Expected sales = \$100 mil, actual \$98 mil

Is finance just quantitative?

- It is quantitative, right?
 - Yes, it is
 - No, it is not
 - The people making the decisions are...well... people
 - Who have emotions (e.g., fears and dreams)



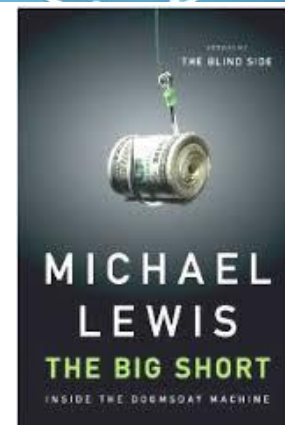
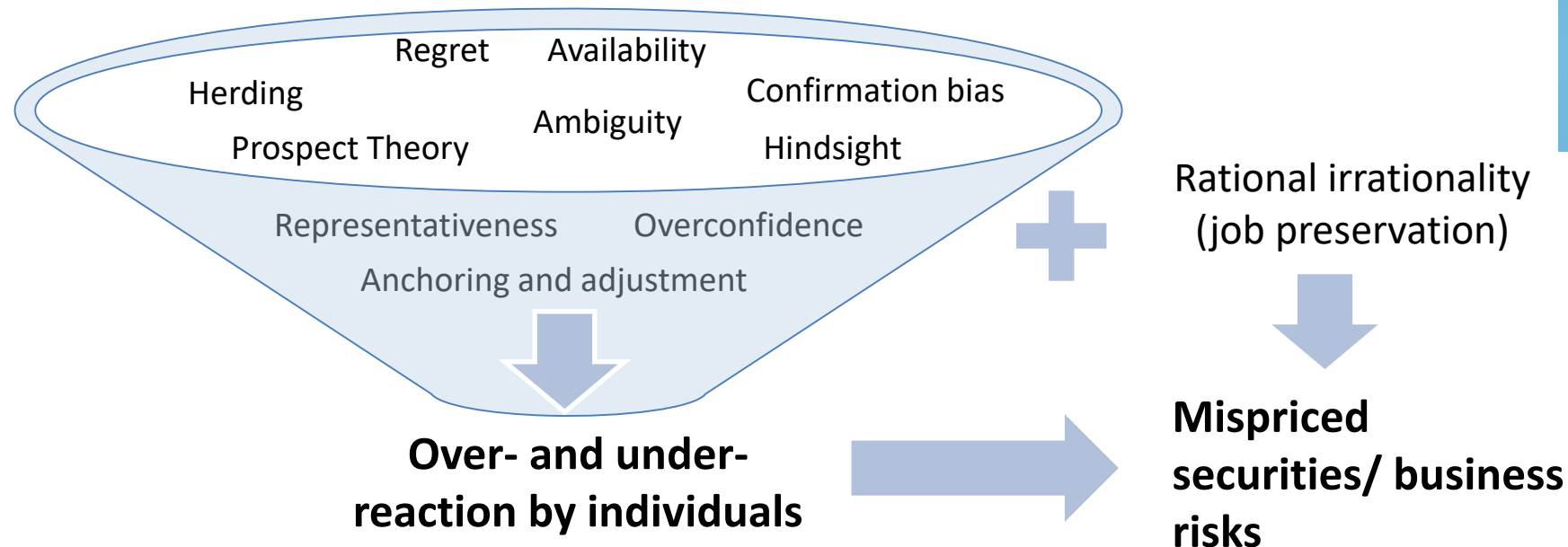
Which change based on the situation



Which impact the outcome and cannot be easily modeled in a finance equation

The X factor

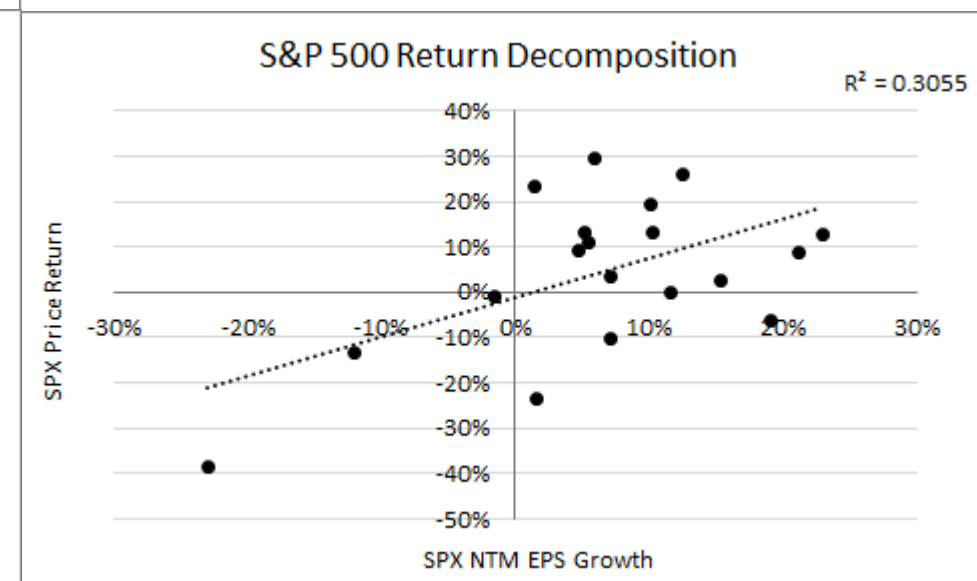
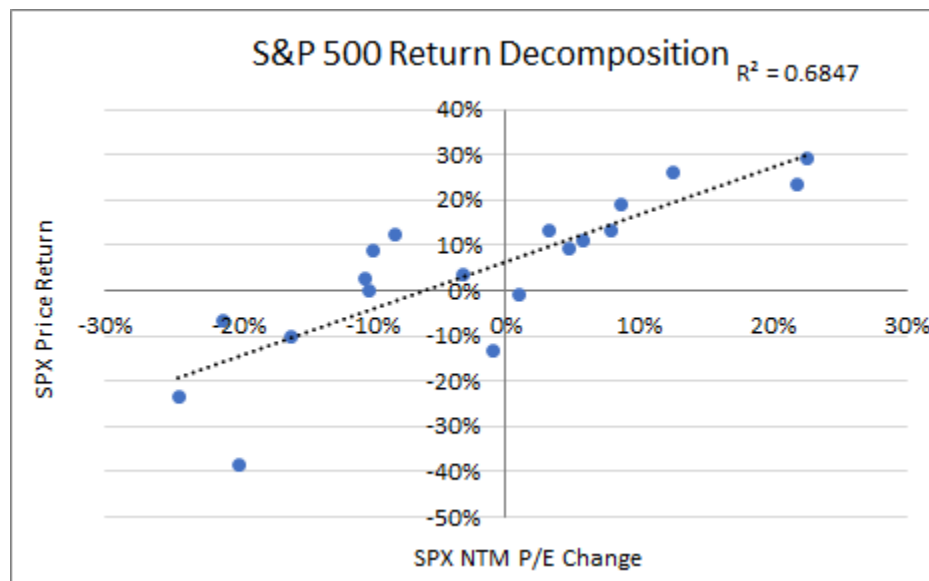
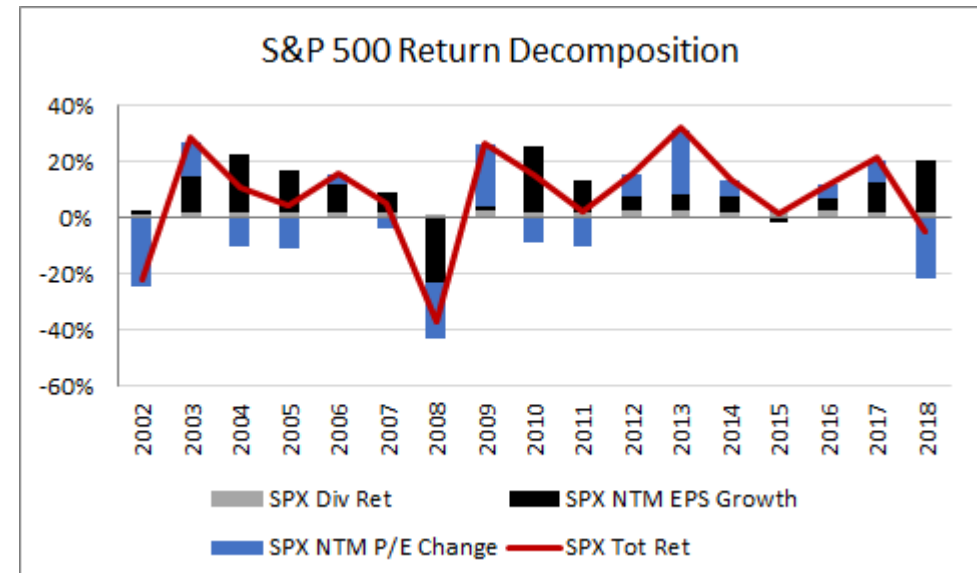
- Psychologists have long known that people are interesting creatures who have biased* (the x) decision-making processes
 - Important note: being biased is **not** synonymous with being unskillful...being biased is simply being a human*



Notes: For simplicity, I do not make a distinction between heuristics (shortcuts that may lead to biases) and biases (when we are predictably wrong) – I call both conditions biases. See www.behaviouralfinance.net for more a more extensive list of biases and associated papers which review them.

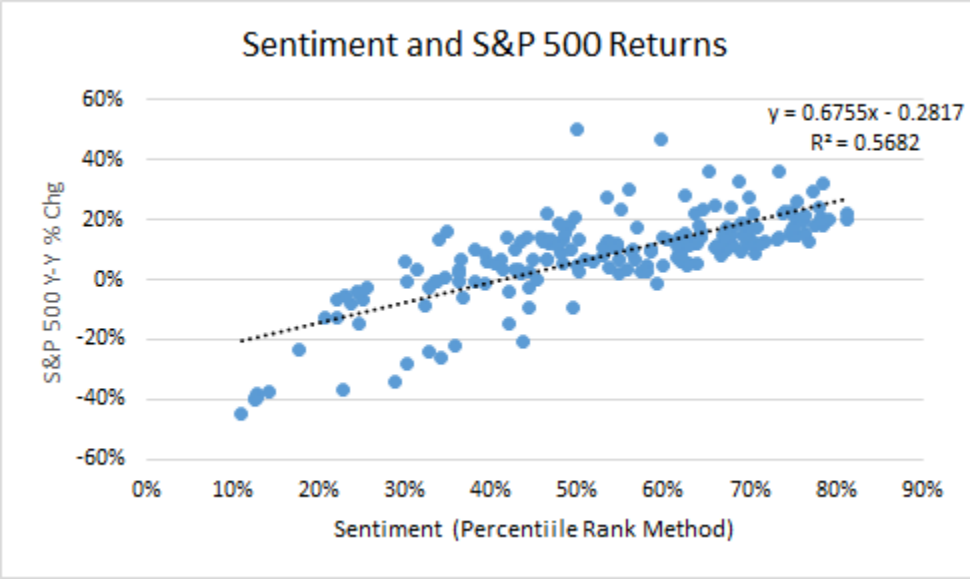
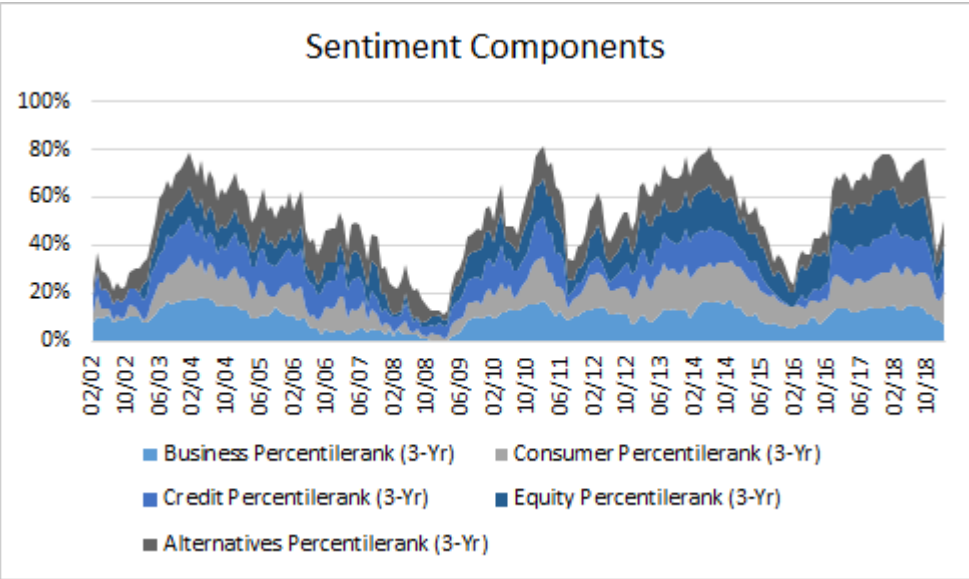
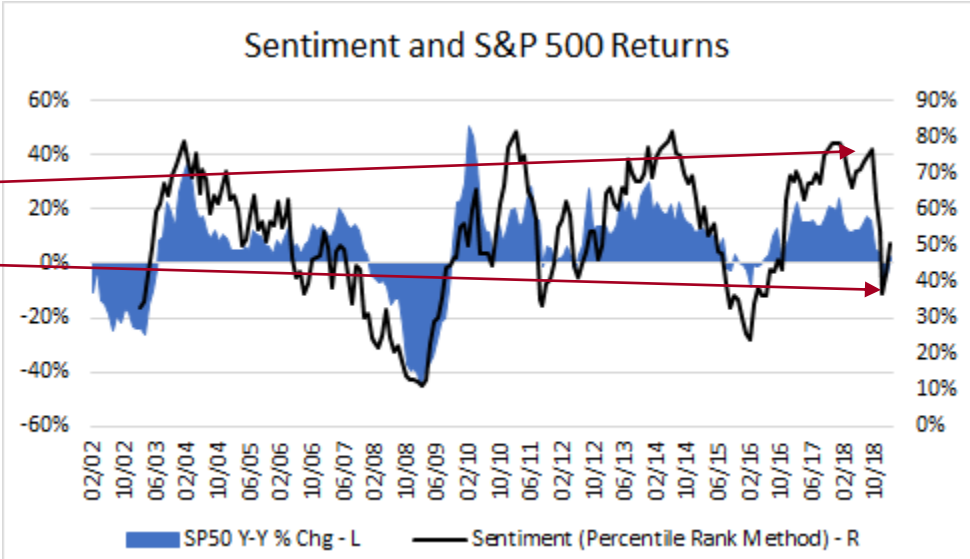
Proof

- What is **most** important to returns?
 - Earnings or expectations (P/E)?
 - **Expectations!**
 - Which are influenced by biases
 - Change in P/E matters more than earnings growth to returns!



Proof

- Expectations (i.e., sentiment) are highly correlated with stock returns
 - *Sentiment elevated before correction and depressed before rally*



Sources: Spellman, FactSet.

Representativeness

- Judgments based on stereotypes
 - What is the probability that A belongs to category B?
 - Depends on the degree that A resembles B
 - If A resembles B, then the probability assumed is to be high
 - Representativeness influences forecasts

Representativeness

- Based on high school GPAs* of three students, what would you expect them to achieve in college?

Student	High School GPA	Predicted College GPA	Actual College GPA
C	2.20		
B	3.00		
A	3.80		
H-L	1.60		

Source: Kahneman, Slovic, and Tversky, *Judgement Under Uncertainty: Heuristics and Biases*, 2001.

* GPA stands for grade point average. As, or top work, receive a 4.0 credit, Bs, or above average, receive 3.0, Cs, average, receive 2.0, Ds, below average, receive 1.0, and F, failing, receive 0.0. In the US, grades are inflated, so the “average” student is probably close to 3.0.

Representativeness

- Based on high school GPAs* of three students, what would you expect them to achieve in college?

Student	High School GPA	Predicted College GPA	Actual College GPA
C	2.20	2.03	2.70
B	3.00	2.77	2.93
A	3.80	3.46	3.30
H-L	1.60	1.43	0.60

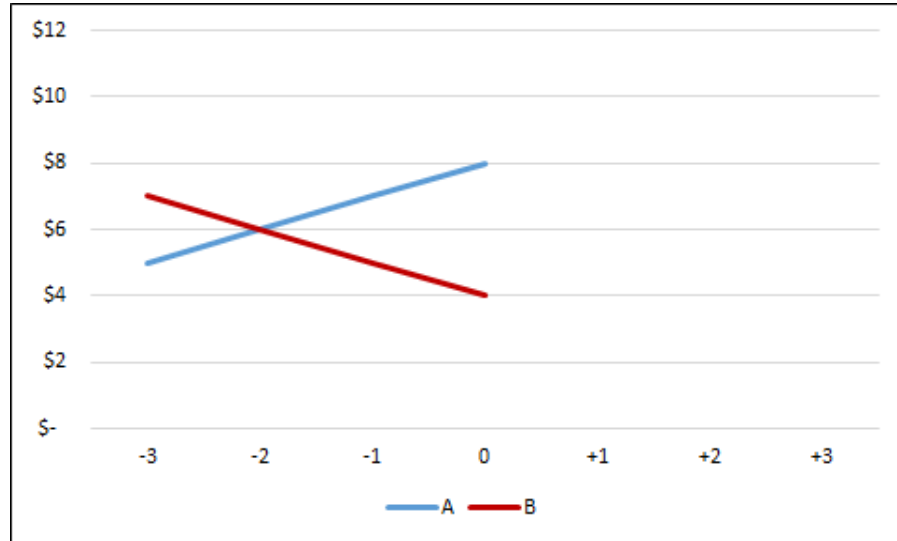
- The students with the high/low GPAs are assumed to be good/poor students and it is assumed that good/bad performance will continue
 - Poor scores could be bad luck, and should reverse
 - The top student may enroll in a more difficult university / pursue a challenging field

Source: Kahneman, Slovic, and Tversky, *Judgement Under Uncertainty: Heuristics and Biases*, 2001.

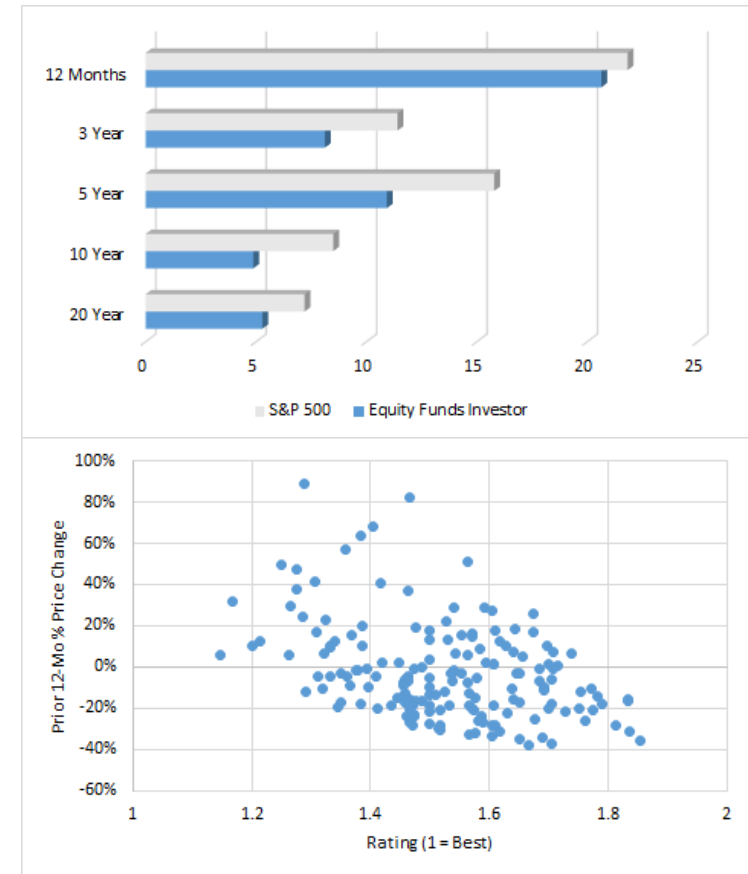
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Representativeness impacts expected returns, target prices, and ratings

- How do you believe most people expect A and B to perform in the future?



High/low performance reverses over time, but people often *extrapolate* past performance in their expectations of the future



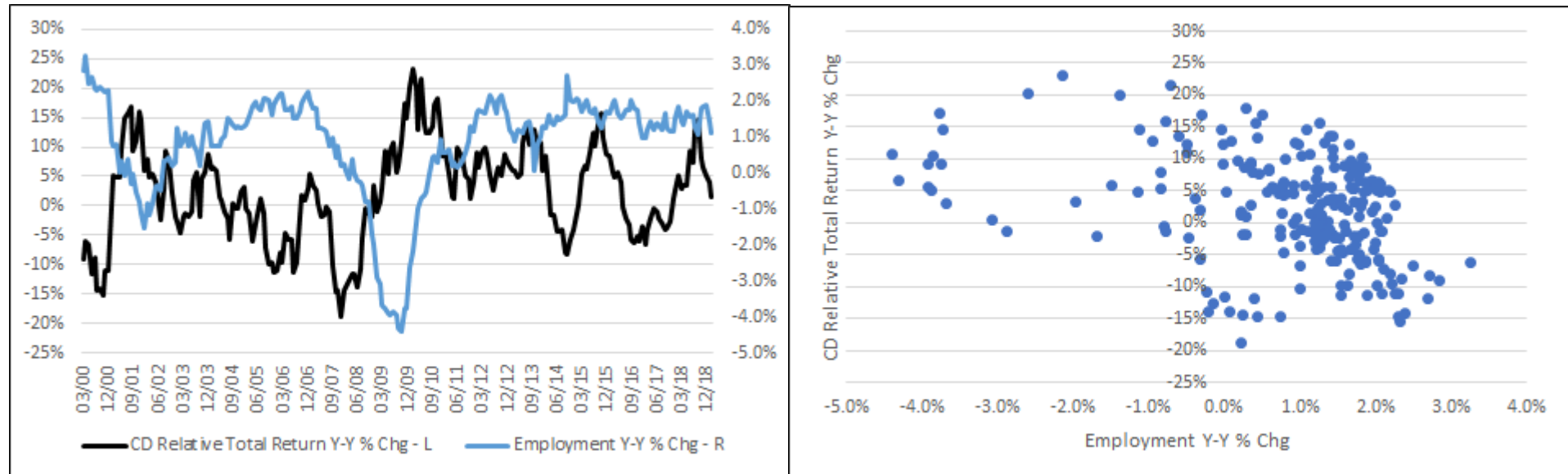
Don't believe me?

Take a look at annual overall investor returns and Intel's ratings peaks and troughs that follow price... high past returns *represent* – suggest – a buy

Sources: DeBondt and Thaler, Does the Stock Market Overreact? The Journal of Finance, 1985; Spellman, The Expectations Clock: A Model for Leadership, Reversion, and Over- and Under-Reaction, Spellman PhD Dissertation, 2009; Dalbar's 2018 Annual Quantitative Analysis of Investor Behavior; and FactSet.

Representativeness impacts associations and expected returns

- **Question:** Is employment growth **positive** correlated with consumer discretionary relative returns to the S&P 500?
 - Employment should result in more income and more confidence to purchase discretionary items which drives up sales
 - Consumer discretionary = retail, auto, etc.
 - Good sales should be **represented** by good stock performance, right?
 - **Answer:** Returns and employment growth are correlated, but **negatively!**



- Be careful making associations without confirming it with the data!

Representativeness takeaway: be careful extrapolating

- Questions to ponder
 - Association
 - Do you believe high earnings growth results in good stock returns? Maybe, but what about implied expectations?
 - Do you believe a quality firm is a good stock? Could be, but what is priced in? A good firm can deteriorate
 - Forecasting
 - How do you forecast sales? margins? stock prices? ... Based on the past?
 - “Everything is in a constant state of change, and the wise investor recognizes that success is a process of continually seeking answers to new questions” Sir John Templeton
 - “An investor of today does not profit from yesterday’s growth” Warren Buffett
 - "Ignoring cycles and extrapolating trends is one of the most dangerous things an investor can do" Howard Marks

Availability

- Ease of recall of similar situations influences one's expectations of outcome
 - If it is easy to recall a past event which is similar to the current event, then one assumes the probability of association is high
 - The more recent and common the experience, the higher the associated assumed probability

Availability and probabilities



- Do you want to go to the beach?
- Even though shark attacks are rare, after the motion picture, Jaws, in 1975, trips to the beach dropped off sharply
 - US averages 19 shark attacks per year and one fatality every two years



Availability and probabilities

- Food health issues (Aug 2015+) for Chipotle, a firm that promotes quality foods
 - Same store sales down
 - Stock crushed
- Chipotle media hype an over-reaction (opportunity)?
 - 1 in 1.5 mil odds and *no* deaths
 - Lower than air/space, storm, and ladder/scaffolding deaths

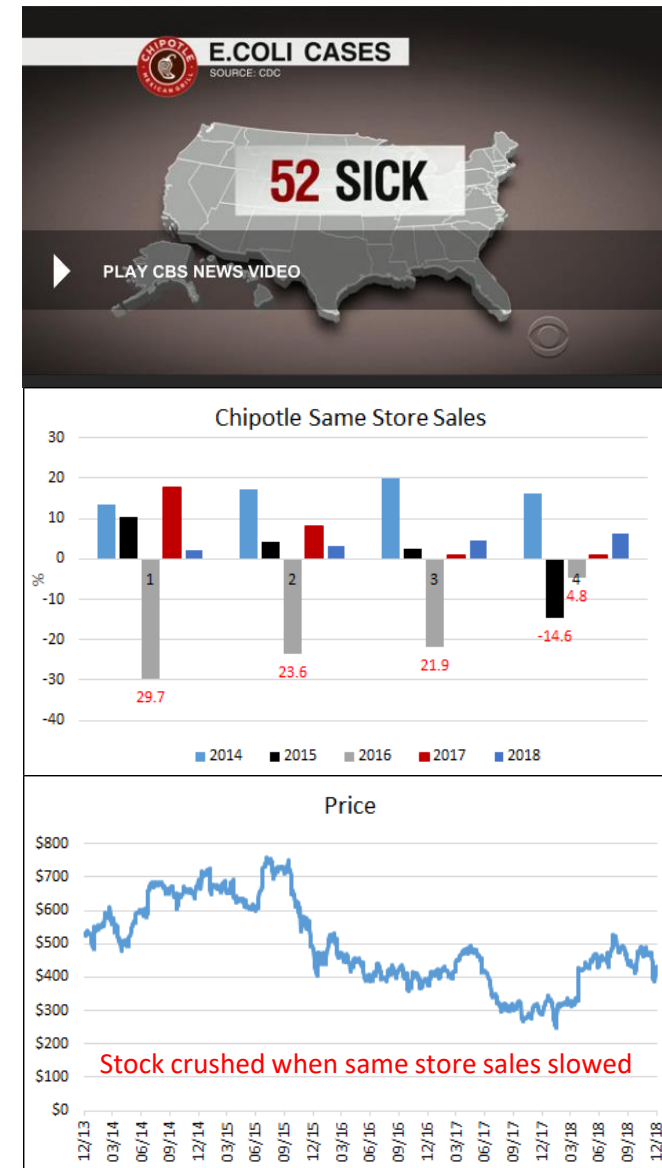
Customers	183,913,043	\$2.1 bil sales last 5 mo 2015 & Jan 2016 / \$11.5 est ticket price
Cases	125	Reported cases of E. coli, salmonella, and 1 norovirus
Probability	0.00007%	
One in	1,471,304	
2011	494	Air and space transport accidents
One in	630,753	Air and space transport accidents
2011	584	Deaths from cataclysmic storm*
One in	533,548	Cataclysmic storm
2011	465	Fall on and from ladder or scaffolding
One in	670,090	Fall on and from ladder or scaffolding

* Tornadoes, hurricanes, blizzards, dust storms, etc.

<http://www.iii.org/fact-statistic/mortality-risk>

<http://nrrn.com/food-safety/chipotle-temporarily-closes-43-units-after-e-coli-outbreak>

http://www.nytimes.com/2016/02/02/business/cdc-unable-to-trace-cause-of-outbreaks-at-chipotle.html?_r=0



Sources: Spellman, FactSet; <http://www.businessinsider.com/chipotle-fourth-quarter-guidance-2016-1>; and <http://marketrealist.com/2016/02/chipotle-store-sales-growth-14-6-blame-food/>.

Overconfidence is a **big** problem

- Overconfidence is one of the most well-documented biases
 - Leads people to be overly aggressive in forecasts, take too much risk, etc. **(not good)**
 - Confidence is due, in part, to neurochemical processes
 - Success through risk taking (e.g. gambling) makes one feel good
 - Alcohol, sex, drugs, and gambling have neurochemical commonalities
 - Stimulate chemical neurotransmission which results in feelings of pleasure; however, “...prolonged use of the drug followed by removal creates an exaggerated sense of craving ... satiated by increased intake” (page 428)



Overconfidence test

- Are you overconfident? **Let's check**
 - Please write down your best guess and a range (high and low) where you are 90% confident that the correct answer is between
 - (1) World Population (3/24/19)
 - (2) Length of the Nile River (in miles)
 - (3) Number of countries in OPEC
 - (4) Number of books in the Old Testament
 - (5) Diameter of the moon (in miles)
 - (6) Weight of an empty Boeing 747 (in pounds)
 - (7) Year in which Wolfgang Amadeus Mozart was born
 - (8) Gestation period of an Asian elephant (in days)
 - (9) Air distance from London to Tokyo (in miles)
 - (10) Deepest known point in the ocean (in feet)

**Now...please don't
cheat by saying
something like 0 to 1
quintillion...**

Source: Lo, Reconciling Efficient Markets With Behavioral Finance: The Adaptive Market Hypothesis, *Journal of Investment Consulting*, 2005 and <https://www.census.gov/popclock/>; 1 kilometer is 0.62 miles (statute), 1 kilogram is 2.20 pounds, and 1 meter is 3.28 feet.

Overconfidence test

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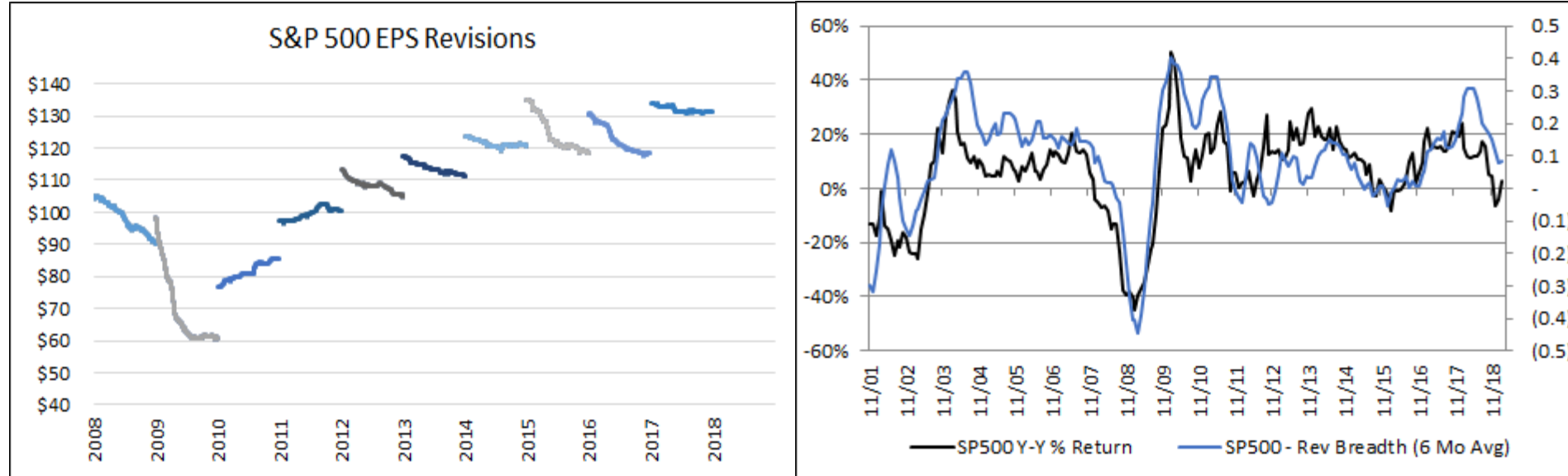
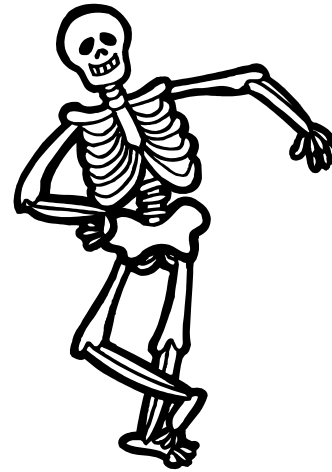
(1) World Population (3/24/19)	7,561,010,850
(2) Length of the Nile River (in miles)	4,187
(3) Number of countries in OPEC	14
(4) Number of books in the Old Testament	39
(5) Diameter of the moon (in miles)	2,160
(6) Weight of an empty Boeing 747 (in pounds)	390,000
(7) Year in which Wolfgang Amadeus Mozart was born	1756
(8) Gestation period of an Asian elephant (in days)	645
(9) Air distance from London to Tokyo (in miles)	5,959
(10) Deepest known point in the ocean (in feet)	36,198

- How did you do?

Source: Lo, Reconciling Efficient Markets With Behavioral Finance: The Adaptive Market Hypothesis, *Journal of Investment Consulting*, 2005 and <https://www.census.gov/popclock/>; 1 kilometer is 0.62 miles (statute), 1 kilogram is 2.20 pounds, and 1 meter is 3.28 feet.

Overconfidence impacts surprises and revisions

- Overconfidence can cause problems
 - “ ‘When the music stops, in terms of liquidity, things will be complicated,’ Mr Prince (CEO Citigroup, July 2007), when asked about problems in the US sub-prime market... ‘But as long as the music is playing, you’ve got to get up and dance. We’re still dancing.’ ”
 - And it is all too common ...
 - Revisions are normally negative (during good times)
 - And the better the revision the higher the returns (a reason to be conservative)



The dance
of
corporate
death

Sources: Spellman, FactSet; and Freeland, Investors Had Little Choice But to Keep on Dancing, *Financial Times*, October 8, 2009.

Capital spending and M&A measure confidence

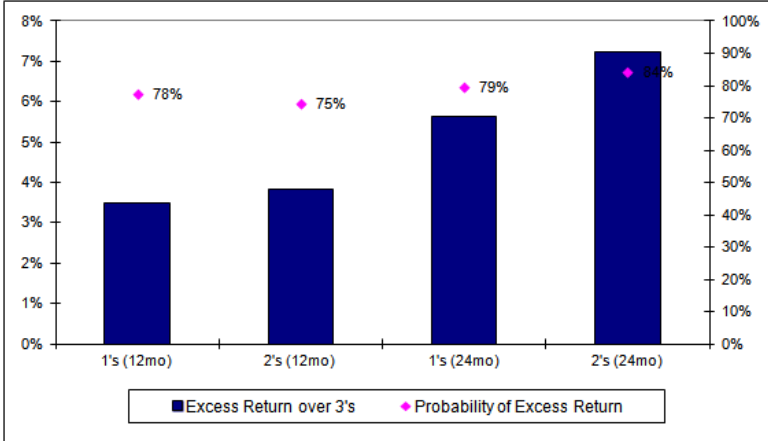
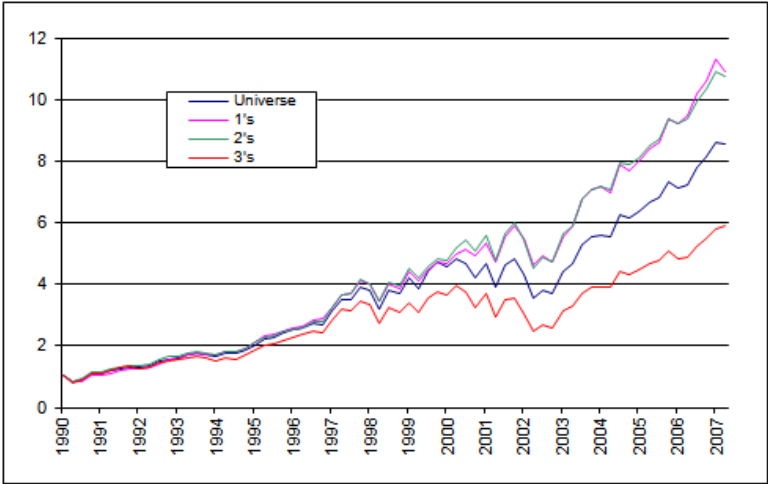
- There is plenty of incentive to grow, so grow we try
 - M&A and capital expansion occurs when believe future is bright
 - After periods of good times and at peaks
 - So, M&A and capital expansion occur at tops (buy high) and at peak prices (buy high), and capital may be shed at bottoms (sell low)

Acquirers outperform before acquisitions, and underperform after

	Year Before	Year After	Three Years After
All Stocks*	+24.5%	-7.4%	-22.2%
Large-Cap Stocks**	+22.0%	-4.3%	-16.5%

*Relative to equal-weighted 1,500 stock universe
 **Relative to cap-weighted S&P 500

Moderate growth (2s) and low growth (1s) are best, and high cap ex growth firms (3s) underperform

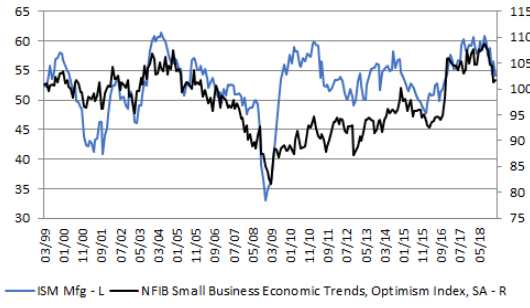


Sources: Francois Trahan, Brian Herlihy and Michael Kantrowitz (with Spellman providing data/analysis as a consultant), "Quantitative Research: Common Sense Meets Quant – Slow and Steady Wins the Race, ISI Group, 2008; and Goldstein, "Mergers and Acquisitions and Their Consequences," Bernstein, 2002.

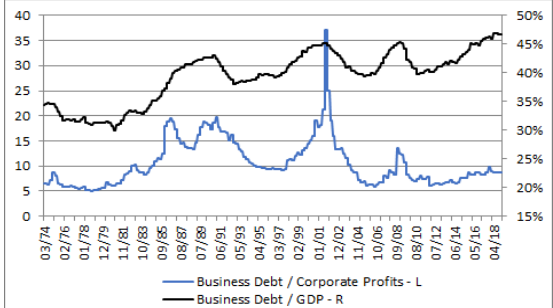
Corporate confidence peaks with cycle (due to *extrapolation* and *anchoring*)

- Growth in cap ex, M&A, and IPO activity, but lending moderate

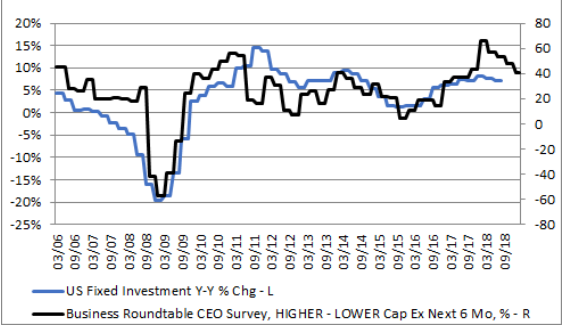
Company optimism coming off high



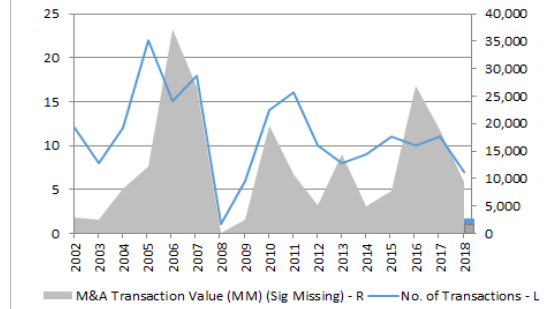
Which may explain willingness to borrow



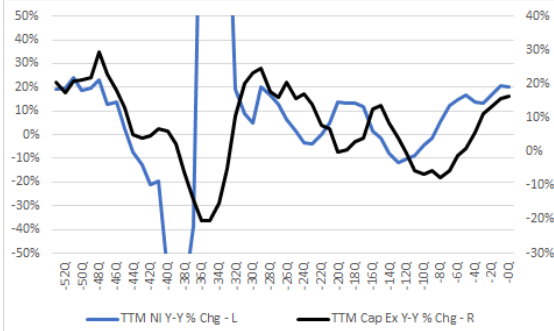
Optimism (high but moderating) leads investment



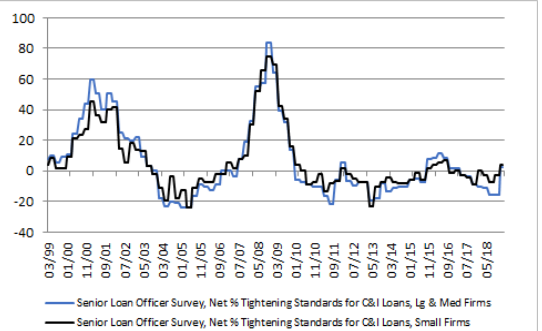
Large M&A strong, but off high pace perhaps due to ample PE funding and drop in number of public firms



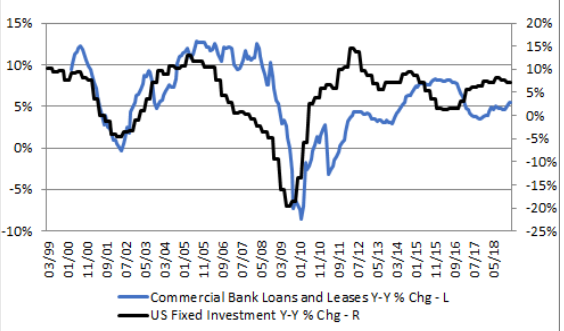
Confident since income is up (leads cap ex)



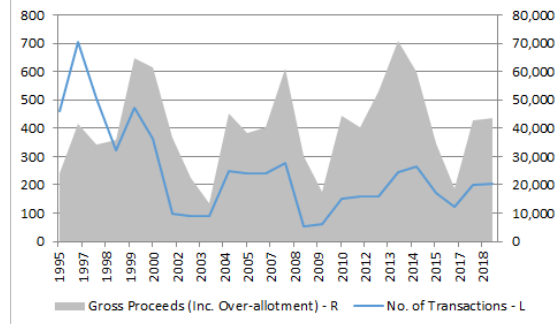
Plus lenders are bullish



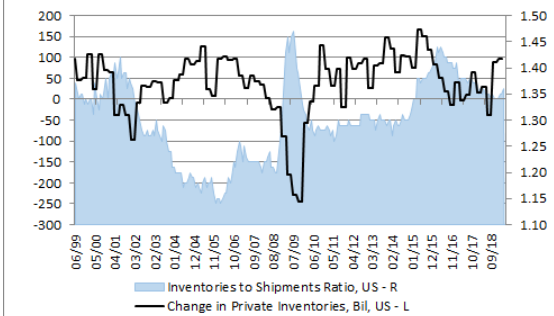
Loan growth follows cap ex



IPO activity coming back (selling high?)



And I/S down and inventory growth rebounding



Source: Spellman, FactSet, BEA, Business Roundtable, Federal Reserve System, ISM, NFIB - National Federation of Independent Business, US Census Bureau.



Anchoring results in slow adjustments

- People tend to anchor opinions from initial *value* and adjust slowly from them in the future
- Consider the following information
 - Data: 100 book bags each with 1000 poker chips; 45 bags with 700 black chips and 300 red chips, and 55 bags with 300 black chips and 700 red chips
 - A bag is selected at random
 - (1) What is the probability it contains predominantly black chips?
 - (2) Imagine that 12 chips are drawn, with replacement, and there were 8 black chips and 4 red chips; [what now would you assign to the probability that the bag contains predominantly black chips?](#)



Anchoring: People do not adjust enough when given new information!

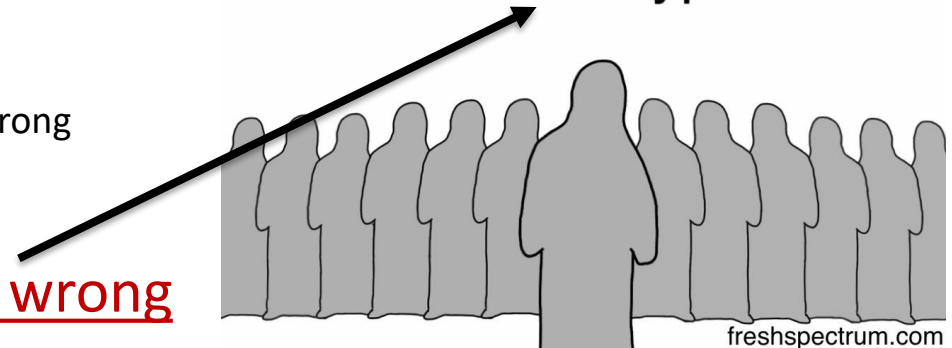
- Continued ...
 - Most people answer 45% for the first question
 - For the second question, you have new data, so you have the opportunity to adjust your guess
 - The most common answers are 45% and 67%
 - Those who answered 45% did not adjust their answers based on the new information
 - Those who answered 67% likely guessed based on the percent in the 12 chip draw
 - The correct answer is 96.04%

Confirmation Bias Causes Us to Ignore Information that Proves We are Wrong

- We tend to look for information to confirm initial decisions and opinions
 - If we make our decisions public (as a CEO does with strategic plans and an analyst does with recommendations) it is even harder to change plans
 - Wrong:
 - Culture suggests people who change opinions are weak and wrong
 - Right:
 - “When the facts change, I change my mind” (Keynes)
- Null hypothesis is what we should try to disprove to accept the alternative
 - We should rigorously test the null
 - Why we are wrong
 - To prove why we are right
 - But we do the opposite
 - We tend accept information why we are right
 - And critically analyze information on why we are wrong

Null needs to be why we are wrong

I am what is
The default, the status quo
I am already accepted, can only be rejected
The burden of proof is on the alternative
I am the null hypothesis



freshspectrum.com

How strong is the Brexit anchor?

- Should government stay anchored to the course of the first vote, or put it to a new vote in light of the new information?



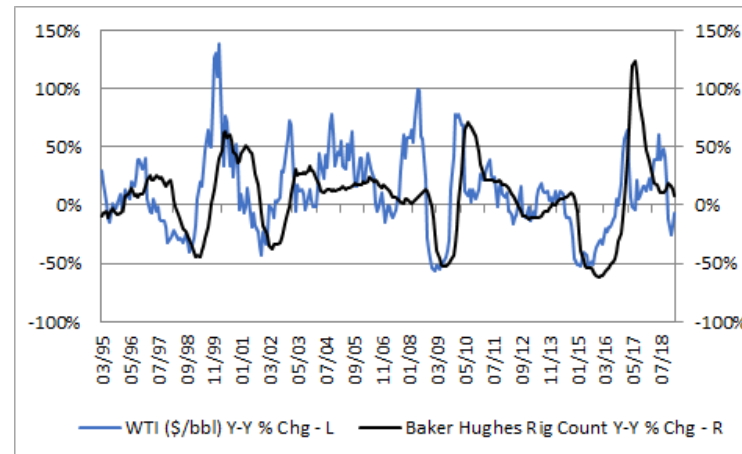
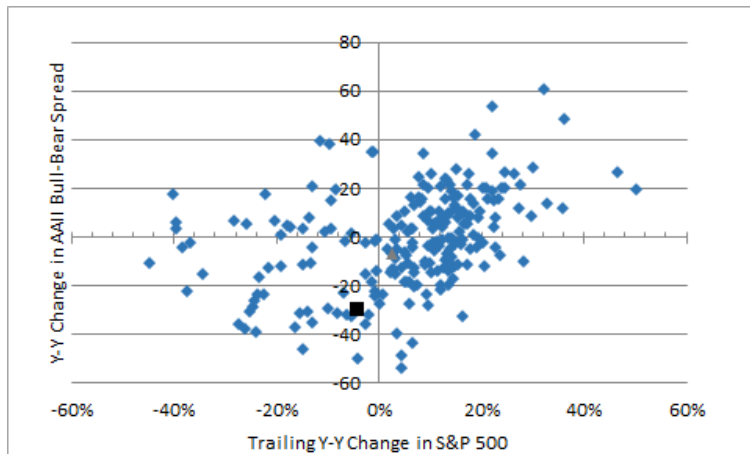
▲ People's vote Brexit rally draws 1 million marchers - video report

Source: <https://www.theguardian.com/politics/live/2019/mar/23/brexit-hundreds-of-thousands-expected-to-march-for-peoples-vote-london-live-updates>.

All types of investors are guilty of anchoring!

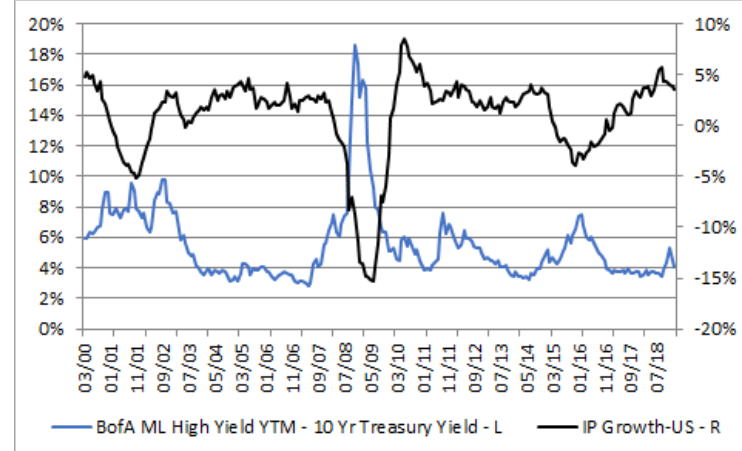
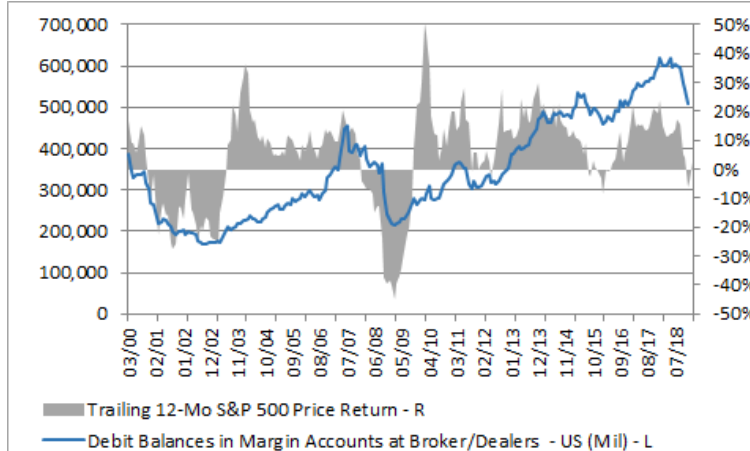
- Investors and corporations are guilty (at least in aggregate) of anchoring as they expect trends to continue
 - Because of this, they are most optimistic when they should be most pessimistic and vice versa!

Individual Investors:
Past stock prices drive Bull-Bear spread



Corporations:
Past oil prices changes drive drilling activity

Equity Investors:
Past stock prices drive margin



Bond Investors:
Past industrial activity drives bond spreads

Source: Spellman, FactSet, Baker Hughes, Inc, Conference Board, CRB, Merrill Lynch Fixed Income, and S&P.

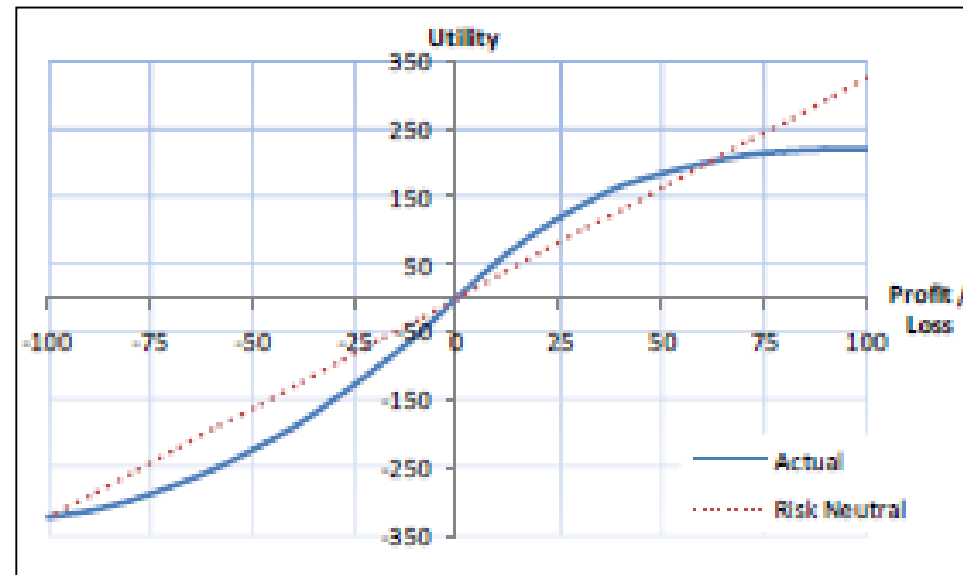
Loss Aversion – Prospect Theory

- Kahneman won Nobel Memorial Prize in Economic Sciences (2002) for his work, in conjunction with Tversky, on prospect theory, etc.
 - Here are two (slight adjusted) famous K-T questions
 - First decision: choose
 - (A) A sure gain of \$74 million, or
 - (B) A 25% chance of gaining nothing and a 75% chance of \$100 million
 - Second decision: choose
 - (A) A sure loss of \$74 million
 - (B) A 75% chance of losing \$100 million and a 25% chance of losing nothing
 - [What do you choose?](#)



People risk more in loss situations than in gain situations

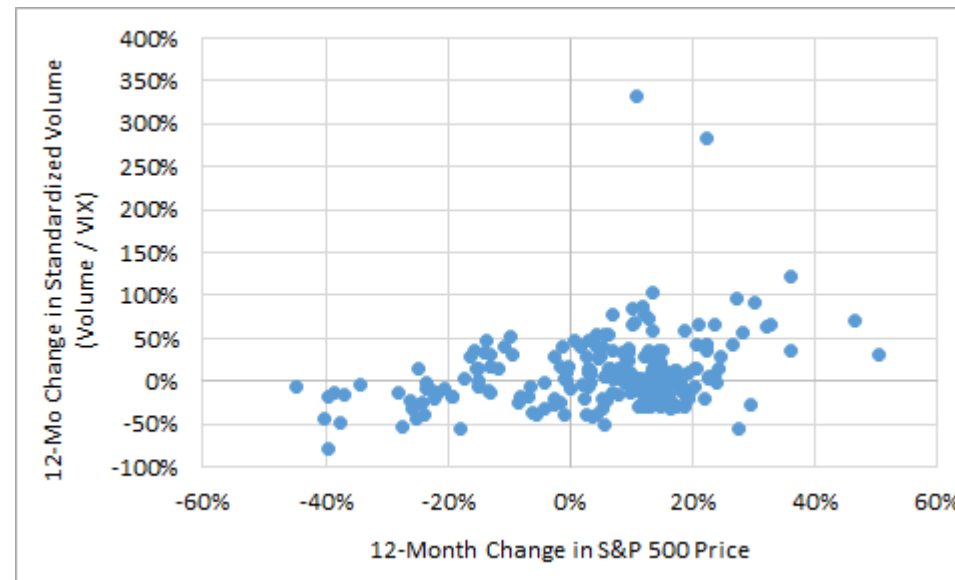
- Most people choose option A in gain situation and option B in loss situation
 - These choices are suboptimal to B and A, respectively!
- Implication
 - People risk more in loss situations than in gain situations
 - We tend to “feel” much more pain, vs. gratification, for similar-sized losses and gains...
 - We sell winners early and ride losers too long...



Source: Kahneman and Tversky, Prospect Theory: An Analysis of Decision Under Risk, *Econometrica*, 1979.

Trading subdued if returns are low as people hunker down

- People are reluctant to sell their losers
- Even if better options present themselves during times of market turmoil



Herding Drives Decisions

- People feel safe in the crowd
 - The elephant is safe if it does not stray too far from the herd



- Why do people herd?
 - It is in our genetic makeup as people survived due to division of labor
 - People are social animals and like to be liked
 - Better to fail conventionally than unconventionally (rational irrationality to save job)

Trade War: *availability* of information and *herding* may lead to false conclusions

- The trade war is making people nervous
 - Impacts sentiment
 - Impacts spending
 - Impacts markets



- But who wins such a war?
- Does China sell more to the US or the US more to China?
 - US imports \$506 billion/\$483 billion from China and exports \$130 billion/\$116 billion in 2017/2015
 - US affiliates in China sell \$481 billion while Chinese US affiliates sell \$26 billion in the US in 2015
 - The **net sales** of US to China (2015) is about \$597 billion and China's sales to US is \$599 billion, **or about even**
 - **Conclusion: China has ample opportunity to pressure US, and it may be easy for them to implement policy**
- Would a full-blown trade war impact earnings and inflation to a *large* degree?

Back of envelope, 25% Chinese tariff *only* boosts inflation 0.6% or hurts profits 7%

+

Why matters? Higher inflation and/or lower profits

Higher inflation leads to a more aggressive Fed and worry of recession while lower profits also hurts corporate outlook and financial markets

7% + drop in business profits if they eat the costs

- Business about 85% of GDP (\$17 trillion / \$20 trillion) so impact is \$110 billion (\$125 billion * 85%)
- Net income = 7% * \$17 trillion = \$1.2 trillion
- Hit to income is 7% (\$110 billion trillion / \$1.2 trillion)
 - Ignores lost income from retaliation on US companies in China, lost export sales on products with tariffs in China, slowing Chinese and world growth, etc.

Data and Assumption:

US GDP = \$20 trillion
 Chinese imports = \$500 billion
 Business GDP = \$17 trillion
 7% estimated net profit margin
 25% tariff on all imports is max, but US could influence allies to partner against China

0.6% jump in inflation if costs passed on to consumers

- \$500 billion imports * 25% = \$125 billion in tariffs
- \$125 billion / \$20 trillion economy = 0.6% rise in inflation

Social media can be dangerous

- Algorithms amplify news?
 - Go to YouTube and search for “Trade War with China”
 - Click on “Trump launches trade war with China” (1st recommended)
 - Click on “What are the ripple effects of a U.S.-China trade war?” (2nd recommended)
 - Click on “American shopping malls struggle to survive” (3rd recommended)
 - Click on “Retailers CLOSING in 2019!” (2nd recommended)
 - Click on “Nearly 5000 U.S. Stores Closing Already in 2019! MASS Debt and Bankruptcy” (2nd recommended)
- Took five clicks to get to armageddon!
 - Note that this was after goofing around for 30-40 min with different searches
 - It appears as YouTube learned my interests and then apocalypse-like videos rose to the top



Overcoming Biases

- Seek non-confirming information

 - Reward dissenters

 - Assign a devil's advocate

 - Rotate decision-makers

 - Have stop-loss and stop-buys

 - Be conservative

 - Implement proper risk controls and incentives

 - Write down your thesis and reassess results

 - Create a checklist for buys and a red flag list for sells

 - View every holding as if it is a new idea

 - Require learning from mistakes

 - Change voting process for losses

 - Pause and reassess before making decisions (e.g., stock circuit breakers)

- Not correcting behavioral blunders delays learning and compounds mistakes

 - After more investment and when the negative implications are greater



Summary: $r = \text{fundamentals} + X$, where X is **market psychology**

- The study of behavioral finance is flourishing
 - Do not ignore the X factor because individuals, businesses, and financial markets under-react and over-react to information
... which is your opportunity!

Google hits (3/24/19)

Behavioral finance = 1,900,000

Behavioural finance = 622,000

Total = 2,522,000

Efficient market hypothesis = 619,000

Efficient markets hypothesis = 132,000

Efficient market theory = 124,000

Efficient markets theory = 51,400

Total = 926,400

Appendix

- The Expectations Clock
- Selling losers is difficult
- Biases and gold
- Sentiment model
- Market model
- Earnings and returns
- Coach Investing website

The Expectations Clock

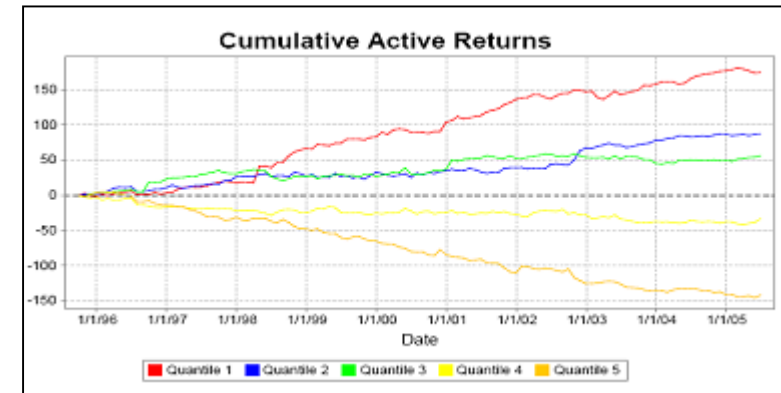
- Fundamentals cycle, and over-reaction and under-reaction occur during different phases of the cycle



Source: Spellman, The Expectations Clock: A Model for Leadership, Reversion, and Over- and Under-Reaction, PhD Dissertation, 2009; and Spellman, "The Expectations Clock: A Model for Cycles and Sentiment," <https://coachinvesting.com/2017/05/02/expectations-clock-a-model-for-cycles-and-sentiment/>, May 2, 2017.

Selling losers is key, but it is very difficult!

- Selling losers *early* is a key to outperformance!
 - The losers often cost more than the winners add
 - A 50% loss needs a 100% gain to get back to even
- Then why is selling losers so difficult?
 - Imagine an analyst who has told investors that a stock is a buy from \$30 to \$50 and then, overnight, it falls to \$25
 - (1) Analyst is probably *overconfident* since stock rose from \$30 to \$50, especially since this success is easy to recall (*availability*)
 - (2) Difficult to sell at \$25 since analyst is convinced about merits of stock (past good returns *represent* a bright future and *anchors* adjust slowly)
 - Plus the analyst has thought of all kinds of new reasons to *confirm* his/her position (*confirmation bias*)
 - (3) Selling a loss is admitting one is wrong which could cost the analyst's job, so he/she is *rationally irrational* and takes more risk in the loss situation (*prospect theory*) and stays with a buy
 - (4) If one sells at \$25 and watches the stock rise back to \$50 then *regret* is higher than not selling and watching it fall to \$0
 - Action decisions (i.e., changing recommendation) cause more regret than inaction decisions and staying the course is common when the outcome is ambiguous



Source: Spellman, "Reluctance to Sell Losers," 2009; the term rationally irrational was developed by Spellman, see <https://coachinvesting.com/2017/05/02/expectations-clock-a-model-for-cycles-and-sentiment/> for more details.

Biases and gold

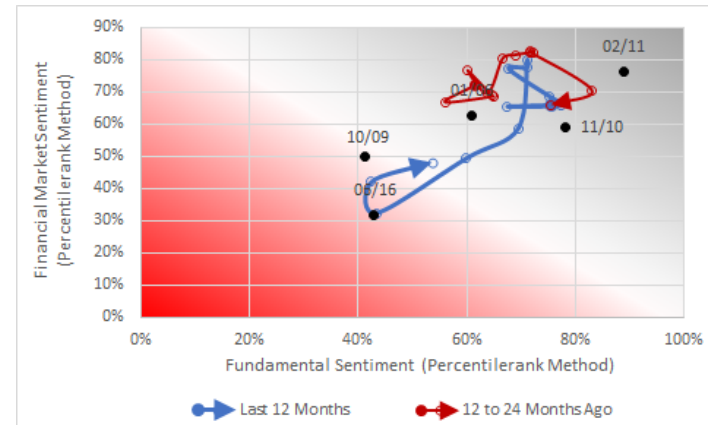
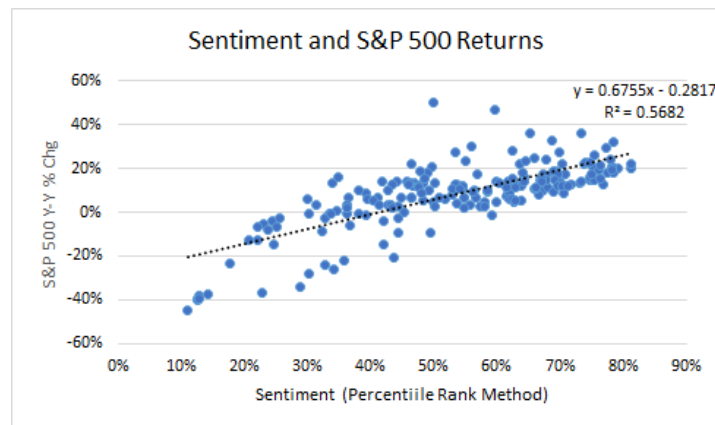
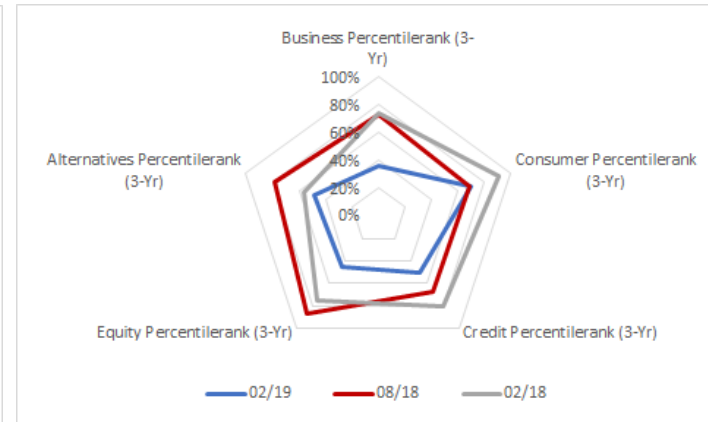
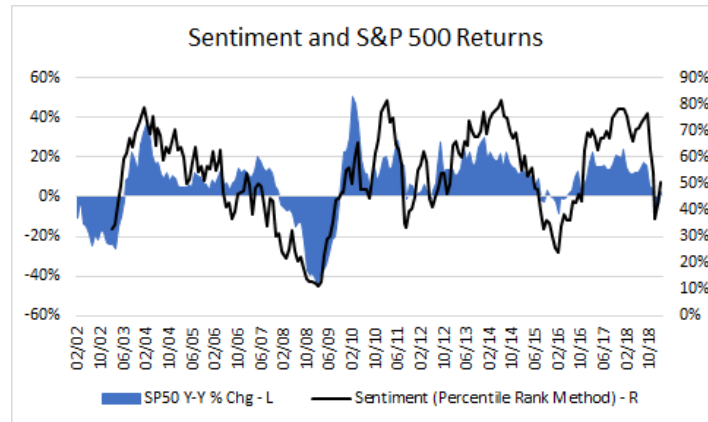
- When gold was at \$1,700 per oz., did people expect it to continue to rise?
 - Most people probably did
 - What was the value of gold?
 - All the gold in world would amount to a cube 67 feet on each side and is worth \$8 trillion
 - What can you do with gold? Polish it, look at it...
 - What could you buy for \$8 trillion?
 - All of the farmland in the US
 - Plus 15 Exxons
 - Plus \$2 trillion pocket change
 - Was the price rational? Was the market efficient?
 - Why had gold gone up so much?
 - Gold initially rose because of inflation concerns and other fears (fundamentals)
 - People then believed gold would rise because it had risen (the past *represents* the future, people *anchor* expectations on recent trends), so they bought more gold and the buying pushed it up more
 - This *confirmed* the initial buyers' thoughts and makes them more *confident* gold will rise again
 - So they bought again, but this time other people see gold rising and they also *herded* and bought the asset so they could profit as well
 - The feedback loop... *efficacy performance spiral*... continues
 - *In the end, gold became overvalued*



Source: Spellman, this illustration was provided by Warren Buffett on April 30, 2011 at the Berkshire Hathaway Annual Meeting as a reason to not own gold.

Warning: sentiment peaked last fall and bottomed at start of year

- Weakening sentiment is negative driver as it is positively correlated with returns
 - All variables, except consumer, down from last fall



Source: Spellman, FactSet, sentiment index includes financial market variables in equities (multiples, revisions, and technical factors), credit markets (real rates, yield curve, and credit spreads), and alternatives (dollar, gold, oil, other commodities, put/call, volatility, and margin balances) and fundamental factors in business (ISM manufacturers index, small business confidence, investment spending, and lending growth) and consumer (consumer confidence, AAll surveys, and fund flows) areas.

The market was VERY EXCITED before correction, but is still elevated

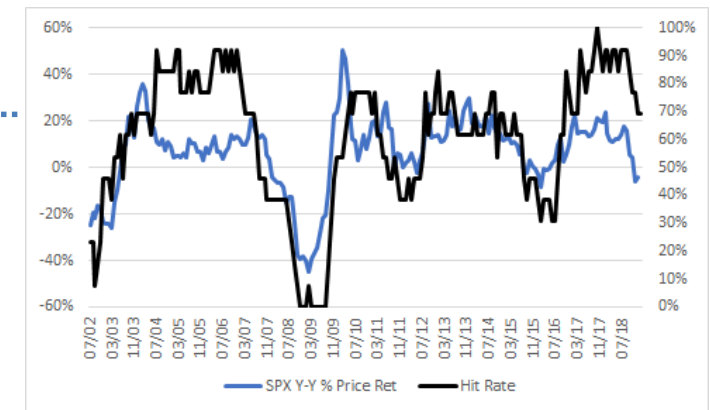
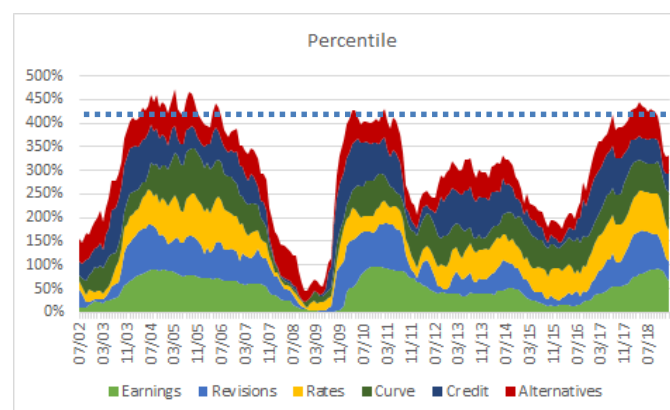
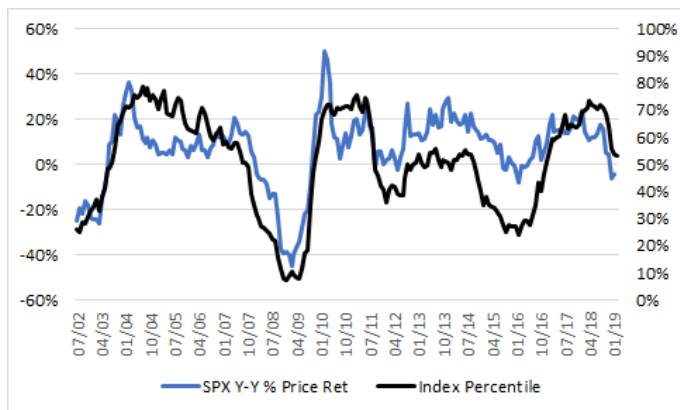
- S&P positively or negatively correlated with 13 variables
 - Growth, revisions, rates, yield curve, credit, and alternatives
 - 9 of 13 pointing in same “up” direction, vs 12 in October 2018
 - Overall composite still at level lofty
 - Positively correlated with returns
 - Poised for correction

Components of composite

100.0% Total
13.3% SPX Y-Y % LTM EPS Growth
13.3% SPX Y-Y % NTM EPS Growth
13.3% SPX (Up-Down)/(Up+Down) 6 Mo Avg
3.3% Y-Y Chg 10-Yr Treasury
3.3% Y-Y Chg 2-Yr Treasury
3.3% Y-Y Chg Fed Funds
3.3% Y-Y Chg in 10-Yr-Fed Funds
3.3% Y-Y Chg in 10-2 Yr Treasury
3.3% Y-Y Chg in Fed Funds - Core CPI
20.0% Y-Y Chg in HY - 10-Yr Treasury
6.7% Dollar Broad Y-Y % Chg
6.7% GSCI Price Y-Y % Chg
6.7% Gold Y-Y % Chg

Correlation to SPX Y-Y % change

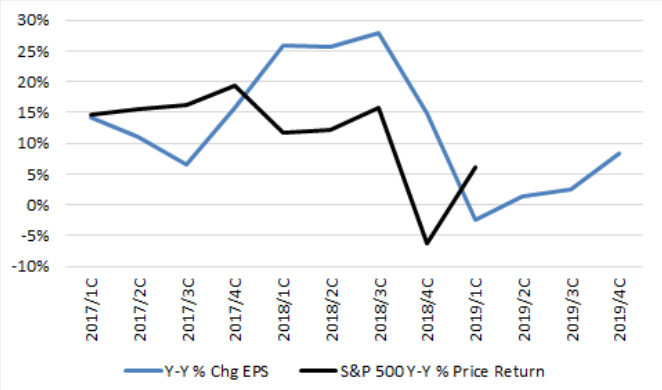
Since 06/01	SPX Y-Y % Price Ret
SPX Y-Y % Price Ret	1.00
SPX Y-Y % LTM EPS Growth	0.51
SPX Y-Y % NTM EPS Growth	0.70
SPX (Up-Down)/(Up+Down) 6 Mo Avg	0.77
Y-Y Chg 10-Yr Treasury	0.59
Y-Y Chg 2-Yr Treasury	0.61
Y-Y Chg Fed Funds	0.62
Y-Y Chg in 10-Yr - Fed Funds	(0.37)
Y-Y Chg in 10-2 Yr Treasury	(0.31)
Y-Y Chg in Fed Funds - Core CPI	0.61
Y-Y Chg in HY - 10-Yr Treasury	(0.71)
Dollar Broad Y-Y % Chg	(0.42)
GSCI Price Y-Y % Chg	0.36
Gold Y-Y % Chg	(0.04)



Source: Spellman, FactSet, Federal Reserve System, Merrill Lynch Fixed Income, S&P GSCI, U.S. Department of Labor.

Markets took breather as growth slowed

- Quarterly Y-Y EPS growth correlated with returns
 - Rising and accelerating EPS growth is overwhelmingly associated with good returns*
 - Consensus: EPS growth is positive through 2018, but Y-Y quarterly EPS growth decelerates in 1Q-3Q 2019 before rebounding in 4Q



	LTM EPS Growth Positive	Accelerating LTM EPS	LTM EPS Growth Positive and Accelerating	LTM EPS Growth Positive and Decelerating	LTM EPS Growth Negative and Accelerating	LTM EPS Growth Negative and Decelerating	Total Count	Price Return Positive	LTM EPS Growth Positive and Price Return Positive	LTM EPS Growth Negative and Price Return Positive	LTM EPS Growth Positive and Accelerating and Price Return Positive	LTM EPS Growth Positive and Decelerating and Price Return Positive	LTM EPS Growth Negative and Accelerating and Price Return Positive	LTM EPS Growth Negative and Decelerating and Price Return Positive
Since 1873	1046	830	687	359	143	539	1728	1084	761	323	530	231	90	233
Percent of Months	61%	48%	40%	21%	8%	31%		63%	73%	47%	77%	64%	63%	43%
Since 1970	364	267	236	128	31	169	564	411	284	127	182	102	26	101
Percent of Months	65%	47%	42%	23%	5%	30%		73%	78%	64%	77%	80%	84%	60%
Since 1980	275	202	174	101	28	141	444	343	234	109	135	99	23	86
Percent of Months	62%	45%	39%	23%	6%	32%		77%	85%	64%	78%	98%	82%	61%
Since 1990	205	142	125	80	17	102	324	253	189	64	111	78	13	51
Percent of Months	63%	44%	39%	25%	5%	31%		78%	92%	54%	89%	98%	76%	50%
Since 2000	132	82	75	57	7	65	204	143	120	23	65	55	4	19
Percent of Months	65%	40%	37%	28%	3%	32%		70%	91%	32%	87%	96%	57%	29%

Source: Spellman, FactSet, Shiller data, annual returns and growth rates, data through 2016.

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Dr. G. Kevin Spellman, CFA, aka "Coach," maintains the site. He coaches students in investments. He has over 20 years of experience in investments as an analyst, portfolio manager, consultant, and director of research on the buy-side and sell-side

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