

Understanding Skill

A Paradox Plus Qualitative and Quantitative Approaches

July 22, 2015

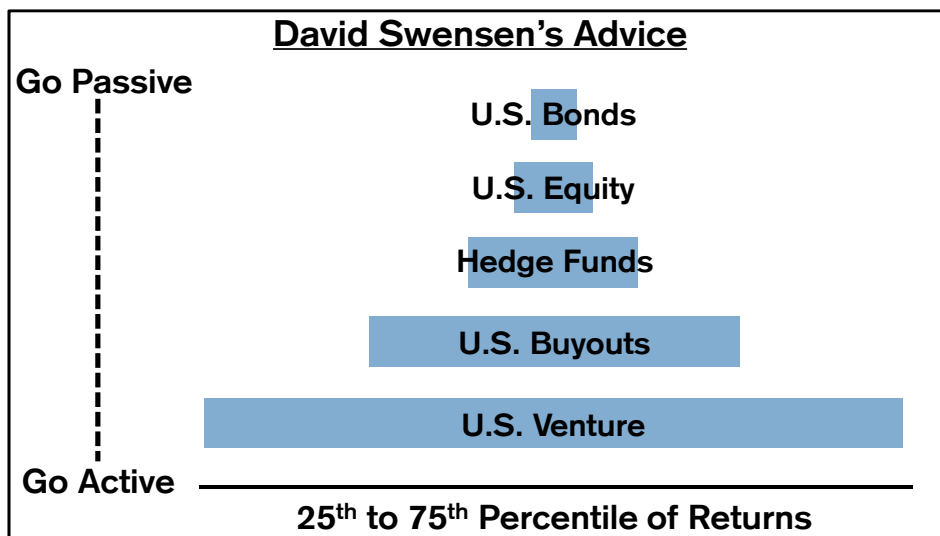
Authors

Michael J. Mauboussin

michael.mauboussin@credit-suisse.com

Dan Callahan, CFA

daniel.callahan@credit-suisse.com



Source: Based on Andy Rachleff, "You Can't Get Access to the Best Alternative Assets," Wealthfront, February 5, 2015; Cambridge Associates.

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- The challenge in finding differential skill among active managers reflects a surfeit, not a dearth, of skill. Skillful managers offset one another, leaving more to luck. This is the major lesson of the paradox of skill. And it applies well beyond the world of investing.
- The key to making money is not just proficiency, but also finding games where you can be the best player. In investing, it's giving a great deal of thought as to why you are on the correct side of the trade. As Napoleon was reported to say, "Ability is nothing without opportunity."
- A useful statistic is persistent, which means it indicates skill, and predictive of the outcomes you are trying to achieve. We are awash in statistics, and we know that they are not created equally. Run that little test by the statistics you see. Active share appears to be potentially interesting as a measure, but we should continue our search.

Good morning. It's a real pleasure for me to join you today, as these roundtable sessions always prompt me to organize my thoughts on an important and topical theme. This morning's topic—understanding skill—is near and dear to my heart since I wrote a book about skill and luck!¹ But it's also a trickier topic than most people think, and it has some counterintuitive aspects.

I will break my comments into three parts:

- First, I want to discuss what I call the “paradox of skill.” When we think of investing, most of us think there's a dearth of skill. But, in fact, the problem is the exact opposite: there is too much skill.
- Second, I'll discuss some qualitative ways to think about where excess returns may come from. These are broader ideas but may still be a useful way to frame investment decisions.
- Finally, I'll touch on some more quantitative ways to think about identifying skill. Well, I'll try to lay out a framework for doing so and then apply an idea or two to the framework.

I. Let me start at the top and discuss what I call the paradox of skill. Now, I want to be clear that it's not my idea, but I did give it that name. The paradox of skill says that in many activities where both skill and luck contribute to outcomes, it's often the case that as skill increases, luck becomes more important in shaping results. More skill leads to more luck? That doesn't make sense on the surface.

I learned about this idea from the famous Harvard biologist, Stephen Jay Gould, who liked to write about evolutionary theory and baseball. One of my favorite pieces is about Ted Williams, the last player in Major League Baseball to hit over .400 for a full season—he hit .406 in the 1941 season. Gould wrote about Williams in his book, *Full House: The Spread of Excellence from Plato to Darwin*.² Gould asked why no player has been able to replicate this feat. A few have come close, including Tony Gwynn, who hit .394 in 1994, and George Brett, who hit .390 in 1980.³

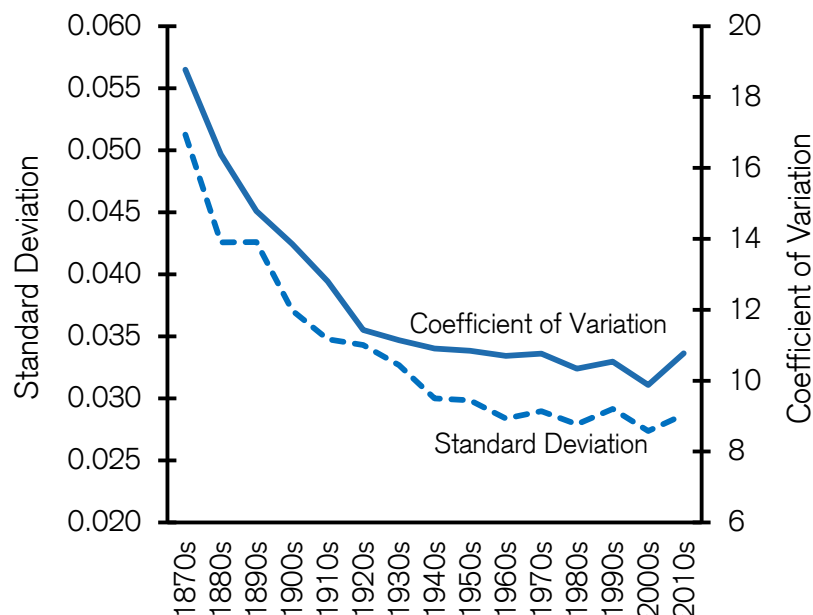
To understand the answer, you have to think about two dimensions of skill: absolute and relative.⁴ Let's start with absolute skill. I think it'd be fair to say that in baseball, as in other professional sports, the level of absolute skill has never been higher. You can attribute that to larger populations who can participate—most professional leagues are truly international—as well as better training, better coaching, and better nutrition. Put a contemporary ballplayer in the past and he'd clean up. This is also true for business and investing.

The problem is that this absolute improvement is obscured by the fact that there are interactions. Pitchers and hitters get better roughly in lockstep. It's an arms war—and that pun is intended. And if one side gets too far ahead, the powers that be at Major League Baseball change the rules to level the playing field. So, even as the averages look about the same from year to year, the underlying skill to achieve those averages is markedly higher today than it was in the past.

The second dimension of skill is the crucial one, and that's relative skill. Perhaps you can imagine the skill of players falling along a bell-shaped distribution. The point is that the bell is getting skinnier in a lot of domains, which means that the difference between the very best and the average participant is less today than it was a generation or two before. A fancier way of saying this is that the standard deviation of skill has declined over time. If you accept that a player's batting average combines both skill and luck, as the standard deviation of skill shrinks, the standard deviation of batting average should follow—even if you assume the distribution of luck stays the same.

That is indeed what we have witnessed. The standard deviation of batting average was .0326 in the 1940s and .0274 in the first decade of this century (see Exhibit 1). Saying this differently, Ted Williams was a four standard deviation event in 1941. To be a four standard deviation event in 2011—exactly 70 years later—a player would have to hit 0.380. Now 0.380 is obviously awesome, and would easily win the batting crown (Jose Altuve won it in 2014 hitting .341). But it doesn't get you over the magic .400 level. And I should add this is not limited to batting average. It applies to other relevant statistics, such as earned run average for pitchers.⁵

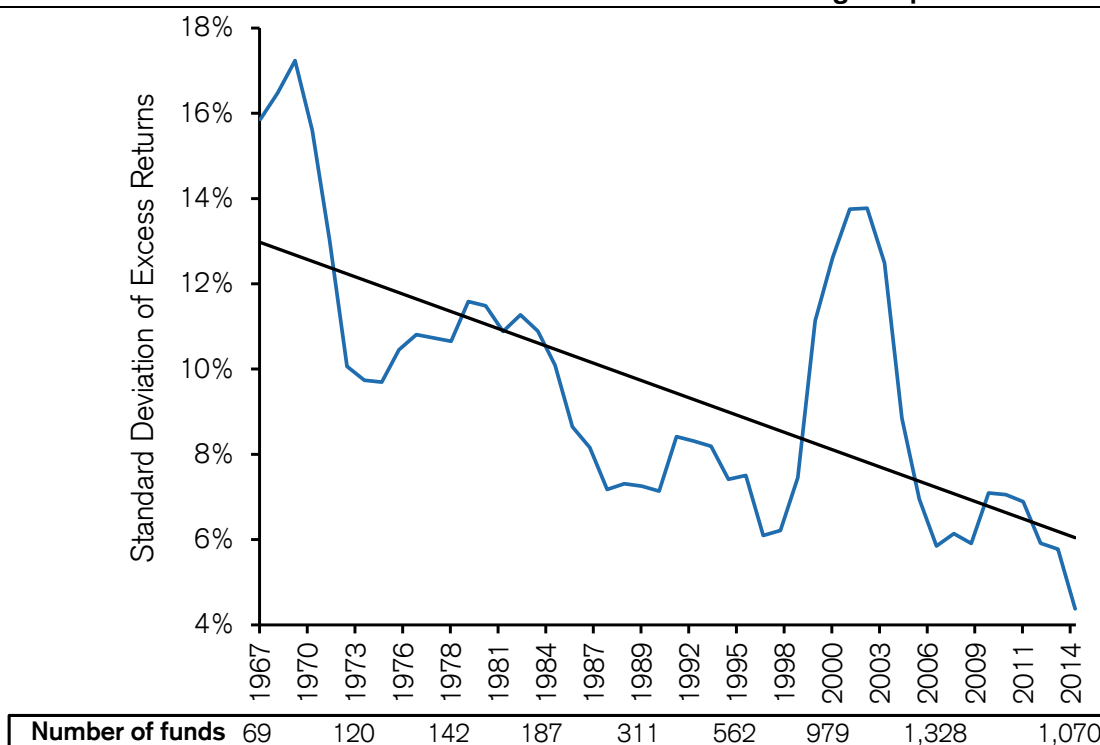
Exhibit 1: Decline in Standard Deviation of Batting Average



Source: Michael J. Mauboussin, *The Success Equation: Untangling Skill and Luck in Business, Sports, and Investing* (Boston, MA: Harvard Business Review Press, 2012), 55; Credit Suisse.

Hopefully, it's not too hard to see the relevance in investing. Certainly, skill has never been higher. Investors today have access to vast quantities of information and powerful computers, and are better trained than ever before. An investor today, put back into the 1960s with today's tools at his or her disposal, could run circles around the competition. But, of course, that skill is obscured by the fact that every investor competes with the market, which embeds information from lots of investors.

The relative skill of investors has declined over the decades. One way we can measure that is through the standard deviation of excess returns. Imagine, again, a bell-shaped distribution. The standard deviation for active mutual funds was about 12 percent in the 1960s and just 3.6 percent last year. The trend, after a brief spike around the dot-com era, has been steadily down. Just as in baseball, the difference between the best and the average has dwindled over time (see Exhibit 2).

Exhibit 2: Decline in Standard Deviation of Excess Returns for U.S. Large Capitalization Funds

Source: Markov Processes International, Morningstar, and Credit Suisse.

Note: Chart shows a five-year rolling average.

Now, the standard deviation of excess returns is an important concept because it defines the amount of available excess return, or alpha. For some market participants to generate excess returns, other investors have to lose an equivalent amount because the sum of positive and negative excess returns must be zero. A low standard deviation says that there are not a lot of winners or losers. So, picking winners is hard.

Let me emphasize that the problem in investing is not a lack of skill, it is the exact opposite: there's too much skill. But the discussion also places the emphasis—properly—on the distribution of skill. And that has gotten narrower virtually everywhere we look.

II. Let me now turn to the second issue I'd like to address, and that's some qualitative ways to think about where you might get excess returns.

Jim Rutt is the former CEO of Network Solutions—which was sold in March 2000 right at the peak of the NASDAQ—and preceded me as chairman of the board at the Santa Fe Institute. He told a great story.

When he was young, he played a lot of poker. Now this was before the recent poker craze, so it was much less mainstream. Jim honed his skills by day, learning the probabilities for various hands and studying common poker tells. Then he found games at night. He said he became pretty good and started playing with better competition. He won some and lost some, but on balance he made money.

At that point, an uncle pulled him aside and offered some advice: "Jim, I wouldn't spend my time getting better; I'd spend my time finding weaker games." In other words, instead of finding players who are as skilled as you are, you want to find players who are not as good as you are and who are rich. That way, you have a better chance of walking out of the room each night with cash stuffed in your pockets.

Let me see if I can make this lesson more relevant for investing. One way to do this is to consider the “fundamental law of active management,” described by Richard Grinold more than 25 years ago.⁶ The fancy version says that the information ratio equals the information coefficient times the square root of breadth.

In plain language, it says that excess returns equal skill times opportunity. So, to make money, in poker or investing, you need skill but you also need opportunity. And that was what Jim’s uncle taught him: Sometimes the key to making money is not getting smarter. It’s finding games where you’re the smartest player. Speaking of poker, Warren Buffett has a great saying: “If you’ve been in the game 30 minutes and you don’t know who the patsy is, *you’re* the patsy.”⁷

So how do you find games where you have an edge in relative skill? It’s a complex answer, but let me focus on three areas in public markets:

- **Institutions versus individuals.**⁸ This is similar to a professional poker player competing with an amateur. Research shows that institutions tend to come out on top in these situations. Let me give you a couple of examples. Institutions tend to fare better than individuals in initial public offerings. In other words, the institutions are better at discerning which deals are fluffy. Institutions are often more sophisticated and hence make fewer mistakes than mom and pop investors. One study of the Taiwanese market showed that institutions had positive alpha and individuals had negative alpha over the same period. So, in effect, the institutions were winning at the expense of individuals.
- **Taking advantage of people who need to buy or sell for non-fundamental reasons.**⁹ A classic and persistent example of this is spin-offs. Spin-offs are often small and debt-laden businesses that large mutual funds have no interest in owning. So, they basically jettison them indiscriminately. This creates an opportunity for excess returns for those willing to scoop them up. Another example is the unwinding of the leverage cycle, where holders have to sell assets to meet margin requirements. Again, they don’t have the luxury to be price sensitive, creating opportunity.
- **Diversity breakdowns.**¹⁰ Markets tend to be efficient in a classic sense when certain conditions prevail, including diversity of the investor base. When investors correlate their behavior, we can see big moves up or down and a resulting departure between fundamentals and expectations. Any time you hear concern about a “crowded trade,” you are hearing about a potential diversity breakdown. Obviously, the dot-com boom is an extraordinary example.

But 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.

If you observe the behavior of investors—institutions as well as individuals—they tend to want to do today what they should have done two years ago. The key is to keep your eyes on the future and to think about where inefficiencies may exist.

David Swensen, the chief investment officer of Yale University’s endowment, uses the dispersion of active managers as a proxy for market efficiency. He measures the dispersion by examining the difference between the first and third quartile results in various asset classes (see report cover). The idea is to index where the opportunities are modest and to seek skill where they are abundant.¹¹

He told his students, “You want to spend your time and energy pursuing the most inefficiently priced asset classes because there’s an enormous reward for identifying the top quartile venture capitalist and almost no reward for being the top quartile of the high-quality bond universe.”¹²

Now, one area that is of interest to me that is getting some more attention is whether the rise in passive investing is itself creating opportunity for active managers.¹³ We do know, for example, that the trading characteristics for stocks change after they have been added to an index such as the S&P 500. But it remains to be seen whether indexing itself becomes a source of edge for active managers.

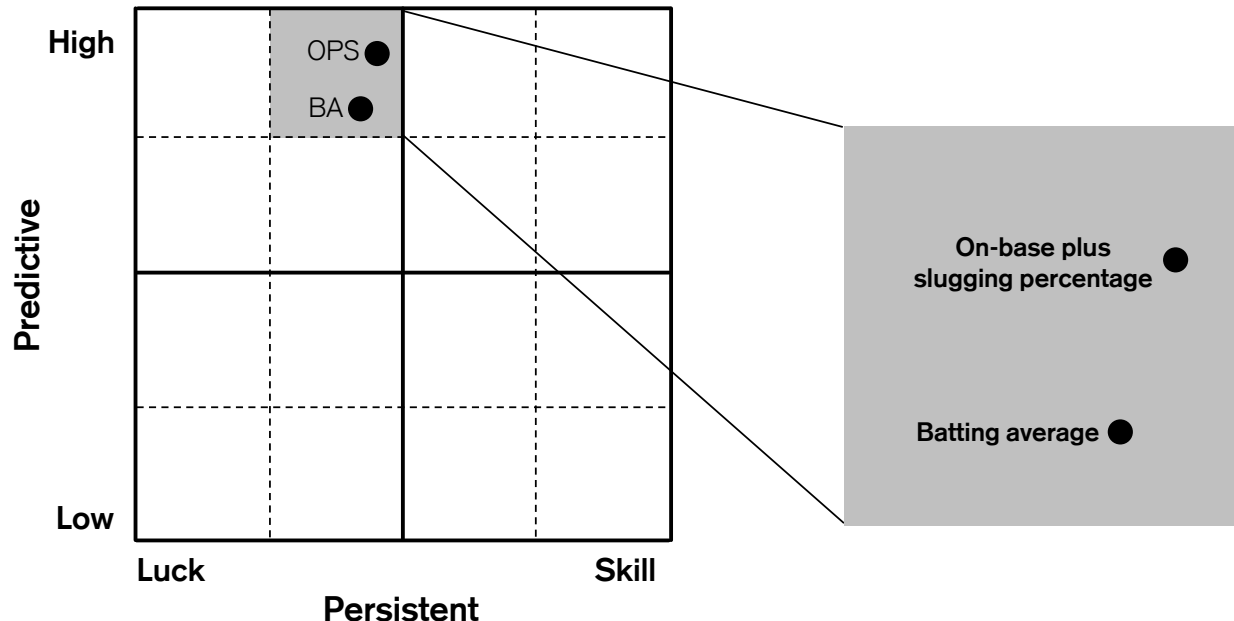
III. Let me now wrap up with a more quantitative approach to thinking about skill. Whether it's sports, business, or investing, we'd all like to come up with statistics that are indicative of a good process and hence give us a good chance of achieving attractive outcomes over time.

What makes for a useful statistic?¹⁴ Well, you generally want two characteristics. The first is that it is persistent—or what statisticians call “reliable.” That means the outcome correlates highly with itself over time. High persistence is generally indicative of skill.

The second characteristic is that it is predictive. In other words, it correlates highly with what you are trying to achieve. Statisticians call this “validity.” So, you want a statistic that is persistent and predictive.

Let me go back to the world of baseball for a moment to make this point more concrete. One of the statistics featured in Michael Lewis's book, *Moneyball*, was on-base plus slugging (OPS) percentage.¹⁵ The Oakland A's thought that was a better statistic than batting average. Well, let's run it through our test. First, it turns out that OPS is more persistent than batting average. Second, it also has a higher correlation with run production. So it is a better statistic—and, of course, the A's thought it was undervalued in the market.¹⁶

Exhibit 3: OPS Is a Better Statistic Than Batting Average



Source: Michael J. Mauboussin, *The Success Equation: Untangling Skill and Luck in Business, Sports, and Investing* (Boston, MA: Harvard Business Review Press, 2012), 141; *Baseball Prospectus*.

Unfortunately, we have no similar measures in the investing world that are super clean. There is one I'll mention because it has made a bit of a splash in recent years, although it remains controversial. And that is active share.¹⁷

I suspect most of you have heard of active share, but let me offer a brief definition so that we're all on the same page. Active share is the percentage of a fund's portfolio that is different from the fund's benchmark index. So, a fund with a zero active share is an index fund, and a fund with an active share of 100 percent is completely different than its benchmark. To give you some sense of the measure, Fidelity's Magellan Fund has an active share in the range of 60-65 percent. A fund can have a high active share by owning the stocks within the index but weighting them very differently, or by owning stocks that are not in the index at all.

Researchers have suggested that a combination of high active share and low tracking error, or low portfolio turnover, has led to excess returns.¹⁸ Active share itself is persistent—this comes as no surprise, as it is largely within the portfolio manager's control. And portfolios with these characteristics have generated excess returns, on average.

Let me make a couple quick final points on active share. The first is that active share has been in steady decline in the last 35 years. Active share in 1980 was around 80 percent, and it's down to about 55 percent today. That, of course, excludes index funds and exchange-traded funds. So, more of the market today is hugging the benchmark than in the past.

Second, active share is a nice way to think about fees. Say you are examining a mutual fund with an active share of 50 percent and total expenses of 125 basis points per year. If you work out the math, that fund has to generate excess returns in its active component of about 250 basis points in order to get to alpha of zero (see Exhibit 4). That's a difficult task, even for a skilled manager.

Exhibit 4: Closet Indexers Need Large Returns on Their Active Investments To Break Even

	<u>Percentage of Portfolio</u>	<u>Excess Return</u>	<u>Weighted Return</u>
Passive	50%	0.00%	0.00%
Active	<u>50%</u>	2.50%	<u>1.25%</u>
	100%		
Gross return			1.25%
Less expenses			<u>-1.25%</u>
Net return			= 0%

Source: Credit Suisse.

On the topic of fees, I'll also mention that there is no simple relationship between fees and results. In fact, we find the correlation between annual net expense ratio and excess returns to be close to zero.

So what do you do about all of this? Let me offer three takeaways:

- Recognize that the challenge in finding differential skill among active managers reflects a surfeit, not a dearth, of skill. This is the major lesson of the paradox of skill. And it applies well beyond the world of investing.
- Remember the story about Jim Rutt: the key to making money is not just proficiency, but finding easy games. In investing, it's giving a great deal of thought as to why you are—or think you can hire—the smartest person at the poker table. As Napoleon was reported to say, "Ability is nothing without opportunity."¹⁹

- A good statistic is one that is persistent and predictive. We are awash in statistics, and we know that they are not created equally. Run that little test by the statistics you see. Active share appears to be potentially interesting as a measure, but we should continue our search.

Thank you very much.

Endnotes:

¹ Michael J. Mauboussin, *The Success Equation: Untangling Skill and Luck in Business, Sports, and Investing* (Boston, MA: Harvard Business Review Press, 2012).

² Stephen Jay Gould, *Full House: The Spread of Excellence from Plato to Darwin* (New York: Three Rivers Press, 1996), 98-121.

³ See http://www.baseball-reference.com/leaders/batting_avg_top_ten.shtml.

⁴ Phil Rosenzweig, *The Halo Effect . . . and the Eight Other Business Delusions That Deceive Managers* (New York: Free Press, 2007), 111-121.

⁵ Wilbert M. Leonard II, "The Decline of the .400 Hitter: An Explanation and a Test," *Journal of Sport Behavior*, Vol. 18, No. 3, September 1995, 226-236.

⁶ Richard C. Grinold, "The Fundamental Law of Active Management," *Journal of Portfolio Management*, Vol. 15, No. 3, Spring 1989, 30-37; Richard C. Grinold and Ronald N. Kahn, *Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk, Second Edition* (New York: McGraw Hill, 2000), 147-169; Roger Clarke, Harindra de Silva, and Steven Thorley, "The Fundamental Law of Active Portfolio Management," *Journal of Investment Management*, Vol. 4, No. 3, Third Quarter 2006, 54-72.

⁷ A person who is easy to take advantage of is called a "patsy." Quote is from Warren E. Buffett, "Letter to Shareholders," *1987 Berkshire Hathaway Annual Report*.

⁸ Laura Casares Field and Michelle Lowry, "Institutional versus Individual Investment in IPOs: The Importance of Firm Fundamentals," *Journal of Financial and Quantitative Analysis*, Vol. 44, No. 3, June 2009, 489-516. Also, Randolph B. Cohen, Paul A. Gompers, and Tuomo Vuolteenaho, "Who underreacts to cash-flow news? Evidence from trading between individuals and institutions," *Journal of Financial Economics*, Vol. 66, No. 2-3, November-December 2002, 409-462. Also, Brad M. Barber, Yi-Tsung Lee, Yu-Jane Liu, and Terrance Odean, "Just How Much Do Individual Investors Lose by Trading?" *Review of Financial Studies*, Vol. 22, No. 2, February 2009, 609-632. For a current example, see Rob Copeland, "Hedge Funds Gear Up for Another Big Short," *Wall Street Journal*, July 22, 2015.

⁹ Chris Veld and Yulia V. Veld-Merkoulova, "Value creation through spin-offs: A review of the empirical evidence," *International Journal of Management Reviews*, Vol. 11, No. 4, December 2009, 407-420. For a popular account, see Joel Greenblatt, *You Can Be a Stock Market Genius: Uncovering the Secret Hiding Places of Stock Market Profits* (New York: Simon & Schuster, 1997). Also, Keith C. Brown and Bryce A. Brooke, "Institutional Demand and Security Price Pressure: The Case of Corporate Spinoffs," *Financial Analysts Journal*, Vol. 49, No. 5, September/October 1993, 53-62. Also, Jeffrey S. Abarbanell, Brian J. Bushee, and Jana Smith Raedy, "Institutional Investor Preferences and Price Pressure: The Case of Corporate Spin-offs," *Journal of Business*, Vol. 76, No. 2, April 2003, 233-261. Also, John Geanakoplos, "The Leverage Cycle," *Cowles Foundation Discussion Paper No. 1715R*, January 2010. Also, Joseph Chen, Samuel Hanson, Harrison Hong, and Jeremy C. Stein, "Do Hedge Funds Profit from Mutual-Fund Distress?" *NBER Working Paper 13786*, February 2008.

¹⁰ 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). Also, Michael J. Mauboussin, "Revisiting Market Efficiency: The Stock Market as a Complex Adaptive System," *Journal of Applied Corporate Finance*, Vol. 14, No. 4, Winter 2002, 8-16. Also, Michael J. Mauboussin, *Think Twice: Harnessing the Power of Counterintuition* (Boston, MA: Harvard Business Press, 2009), 101-118.

¹¹ Michael J. Mauboussin and Dan Callahan, "Min(d)ing the Opportunity: Excess Returns Require the Chance to Apply Skill," *Credit Suisse Global Financial Strategies*, March 17, 2015.

¹² David Swensen, "Guest Lecture for ECON-252-08: Financial Markets," *Yale University*, February 13, 2008.

¹³ Russ Wermers and Tong Yao, "Active vs. Passive Investing and the Efficiency of Individual Stock Prices," *Working Paper*, February 2010; Rodney N. Sullivan and James X. Xiong, "How Index Trading Increases Market Vulnerability," *Financial Analysts Journal*, Vol. 68, No. 2, March/April 2012, 70-84; and Jeffrey Wurgler, "On the Economic Consequences of Index-Linked Investing," in *Challenges to Business in the*

Twenty-First Century: The Way Forward, Gerald Rosenfeld, Jay W. Lorsch, and Rakesh Khurana, eds. (Cambridge, Mass: American Academy of Arts and Sciences, 2011).

¹⁴ Michael J. Mauboussin, "The True Measures of Success," *Harvard Business Review*, October 2012, 46-56.

¹⁵ Michael Lewis, *Moneyball: The Art of Winning an Unfair Game* (New York: W.W. Norton & Company, 2003), 127-128. On-base plus slugging percentage equals on-base percentage plus slugging percentage. On-base percentage equals hits + bases on balls (walks) + hit by pitch divided by at-bats + bases on balls + hit by pitch + sacrifice flies. Slugging percentage equals total bases divided by at-bats.

¹⁶ Ben S. Baumer, "Why On-Base Percentage is a Better Indicator of Future Performance than Batting Average: An Algebraic Proof," *Journal of Quantitative Analysis in Sports*, Vol. 4, No. 2, April 2008, 1-13.

¹⁷ K. J. Martijn Cremers and Antti Petajisto, "How Active is Your Fund Manager? A New Measure That Predicts Performance," *Review of Financial Studies*, Vol. 22, No. 9, September 2009, 3329-3365. Also, Antti Petajisto, "Active Share and Mutual Fund Performance," *Financial Analysts Journal*, Vol. 69, No. 4, July/August 2013, 73-93. For controversy, see Andrea Frazzini, Jacques Friedman, Lukasz Pomorski, "Deactivating Active Share," *AQR White Paper*, April 10, 2015. For a response, see Antti Petajisto, "Response to AQR's Article Titled 'Deactivating Active Share,'" June 18, 2015.

¹⁸ Martijn Cremers and Ankur Pareek, "Patient Capital Outperformance: The Investment Skill of High Active Share Managers Who Trade Infrequently," *SSRN Working Paper*, September 19, 2014.

¹⁹ We could not find an original source. The quotation has also appeared on the paper label of Salada tea bags.

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