Animating Mr. Market

Adopting a Proper Psychological Attitude

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"If you want to make money on Wall Street, you must have the proper psychological attitude. You must look at things under the aspect of eternity."

Ben Graham
The Legacy of Ben Graham

- To be an active investor, you must believe in market inefficiency to get opportunities and in market efficiency for those opportunities to turn into profits.

- The Mr. Market metaphor is very powerful because it makes an abstract idea concrete, encouraging an appropriate way to think about markets.

- One way to animate Mr. Market is to consider the wisdom of crowds. What's key is that crowds are wise under some conditions and mad when any of those conditions are violated.

- Diversity breakdowns, which can happen for sociological as well as technical reasons, lead to extremes.

- Look for cases where uniform belief has led to a mispricing of expectations and hence a way to make money.

The Proper Psychological Attitude

Ben Graham, a renowned investor and revered teacher, opened his course at Columbia Business School by saying, "If you want to make money on Wall Street, you must have the proper psychological attitude." Referring to a passage in *Ethics* by the philosopher Baruch Spinoza, he added, "You must look at things under the aspect of eternity." Translated loosely, this means you need to take an objective point of view.[1]

Warren Buffett, chairman and chief executive officer of Berkshire Hathaway and Graham's most famous student, suggests you need to read three chapters in order to shape that attitude[2]:

- Chapter 8 from *The Intelligent Investor* by Ben Graham ("The Investor and Market Fluctuations");

- Chapter 20 from *The Intelligent Investor* ("'Margin of Safety' as The Central Concept of Investment");

- Chapter 12 from *The General Theory of Employment, Interest and Money* by John Maynard Keynes ("The State of Long-Term Expectation").

The focus of this discussion is chapter 8, and in particular Ben Graham's parable of Mr. Market. We have three goals:

1. Argue that the Mr. Market metaphor remains a powerful way to think about markets;

2. Introduce a handful of ideas, some of which were not fully developed when Graham introduced the metaphor, to help animate the concept;

3. Provide some concrete ways to think about using Mr. Market to your benefit.

Graham opens chapter 8 by noting that stocks fluctuate (of course) and that there are two ways that a participant in the market can profit from those swings. The first is "timing," the endeavor to anticipate the action of the stock market. The second is "pricing," buying stocks for less than they are worth and selling them for more than they are worth.

He adds quickly that timing doesn't work for an investor and remains the purview of the speculator.[3] Notwithstanding the parade of commentators in the media, the evidence that experts predict poorly in complex domains is quite clear and well documented. The best work in this area is by Philip Tetlock, a professor of psychology at the University of Pennsylvania, who studied the predictions of hundreds of experts making political, economic, and social forecasts over 20 years. His conclusions would have come as no surprise to Graham: ". . . many pundits were hardpressed to do better than chance, were overconfident, and were reluctant to change their minds in response to new evidence."[4]

Graham goes on to argue that a useful way for an intelligent investor to think about the market is through the parable of Mr. Market. In Graham's version, you own a small stake in a private company that costs you $1,000 (approximately $10,000 in today's dollars). One of your partners is an obliging fellow named Mr. Market who tells you, every day, what he thinks your stake is worth and, further, offers a price at which he's willing to buy you out or offer you an additional interest.

In his telling of the Mr. Market parable, Warren Buffett adds that Mr. Market has "incurable emotional problems."[5] Sometimes he is euphoric and sees only favorable outcomes and hence names a very high buy-sell price. Other times he is depressed and sees only negative outcomes and provides a very low buy-sell price.

But, in fact, there are plenty of days when Mr. Market is doing fine and his price is sensible.

In 2013, the Nobel Prize in economics went to three men. One of the recipients, Robert Shiller, is a professor at Yale University known for showing that markets are inefficient. Another was Eugene Fama, a professor at the University of Chicago known for his advocacy of market efficiency. (The third was Lars Hansen, also at the University of Chicago.)

This leads to the first point worth stressing: to be an active investor, you must believe in both inefficiency *and* efficiency. In other words, you have to think that both Shiller and Fama are right—just not at the same time. Naturally, if markets are perfectly efficient there's no reason to try to beat them through active management. But it's also true that there's no reason to try to beat the market through active management if you think markets are always inefficient. That's because even if you are savvy enough to buy a dollar for fifty cents, there's no reason to believe that the price and value will ever converge in a perpetually inefficient market.

A maxim that Graham spoke, but never wrote formally, is, "In the short run, the market is a voting machine but in the long run it is a weighing machine." This quotation is sometimes taken as evidence of short-termism. We believe this is a misreading of the message. A better interpretation is that sometimes the market prices stocks incorrectly, but that price and value ultimately converge in the future.[6]

Intrinsic value equals the present value of future free cash flow. Because the future is unknowable, you might think of intrinsic value as a range. Indeed, prices are often in that range—Mr. Market is getting things mostly right. But there are times when Mr. Market becomes manic and names a very high buy-sell price, and other times when he's depressed and names a low price. See exhibit 1.

Exhibit 1: Mr. Market Goes to Extremes
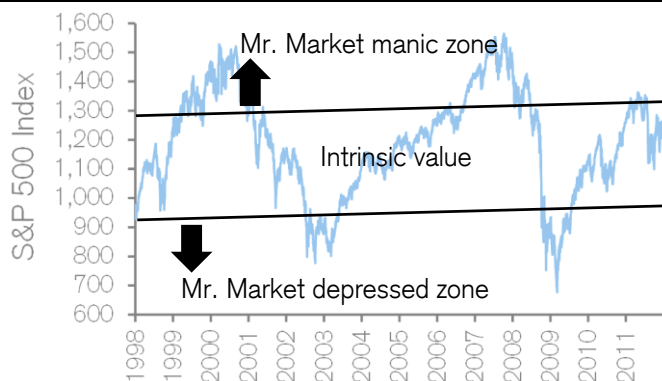
Source: Credit Suisse.

Graham's point, to which we will return, is that the intelligent investor uses Mr. Market's swings as *information* that he or she can take advantage of, rather than being *influenced* by the price action. This, of course, is very difficult to do psychologically.

Before leaving this part of the discussion, two additional points are worth making. The first is that it is not easy to generate returns in a portfolio, adjusted for risk, that exceed the S&P 500 or any relevant benchmark. And it has become more difficult over time. One way we can show this is through the standard deviation of excess returns. Exhibit 2 shows the five-year average standard deviation of excess returns for U.S. large capitalization mutual funds from 1963 through 2014. If you imagine excess returns as a bell-shaped distribution—which is not true but not so far off to be useless—then the bell has gotten skinnier over the decades. Indeed, the 2014 figure set a new low mark.

Exhibit 2: Standard Deviation of Excess Returns for U.S. Large Capitalization Funds, 1967-2014
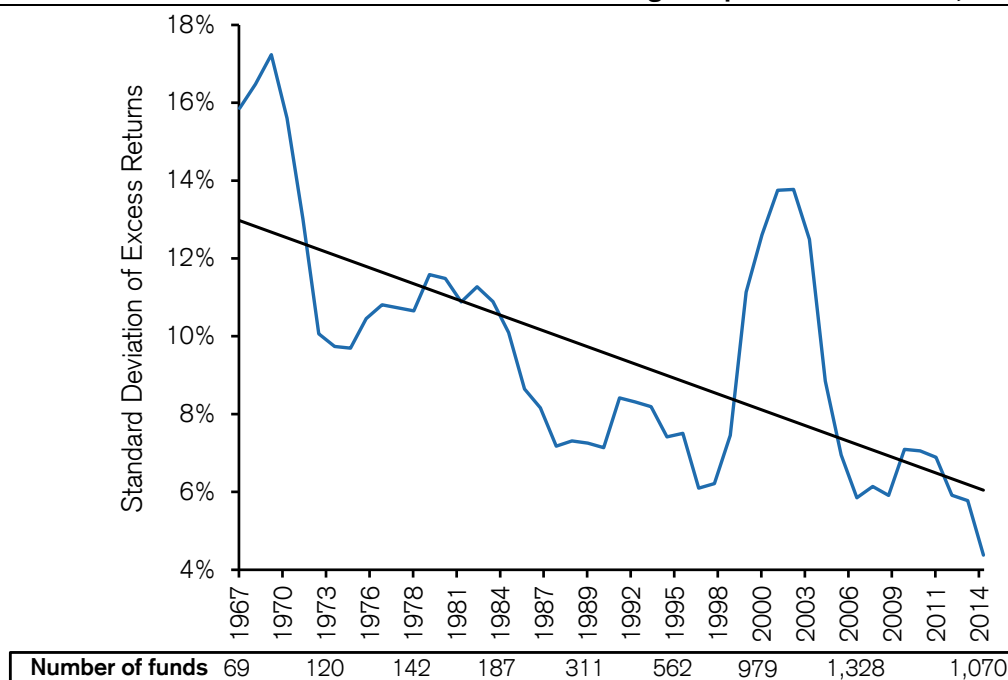
Source: Markov Processes International, Morningstar, and Credit Suisse.
Note: Shows five-year average of standard deviation of excess returns.

Second, value investing works. Exhibit 3 shows value versus growth going back to 1927. The exhibit displays the difference in the compound annual growth rate (CAGR) for a portfolio of expensive stocks versus one of cheap stocks, based on the ratio of price to book value. Now it's reasonable to ask whether the value premium of 250 basis points is the result of risk or behavioral issues. The balance of the evidence suggests that the behavioral explanation better fits the facts. This is all very consistent with Mr. Market.[7]

Exhibit 3: The Value Premium, 1927-2014
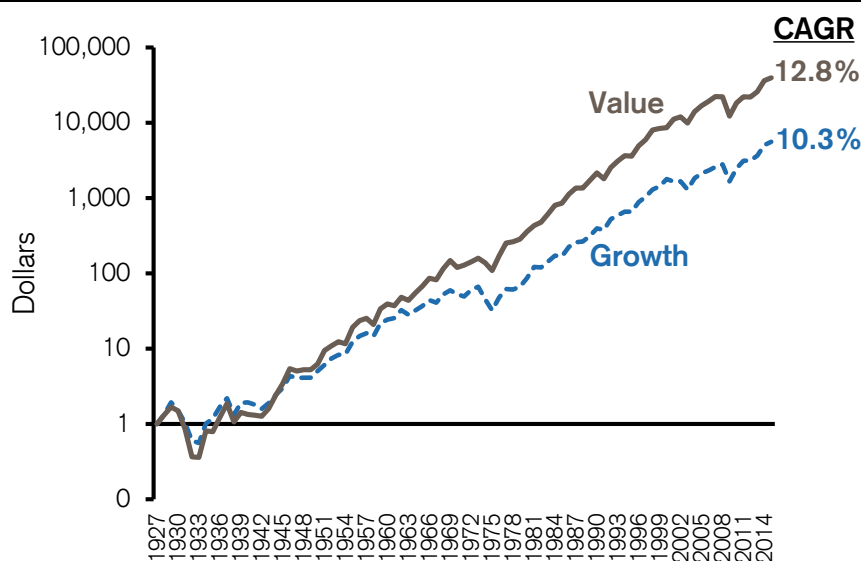
Source: Kenneth R. French, see http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/.
Note: From series "4 Portfolios Formed on Size and Book-to-Market"; Annual series uses average equal-weighted returns for "big" stocks;
CAGR = compound annual growth rate.

The Wisdom and Madness of Crowds

So now let's roll up our sleeves and ask about the various theories to explain market efficiency. Going in, we need to acknowledge that any satisfactory theory has to accommodate two realities. First, markets are hard to beat. Second, markets periodically zoom to excesses on the upside and downside.

There are three basic theories to explain market efficiency.[8] The first is to assume that investors are rational, which means that they make normatively acceptable choices based on expected utility theory and correctly update their views based on new information.

The second is to assume a small set of rational investors who use arbitrage to remove pricing errors. We can relax the assumption that all investors are rational and rely on a handful of them to make sure the trains run on time and the mail is delivered.

The final theory is the wisdom of crowds, the idea that a group of diverse individuals can come up with an efficient price. We are going to argue that this fits the Mr. Market story the best, but before we get to those details, let's look very quickly at rational agents and arbitrage.

There are few remaining hard-core believers in rational agents. But it is still a common way for financial economists to describe and discuss markets. In a debate about whether markets are rational, Mark Rubinstein, a professor at the University of California, Berkeley, took the affirmative side. Here's what he said in the paper that outlined his case (the emphasis in italics and underlining is original):[9]

> When I went to financial economist training school, I was taught **The Prime Directive** . . .
> Whatever else I would do, I should follow **The Prime Directive**:
>
> *Explain asset prices by rational models. Only if _all_ attempts fail, resort to irrational investor behavior.*

The paper itself is quite interesting, and worth a read. It's not as one-sided as this excerpt suggests. But it does reflect the training and attitude of a generation of financial economists.

Now it's not all that hard to dismiss the rational agent theory. First, we know that investors have nowhere near the computational ability or rationality to act in a normatively acceptable way, and we also know that markets go haywire in a fashion that rationality has a hard time explaining.

An obvious example of the latter is the stock market crash of 1987, a day when the Dow Jones Industrial Average plunged 22.6 percent. The probability of such an event was vanishingly small using conventional theory, and a rational explanation stretches credulity.[10] When asked about it, for instance, Eugene Fama said, "I think the crash in '87 was a mistake."[11] He went on to argue that the crash of 1987 was an error that was too big and the crash of 1929 was an error too small.

Now if you ask finance professors about market efficiency, most will fall back on the arbitrage argument, which basically says that we only need a handful of well-capitalized arbitrageurs who will cruise around markets seeking aberrant price-to-value gaps and will buy and sell accordingly.[12] The beauty of this argument is not everyone has to be smart and the rest of us benefit from the work of the arbitrageurs. Arbitrage is based on negative feedback, pushing things that are out of line back to where they should be.

There is a literature on the limits to arbitrage that explains why arbitrageurs can't always do their jobs.[13] Often these limits are technical. For instance, take the case of 3Com, a networking company, and Palm, a hand-

held computer company wholly owned by 3Com. In early March 2000, 3Com sold 5 percent of Palm in an initial public offering, with the stated intention of spinning off the other 95 percent to shareholders later in the year. Following the offering, each 3Com share would represent 1.5 shares of Palm as well as the proportionate value of the 3Com operations.

On the first day of trading following the offering, Palm shares traded at roughly $95 per share, representing a market capitalization of $54 billion, and 3Com shares were at $82, a $28 billion valuation. This suggested a value for 3Com of roughly negative $20 billion. Given that each 3Com share was worth 1.5 Palm shares plus the company's own operations, the obvious trade was to go long 3Com and short Palm. The problem was that there was insufficient Palm stock to borrow. So even though the math of the trade was clear, arbitrageurs could not execute the trade. This allowed the inefficiency to persist until sufficient Palm shares became available to borrow.

Even after taking into consideration the limits to arbitrage, the existence of arbitrageurs is a reasonable assumption. There remain substantial resources dedicated to arbitrage, and arbitrageurs play an essential role in ensuring efficient prices day to day.

But there are a couple more issues with the arbitrage argument that Jack Treynor, president of Treynor Capital Management, suggests in a fine paper on market efficiency published in 1987.[14]

First, arbitrageurs themselves are not rational because the risk of their portfolios can rise faster than the reward, inconsistent with the principle of risk aversion and hence expected utility theory.

Second, the theory assumes that investors who know true value expand their positions and those who don't willingly sell. As he says, "Those investors who are right know they are right, while those investors who are wrong know they are wrong" and they all act accordingly. This, he adds flatly, is "an unlikely state of affairs."

Another problem is that the arbitrageurs have failed to show up at critical junctures throughout the history of markets. One well-documented example is that of Long-Term Capital Management (LTCM) and "on-the-run" and "off-the-run" bonds. There's a wonderful chapter about LTCM in "An Engine, Not a Camera: How Financial Models Shape Markets" by Donald MacKenzie, a professor of sociology at the University of Edinburgh.[15]

The most recent issue of a bond is called on-the-run. At that time, the 30-year Treasury bond was a bellwether security. The comparable 30-year bond issued, say, six months before, is off-the-run. These bonds have very similar values based on math, but since the newer issue is more liquid it commands a small premium. The trade here is very straightforward: If the off-the-run bond gets unusually cheap versus the on-the-run bond, measured by a wide spread between the yields, you buy the off-the-run and sell the on-the-run until the valuation gap reverts to normal. This is arbitrage 101. And because this is a plain vanilla transaction, arbitrageurs use plenty of debt to supercharge their returns.

The point MacKenzie makes is that as the spread expanded on this trade in 1998, the arbitrageurs were nowhere to be found. He writes:[16]

> As 'spreads' widened, and thus arbitrage opportunities grew more attractive, arbitrageurs did not move into the market, narrowing spreads and restoring 'normality.' Instead, potential arbitrageurs continued to flee, widening spreads and intensifying the problems of those who remained, such as LTCM.

The trade itself wasn't a problem, as in theory LTCM could have held those securities to maturity and done fine. The problem was leverage, which amplified the impact of small changes in the spread. But the essential point here is that at the time when we most need the arbitrageurs to provide the market with negative feedback—that is, to bring price and value back into line—they fail to do so.

The final path to market efficiency is the wisdom of crowds.[17] To be more formal, we can call the market a complex adaptive system:[18]

- **Complex** means there are lots of heterogeneous agents interacting. These can be neurons in your brain, ants in an ant colony, or investors in a market;

- **Adaptive** means that the decision rules of those agents change in response to the environment. Synaptic connections are strengthened or weakened, the ants forage or stay in the nest, or investors buy or sell based on the market's moves. The essential point is that there is feedback between the decision rules and the environment;

- **System** means that the whole is greater than the sum of the parts. Reductionism doesn't work. You can't understand the system solely by analyzing the constituent parts.

Now here's the key: The wisdom of crowds only works under certain conditions, which include diversity, aggregation, and incentives. Here are some definitions:

- **Diversity** means that the agents, whether neurons, ants, or investors, are heterogeneous. In markets, this means investors who have a short-term or a long-term outlook, do fundamental or technical analysis, or even those who trade based on the alignment of the stars;

- **Aggregation** means there's a way to bring information together. That would be synaptic firings in your brain, pheromone trails for ants, and exchanges for investors;

- **Incentives** mean there are rewards for being right and penalties for being wrong. Incentives need not be monetary—they can be represented by fitness for a species or even be reputational. But the important idea is that good results are rewarded and poor performance penalized.

There's an equation that shows the math of how the wisdom of crowds works. Scott E. Page, a professor of economics and political science at the University of Michigan, calls this the "diversity prediction theorem:"[19]

Collective error = Average individual error – Prediction diversity

You can think of "average individual error" as smarts, "prediction diversity" as diversity, and the "collective error" as the wisdom of crowds.

There are two axioms that follow from the diversity prediction theorem. The first is that the collective error is always less than the average individual error. This means the collective is smarter than the average guess within the collective. For those who participate in markets, this is a message that suggests appropriate humility.

Second, the wisdom of the crowd is equal parts smarts and diversity. As Page stresses, "Being different is as important as being good." This highlights the relevance of diversity in multiple settings, including any decisions that groups make.

Here's a simple example to show how the wisdom of crowds works. In the summer of 2013, we had a meeting that included 67 interns. We passed around a large jar of jelly beans and asked them to independently make an estimate of the number of beans in the jar. We offered a reward for the best guess and threatened public shame (without follow through) for the worst one. So the conditions for the wisdom of crowds were in place: diversity, aggregation (a spreadsheet), and incentives.

The average estimate of the group was 1,427 beans. The jar contained 1,416 beans. So the collective estimate was within one percent of the actual number. The accuracy was not the result of sharp individual guesses, as the average individual error was 53 percent. Rather, the guesses were sufficiently diverse to get to a very good final result. In this particular exercise, no participant did better than the collective.

While this outcome is interesting and illuminating, it relies on a very contrived setting. But it turns out that collectives can do well in environments closer to markets. One example is pari-mutuel betting in horse racing.

Exhibit 4 shows a plot based on more than 11,000 horse races.[20] The horizontal axis is the ordinal finish, as determined by the handicappers, and the vertical axis is the actual outcome. Each dot compares the expected versus the actual result. A line at a 45-degree angle shows how well they match up. If you examine this closely you can see that horse bettors are not perfect, and the results for any particular race can be way off (as we'll see in a moment). But these results are sufficiently accurate to make it really hard to make money after the track withholds a standard percentage of the betting pool (known as a "takeout").

Exhibit 4: Handicappers Are Accurate
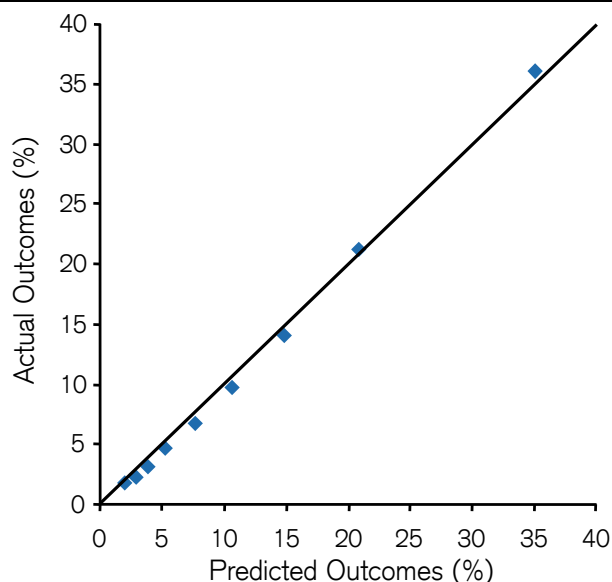
Source: Marshall K. Gramm and Douglas H. Owens, "Efficiency in Parimutuel Betting Markets Across Wagering Pools in the Simulcast Era," *Southern Economic Journal, Vol. 72, No.4, April 2006, 926-937.*

Ben Graham knew about the wisdom of crowds. When posed the question about whether Wall Street professionals are better at forecasting than others, here's what he said:[21]

> Well, we've been following that interesting question for a generation or more. And I must say frankly that our studies indicate that you have your choice between tossing coins and taking the consensus of expert opinion and the results are just about the same in each case. Your question as to why they are not more dependable is a very good one and an interesting one and my own explanation for that is

this: Everybody on Wall Street is so smart that their brilliance offsets each other. And that whatever they know is already reflected in the level of stock prices, pretty much, and consequently what happens in the future represents what they don't know.

Now we turn to the heart of the discussion, which is "animating Mr. Market." The question is: How does Mr. Market go from offering prices that are "plausible and justified" to offering prices that are "little short of silly?"

The answer, we believe, is that one or more of the conditions for the wisdom of crowds is violated and hence we go from the wisdom of crowds to the madness of crowds. Given that we are social beings, it is not surprising that the condition most likely to be violated is diversity. Rather than operating in a diverse fashion, we correlate our behaviors. And stock prices themselves contribute to the process of correlation.

There's a classic experiment in social psychology that explains this well. It was about social conformity and was conceived and conducted by the social psychologist Solomon Asch in the 1940s and 1950s. In one version of the experiment, Asch had eight people seated around a table. Seven of those "participants" were Asch's confederates who were in on the experiment. The eighth was the subject.

Asch showed the participants a reference line (X) and three additional lines (A, B, and C), one of which was the same length as X. The simple task was to identify which line—A, B, or C—was as long as X. They did this for 18 rounds. With no pressure to conform, the answers of the subjects were nearly flawless.

The experiment then started for real. Asch signaled his confederates to give the wrong answer. In these trials, more than one-third of the responses were wrong. Further, three out of the four subjects answered wrong at least once. Even subjects who initially resisted going with the group commonly ended up doing so for a round or more.[22] It is also worth noting that about one-quarter of the subjects did remain independent.[23]

In writing about the experiments, Asch wondered what was going through the minds of those who conformed.[24] He suggested three possible distortions. The first is judgment, where the subject knows the answer, feels conflict when others answer differently, and assumes the group knows better and so rejects his own answer. Second is action, which suggests that the subject knows the answer but feels more comfortable going with the group and being wrong than standing out and being right. As the renowned economist John Maynard Keynes wrote in chapter 12 of *The General Theory*, "Worldly wisdom teaches that it is better for the reputation to fail conventionally than to succeed unconventionally."[25]

The final distortion is perception, which suggests the group opinion actually alters how the subject perceives what is going on. Asch died in 1996, so he never had the chance to see which explanation is most likely.

Fast forward 50 years from the time Asch did his experiments to a functional magnetic resonance imaging (fMRI) lab on the campus of Emory University. Greg Berns, a professor of neuroscience, decided to replicate the Asch experiments while subjects were in the fMRI machine. This allowed Berns and his colleagues to peer into the brains of the subjects as they decided.[26]

Berns selected a different task than that of Asch. He showed a pair of three-dimensional objects that were rotated. In roughly half the instances the object was the same and in the other half the object was a mirror image, hence different. Under control conditions, the subject selected the incorrect answer 14 percent of the time, indicating that the task was somewhat more difficult than matching lines. When the researchers introduced the answers of others, the error rate rose to 41 percent, but about a quarter of the subjects remained independent. Even though the task was different, the scientists successfully replicated Asch's basic findings.

Here's where things got interesting. Berns could not only see the results of the trials but could also observe what parts of the brain were active as the subjects decided. For distortions of judgment and action you would expect activity in the forebrain, whereas a distortion of perception would be in the posterior brain where your visual and perceptual regions reside.

It was the posterior brain that was active for those subjects who conformed. This suggests the group's opinion affected how the subject perceived the situation. As surprising, the researchers did not find a substantial change in activity in the frontal lobe, associated with higher level processing such as a distortion of action.

Now we have all either been in, or can relate to, situations where we allowed the decisions of others to influence us. In other words, we knew the right answer but chose differently. But in a survey following the experiments, only three percent of the subjects admitted to knowing the right answer and going with the majority anyway.

Berns summed up the experiment, "We like to think that seeing is believing," but seeing is believing what the group tells you to believe.[27]

There's another element of the experiment worth mentioning, and that is what happened inside the brains of those who remained independent. Those subjects experienced increased activity in the amygdala, the part of your brain that cues for immediate action. Fear is a powerful trigger for the amygdala, and it's behind the fight-or-flight response. So while those who stayed independent deserve our admiration, it is important to know that they had to overcome an unpleasant sense to do so.

Throughout chapter 8, Graham stresses the importance of thinking for yourself. Don't get caught up in the notion that the stock market's gyrations are telling you something. Use Mr. Market's prices for information but don't be influenced by them. The experiments by Asch and Berns tell us that this is hard to do.

Diversity breakdowns are crucial to pushing Mr. Market from healthy to manic or depressed. And herein is the critical point: **The very factor that causes market inefficiency—correlated beliefs—makes exploiting that inefficiency difficult.** The desire to be part of the crowd is powerful, and being apart from the crowd is scary for most.

But there's another essential element worth stressing, which is that the loss in diversity and the movement in asset prices have a non-linear relationship. In other words, you can lose diversity for a while and nothing happens. But then there's a sudden shift and you can get big, unexpected changes.

Let's start with a physical example, the Millennium Bridge in London. The Millennium Bridge was the first footbridge built over the River Thames in over a century, and connects St Paul's Cathedral on the north with the Tate Modern and the Globe Theatre on the south. The bridge was designed by the famous architect, Norman Foster, and built by the reputable engineering firm, Arup.

The bridge officially opened at lunchtime on June 10, 2000. Within a few moments, it started swaying from side to side. This is a major problem in the bridge business. If you watch the video of the people crossing the bridge on that day, it looks like a bunch of penguins inching along.[28] The bridge closed immediately, to the embarrassment of all involved.

What happened? Naturally, bridge makers know about vertical force and accommodate it in their design. But when you walk you also generate a bit of lateral force. In general, bridges are stiff enough to deal with that and when people walk, the forces tend to cancel out.

But the Millennium Bridge had insufficient lateral dampeners. So once the bridge started to sway, the pedestrians widened their gait to maintain stability. This led them to synchronize their steps, which further amplified the effect.

The essential part of the story for our purpose is that the swaying only happened beyond a certain threshold of pedestrians. As exhibit 5 shows, there is little swaying up to 165 pedestrians. But above 165, and the action kicks in. A small incremental change leads to a large-scale effect.[29]

Exhibit 5: The Millennium Bridge Wobbled with More Than 165 People
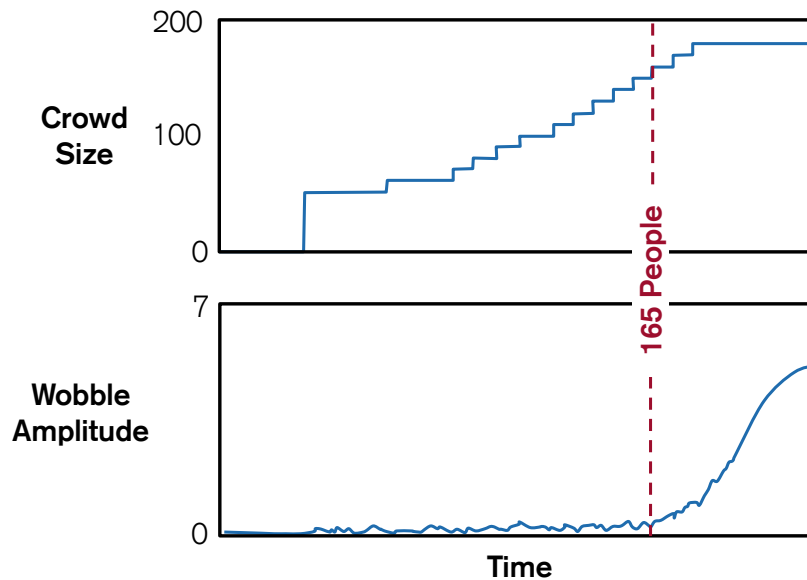
Source: Based on Steven H. Strogatz, Daniel M. Abrams, Allan McRobie, Bruno Eckhardt, and Edward Ott, "Theoretical Mechanics: Crowd Synchrony on the Millennium Bridge," Nature, Vol. 438, November 3, 2005.
Note: Wobble amplitude in centimeters.

We believe the same thing is true in markets.[30] It's hard to have a clear measure of diversity in real time, but we see these nonlinearities clearly in agent-based models. Blake LeBaron, an economist at Brandeis University, developed such a model.[31] LeBaron's world has 1,000 agents who trade a stock, know portfolio theory, and use various trading rules. The value of the stock is determined by future dividends, and LeBaron based the numbers on historical results. LeBaron is able to replicate many of the features we see in real markets, including clustered volatility and fat tails. Exhibit 6 shows the results.

Exhibit 6: Agent-Based Model Shows Non-Linear Relationship between Diversity and Price
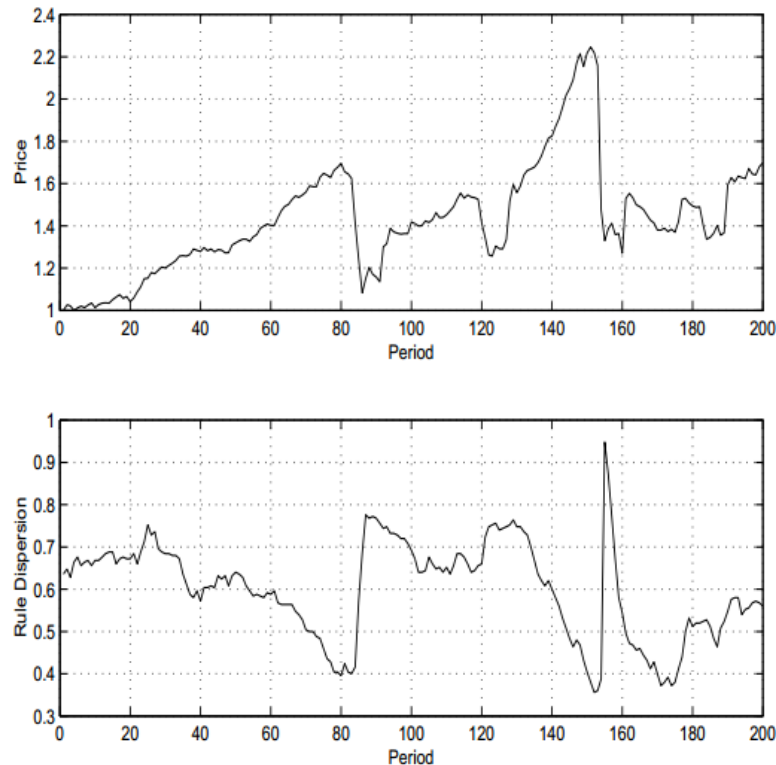
Source: Blake LeBaron, "Financial Market Efficiency in a Coevolutionary Environment," Proceedings of the Workshop on Simulation of Social Agents: Architectures and Institutions, Argonne National Laboratory and University of Chicago, *October 2000, Argonne 2001, 33-51.*

For the purpose of our discussion, you can focus on the first 80 periods on the left of the exhibit. On the top you see the stock price, which is in steady ascent. On the bottom you see a measure of diversity. What you can observe is that diversity is dropping even as the stock price rises. This is a crowded trade. Everyone is doing the same thing and making money doing it.

The stock price then drops precipitously as there are no more buyers to bid the stock higher. At the same time, diversity increases in the population and restores some health.

Before we move to the final part of this discussion, let's review the main points:

1. The concept of diversity is essential to animating Mr. Market. When we have diversity we tend to have efficient markets, and Mr. Market's idea of value is plausible. When we lose diversity, the wisdom of crowds flips to the madness of crowds. Mr. Market becomes manic or depressed and prices depart from value.

2. The loss of diversity is not linearly related to asset prices. As diversity declines, the fragility of the market increases but everything seems fine. In fact, it seems better than fine because market participants are generally making money and sometimes even encouraged to use debt to enhance their returns.

3. When nearly everyone adopts a point of view, whether it's bullish or bearish, the psychological pull to conform is powerful. This is the main lesson from the Asch experiment. And when that psychological pull is led by stock prices, Mr. Market is no longer informing you, he is influencing you. You have come under his sway.

These points lead to what may be the most important paragraph in chapter 8. Graham writes:

> The true investor scarcely ever *is forced to sell* his shares, and at all other times he is free to disregard the current price quotation. He need pay attention to it and act upon it only to the extent that it suits his book, and no more. Thus the investor who permits himself to be stampeded or unduly worried by unjustified market declines is perversely transforming his basic advantage into a basic disadvantage. That man would be better off if there were no market quotation at all, for he would be spared the mental anguish caused him by *other persons'* mistakes of judgment.

Solomon Asch meets the stock market.

Contrarian Streak + a Calculator

Now let us turn to the final part of the discussion, which is how to use Mr. Market to your benefit. And we don't think you can do better than a line that Seth Klarman, founder of The Baupost Group, shared in 2008: "Value investing is at its core the marriage of a contrarian streak and a calculator."[32]

There are two parts to this message, as we interpret it. The first is to be a contrarian. This is fully consistent with everything we have been discussing. As Warren Buffett has said, "Be fearful when others are greedy, and be greedy when others are fearful."[33]

However, being a contrarian for the sake of being a contrarian is a bad idea because the consensus *is* right sometimes. When the movie house catches on fire, you should by all means run *out* the door. Positive feedback changes the state, and sometimes the state needs to be changed for advancement or safety.

So the second part of the message is equally crucial. The calculator allows you to assess whether the expectations, as reflected in the price, are out of sync with the fundamentals, a reasonable sense of a company's future financial results.

Klarman grew up near the Pimlico horse race track in Baltimore, Maryland, and spent a lot of time there as a kid. Horse racing is a useful metaphor to make the point about expectations and fundamentals.

In the U.S., winning the Triple Crown puts a horse in the pantheon of racing. It's difficult to do because it entails three races (Kentucky Derby, Preakness Stakes, Belmont Stakes), over three different distances (1.25, 1.1875, and 1.5 miles) all in just five weeks. In the summer of 2014, a beautiful colt named California Chrome came along. He had won 6 of the 10 races he had run prior to the Kentucky Derby and had won 4 in a row leading up to the first leg.

California Chrome won the Kentucky Derby by 1 ¾ lengths and went on to win the Preakness by 1 ½ lengths. This put him just one win away from horse racing immortality.

In this case, Mr. Market is the collection of pari-mutuel bettors. Triple Crown contenders are like shiny, sexy growth stocks. Everyone wants to bet on them. Naturally, the horse's handlers were also very bullish on his prospects and were not afraid to share their views with the public. The handicappers were bullish as well, as California Chrome went off at 3-to-5 odds. Those odds suggest a 62.5 percent chance of winning the race.

As a value investor unaffected by the price, you would want to understand whether that probability was a fair representation of the horse's prospects. In other words, would the fundamentals live up to the expectations? There are a couple of ways to look at this.

First is the base rate of success. Since 1875 there have been 30 horses in a position to win the Triple Crown, but only 11 achieved the feat. That's a 37 percent success rate. But there was a marked difference before and after 1950: Before 1950, 8 of the 9 horses that tried were victorious, close to a 90 percent rate. But after 1950 only 3 of 21 won, less than a 15 percent success rate, and none have succeeded since Affirmed did so in 1978. So the 62.5 percent probability sounds a bit rich based on the last 65 years of results.

A reasonable thought is that California Chrome's speed justified his odds. There is a way we can measure that. It's called a Beyer Speed Figure and measures a horse's performance adjusted for track conditions. The details are not important; all you really need to know is higher speed figures equal faster horses. Exhibit 7 shows the last eight Triple Crown aspirants, including California Chrome, and you can see that he's the slowest of the lot.[34]

Exhibit 7: Beyer Speed Figures for the Last Eight Triple Crown Aspirants
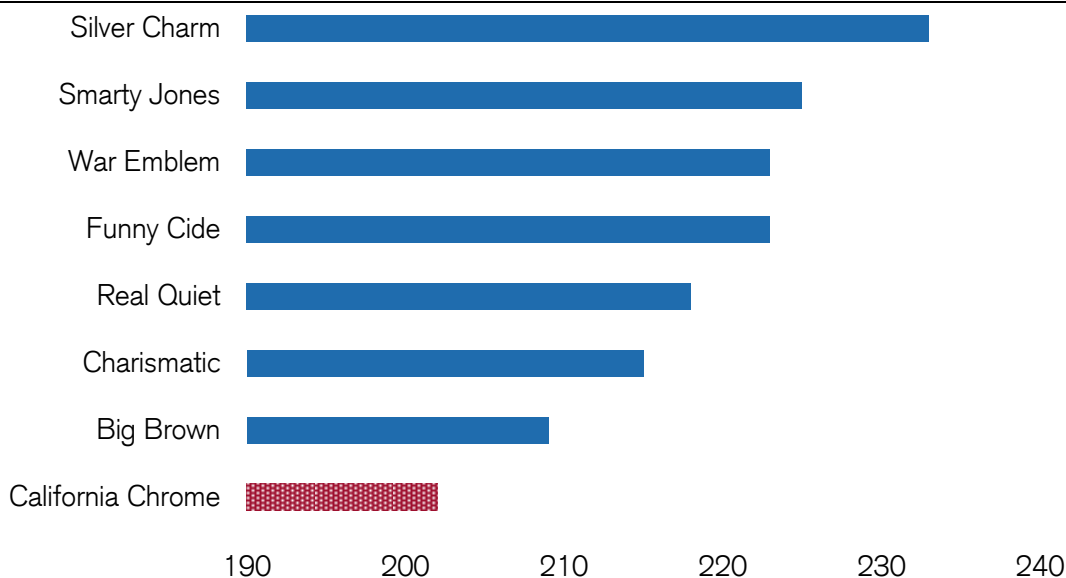
Source: Steven Crist; www.drf.com.

So we now have two fundamental indicators. We have a base rate of low success and a horse that is not particularly fast trying to achieve the feat. In this case, Mr. Market is much too optimistic and you should sell. Indeed, California Chrome finished in 4th place in the Belmont Stakes, disappointing more than 100,000 fans who came to see history made.

It turns out that overinflated odds are common with Triple Crown contenders. Exhibit 8 shows the same eight horses along with their implied probability of winning and their actual finish. Almost all of these horses were among the favorites, but their odds were consistently too optimistic.

Exhibit 8: Probability and Results for Last Eight Triple Crown Aspirants

	Probability		Finish
Silver Charm	50%		2nd
Real Quiet	56		2nd
Charismatic	38		3rd
War Emblem	45	//	8th
Funny Cide	50		3rd
Smarty Jones	71		2nd
Big Brown	77	*	Last
California Chrome	63		4th

*Source: Barry Bearak, "12 Contenders Who Just Missed Out on a Triple Crown," New York Times, June 6, 2014; belmontstakes.org; Credit Suisse.
Note: // = Not to scale (finished 19 ½ lengths behind winner); * = Eased.*

In this case, the contrarian streak would say "examine betting against the favorite" and the calculator would tell you that the odds overstate the probability of winning.

Horse racing is much simpler than investing because the expectations are explicit and the race reveals the winner. In the stock market, you have to reverse-engineer expectations from stock prices and the market is essentially perpetual. But the mindset remains the same.

To use another metaphor, expectations are where the bar is set for the high jumper, and fundamentals are how high the company can jump. Value investors seek expectations mismatches. Because Mr. Market is erratic in where he sets the bar, opportunities tend to come and go.

Perhaps the single most important question an investor can ask is: "What's priced in?" From there, the issue becomes whether a company's financial results will meet, exceed, or come up shy of what's in the price.

While there may be differences in practice, almost all value investors accept the idea that the value of a financial asset is the present value of future free cash flow. Bruce Greenwald, a professor of finance at Columbia Business School, has laid out a way to think about value that is useful and practical. You can also tie it back to some of the seminal work in valuation.

Here's the basic idea. You start your valuation process with a careful calculation of asset value. This is what the assets are actually worth, net of the appropriate liabilities. You can think of this as the bedrock of value. Most stocks trade at a price above this value.

Next is earnings power, which reflects the normalized earnings of the company capitalized by the cost of capital. This value assumes the level of current earnings, adjusted for unusual items, is sustainable.

The final piece, and the one that demands the most skepticism, is the value of growth, or more accurately, future value creation.[35] Exhibit 9 shows these three components of value.

Exhibit 9: The Components of Value

= Total Value

+ Value of Growth

+ Earnings Power Value

Asset Value
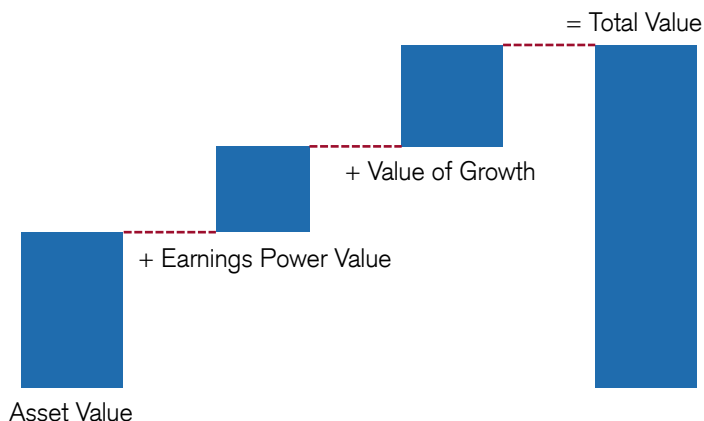
Source: Bruce C.N. Greenwald, Judd Kahn, Paul D. Sonkin, and Michael van Biema, Value Investing: From Graham to Buffett and Beyond *(New York: John Wiley & Sons, 2001), 35-43.*

If you read one of the foundational papers on valuation, that of Merton Miller and Franco Modigliani from 1961, you will see that they suggest the value of a firm is a steady-state value plus the present value of growth opportunities. Miller and Modigliani suggest that this approach "has a number of revealing features and deserves to be more widely used in discussions of valuation." This matches quite closely with the model that Greenwald has advocated for over the years.[36]

Conclusion

Here's a summary of this discussion. First, reading chapters 8 and 20 from *The Intelligent Investor*, as well as chapter 12 from Keynes's *General Theory*, can help shape the proper attitude an investor should have toward markets.

The other main points are as follows:

- To be an active investor, you must believe both Eugene Fama and Robert Shiller are correct, just not at the same time. You need inefficiency to get opportunities and efficiency for those opportunities to turn into returns.

- Mr. Market remains a very powerful metaphor for thinking about markets. Anthropomorphizing the market makes the story less abstract and more concrete.

- One way to animate Mr. Market is to understand the market as a complex adaptive system, or to apply the wisdom of crowds. What's key is that crowds are wise under some conditions and mad when any of those conditions are violated.

- Diversity breakdowns, which can happen for sociological as well as technical reasons, lead to extremes and hence opportunity.

- Remember the line from Seth Klarman: You are looking for cases where uniform belief has led to a mispricing of expectations and thus a way to make money. The Triple Crown contenders show this vividly.

The preceding is based on a presentation at the Columbia Student Investment Management Association Conference delivered on January 30, 2015.

Endnotes

[1] Quoted from an interview with one of Ben Graham's students, Marshall Weinberg, in the video "The Legacy of Ben Graham," produced by the Heilbrunn Center for Graham and Dodd Investing. See https://www.youtube.com/watch?v=m1WLoNEqkV4. Graham was quoting Spinoza's *Ethics*, published in 1677. The phrase, in Latin, is "sub specie aeternitatis" and is generally taken to mean "what is universally and eternally true."

[2] See http://www.businesswire.com/news/home/20111115006090/en/Warren-Buffett-Remarks-European-Debt-Crisis-%E2%80%9CBuffett#.VM-dOCyJLd4. Buffett said, "If you understand chapters 8 and 20 of *The Intelligent Investor* (Benjamin Graham, 1949) and chapter 12 of the *General Theory* (John Maynard Keynes, 1936), you don't need to read anything else and you can turn off your TV."

[3] Distinguishing between investors and speculators is tricky. In *Security Analysis*, Graham and Dodd suggested that, "An investment operation is one which, upon thorough analysis, promises safety of principal and a satisfactory return. Operations not meeting these requirements are speculative." See Benjamin Graham and David L. Dodd, *Security Analysis* (New York: McGraw-Hill, 1934). But as Jason Zweig, a journalist at the *Wall Street Journal* demonstrates, this definition is lacking. See http://blogs.wsj.com/totalreturn/2013/02/28/are-you-an-investor-or-a-speculator-part-one/ and http://blogs.wsj.com/totalreturn/2013/02/28/are-you-an-investor-or-a-speculator-part-two/.

[4] See http://edge.org/conversation/how-to-win-at-forecasting.

[5] Warren E. Buffett, "Letter to Shareholders," *Berkshire Hathaway Annual Report, 1987*. See www.berkshirehathaway.com/letters/1987.html.

[6] In an exchange with some investors, Jason Zweig, a journalist with the *Wall Street Journal*, wrote the following about this famous phrase: "I called Warren Buffett and asked him. He, who knows Graham's writings better than anyone else alive, was surprised when I walked him through the same two passages you cited. He had presumed, like many of us, that Graham had written these words. After a few minutes of thinking it through aloud, he realized that he might never have read the maxim after all, but rather that he had heard Graham say these words many times in class and around the office. Even if Graham never wrote them down in canonical form, he stated this view many times to those who were closest to him.

In its most commonly cited form, I think the short-run-voting-machine-long-run-weighing-machine apothegm comes from Buffett, not Graham. In one of the Berkshire Hathaway annual reports (1987? I don't remember which one, to be honest), Buffett attributes the maxim to Graham, in quotation marks. That's the closest to their original form that I believe anyone will find them in. The only other possibility is that one of Graham's students captured these words in some of the lecture notes that are preserved from Graham's value-investing classes from the early 1930s. I haven't read through them all to see if this saying can be found there. But I don't think it's likely. I regard Warren Buffett as an unimpeachable source in this case and, in my opinion, the case is closed: Graham said it, even if he never wrote it."
See http://www.bogleheads.org/forum/viewtopic.php?t=77840.

[7] Josef Lakonishok, Andrei Shleifer, and Robert Vishny, "Contrarian Investment, Extrapolation, and Risk," *Journal of Finance*, Vol. 49, No. 5, December 1994, 1541-1578; Chi F. Ling and Simon G. M. Koo, "On Value Premium, Part II: The Explanations," *Journal of Mathematical Finance,* Vol. 2, No. 1, February 2012, 66-74.

[8] Andrei Shleifer, *Inefficient Markets: An Introduction to Behavioral Finance* (Oxford, UK: Oxford University Press, 2000).

[9] Mark Rubinstein, "Rational Markets: Yes or No? The Affirmative Case," *Financial Analysts Journal*, Vol. 57, No. 3, May/June 2001, 15-29.

[10] Jens Carsten Jackwerth and Mark Rubinstein, "Recovering Probability Distributions from Option Prices," *Journal of Finance,* Vol. 51, No. 5*,* December 1996, 1611-1631*.* Astute (and probably older) readers will make some connections here. First, Rubinstein was a principal at a firm called Leland O'Brien Rubinstein Associates, Incorporated that provided portfolio insurance in the 1980s. Some have argued that portfolio

insurance exacerbated the crash of 1987. Second, Rubinstein documented how unlikely a crash would be under standard theory. And finally, Rubinstein took up the case for rational markets.

[11] Peter J. Tanous, *Investment Gurus: A Road Map to Wealth from the World's Best Money Managers* (New York: New York Institute of Finance, 1997), 174.

[12] Steven A. Ross, "Neoclassical Finance, Alternative Finance, and the Closed End Fund Puzzle," *European Financial Management*, Vol. 8, No. 2, June 2002, 129-137.

[13] Andrei Shleifer and Robert W. Vishny, "The Limits to Arbitrage," *Journal of Finance*, Vol. 52, No. 1, March 1997, 35-55.

[14] Jack L. Treynor, "Market Efficiency and the Bean Jar Experiment," *Financial Analysts Journal*, Vol. 43, No. 3, May/June 1987, 50-53.

[15] Donald MacKenzie, *An Engine, Not a Camera: How Financial Models Shape Markets* (Cambridge, MA: MIT Press, 2006), 211-242.

[16] Donald MacKenzie, "Models of Markets: Finance Theory and the Historical Sociology of Arbitrage," *Revue d'histoire des Sciences*, Vol. 57, No. 2, 2004, 407-431.

[17] James Surowiecki, *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies, and Nations* (New York: Doubleday, 2004).

[18] John H. Miller and Scott E. Page, *Complex Adaptive Systems: An Introduction to Computational Models of Social Life* (Princeton, NJ: Princeton University Press, 2007).

[19] Scott E. Page, *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies* (Princeton, NJ: Princeton University Press, 2007), 208.

[20] Marshall K. Gramm and Douglas H. Owens, "Efficiency in Parimutuel Betting Markets Across Wagering Pools in the Simulcast Era," *Southern Economic Journal*, Vol. 72, No.4, April 2006, 926-937.

[21] "The Legacy of Ben Graham" at https://www.youtube.com/watch?v=m1WLoNEqkV4.

[22] Solomon E. Asch, "Opinions and Social Pressure," *Scientific American*, Vol. 193. No. 5, November 1955, 31-35.

[23] Here's a side story for endnote readers. Asch ran some of these experiments when he was a professor at Swarthmore College, and recruited students from nearby Haverford College to participate as well. One of those students was Jack Treynor, who was studying mathematics. Treynor recalls having no problem remaining independent.

[24] S.E. Asch, "Effects of Group Pressure Upon the Modification and Distortion of Judgments," in Harold Guetzkow (ed.), *Groups, Leadership and Men* (Pittsburgh, PA: Carnegie Press, 1951), 177-190.

[25] John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (New York: Harcourt, Brace and Company, 1936).

[26] Gregory S. Berns, Jonathan Chappelow, Caroline F. Zink, Giuseppe Pagnoni, Megan E. Martin-Skurski, and Jim Richards, "Neurobiological Correlates of Social Conformity and Independence During Mental Rotation," *Biological Psychiatry*, Vol. 58, No. 3, August 2005, 245-253.

[27] Sandra Blakeslee, "What Other People Say May Change What You See," *New York Times*, June 28, 2005.

[28] See https://www.youtube.com/watch?v=eAXVa__XWZ8.

[29] Steven H. Strogatz, Daniel M. Abrams, Allan McRobie, Bruno Eckhardt, and Edward Ott, "Theoretical Mechanics: Crowd Synchrony on the Millennium Bridge," *Nature*, Vol. 438, November 3, 2005.

[30] For example, see Momtchil Pojarliev, CFA, and Richard M. Levich, "Detecting Crowded Trades in Currency Funds," *Financial Analysts Journal*, Vol. 67, No. 1, January/February 2011, 26-39.

[31] Blake LeBaron, "Financial Market Efficiency in a Coevolutionary Environment," *Proceedings of the Workshop on Simulation of Social Agents: Architectures and Institutions, Argonne National Laboratory and University of Chicago*, October 2000, Argonne 2001, 33-51.

[32] From Seth Klarman's speech at Columbia Business School on October 2, 2008. Reproduced in *Outstanding Investor Digest*, Vol. 22, Nos. 1 & 2, March 17, 2009, 3.

[33] Warren E. Buffett, "Buy American. I Am." *New York Times,* October 16, 2008.

[34] This analysis comes from Steven Crist, who wrote about Triple Crown contenders in his blog, *Cristblog with Steve Crist*. His first entry was "Triple Crown Bids" (May 19, 2008) and the second, "Triple Crown Figs," (May 21, 2008). We updated the results to include Big Brown and California Chrome. Crist contributed a chapter to the book, "Bet with the Best," that may be worthy of the three chapters mentioned by Buffett. It's called "Crist on Value," and very clearly spells out the distinction between price and value.

[35] Bruce C.N. Greenwald, Judd Kahn, Paul D. Sonkin, and Michael van Biema, *Value Investing: From Graham to Buffett and Beyond* (New York: John Wiley & Sons, 2001), 35-43.

[36] Merton H. Miller and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business*, Vol. 34, No. 4, October 1961, 411-433.

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