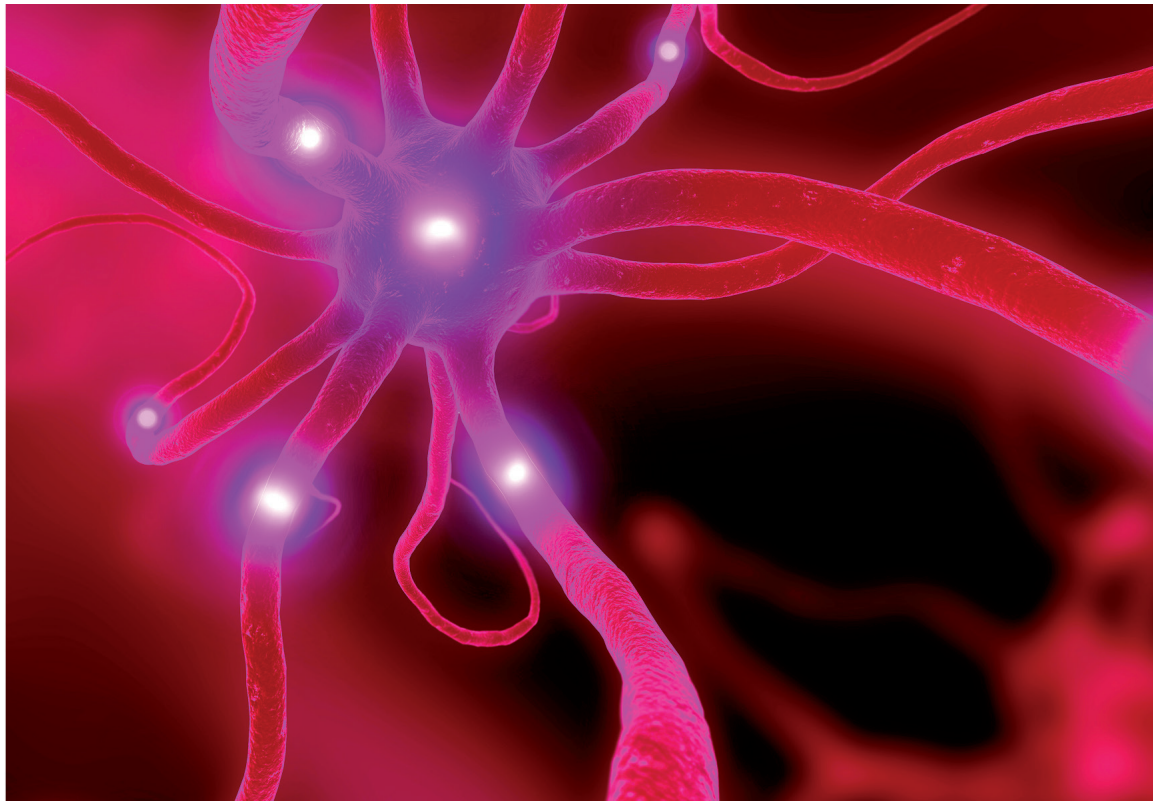


An analytics approach to debiasing asset- management decisions

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An analytics approach to debiasing asset-management decisions

Asset managers can find a competitive edge in debiasing techniques—accelerated with advanced analytics.

Investment managers are pursuing analytics-aided improvements in many different areas of the business, from customer and asset acquisition to operations and overhead costs. The change area we focus on in this discussion is investment performance improvement, specifically the debiasing of investment decisions. With the help of more advanced analytics than they are already using, funds have been able to measure the role played by bias in suboptimal trading decisions, connecting particular biases to particular decisions. Such discoveries provide the necessary foundation for effective countermeasures—the debiasing methods that can bring significant performance improvements to a pressured industry.

Business leaders are increasingly recognizing the risk of bias in business decision making. Insights from the fields of behavioral economics and cognitive psychology continually emerge to reveal that individuals and institutions do not base financial and other decisions on purely rational considerations. The contours of the irrational biases have become increasingly known, and the ways bias operates in our thought processes can often be predicted. Most important of all, the methods and means to counteract biases are becoming more sophisticated and effective, at least for those executives willing to inquire into their debiasing needs.

Advances in the use of debiasing techniques to improve decision making have been inspired by the research of many pioneering scholars. Their innovations have had numerous practical confirmations in the public sector and business settings as well as in the decisions of individuals. As if in recognition of the deepening relevance of debiasing in economic life, the Nobel Prize in Economic Sciences was awarded this year to

Richard H. Thaler, one of the leaders in this field (see sidebar, “The debiasing nudge”).

Asset management: An industry facing challenges

Investment managers are facing significant challenges to profitability. Demonstrating the value of active management has become more difficult in a market where returns are narrowing. Dissatisfaction with active performance is causing customers to migrate toward cheaper passive funds (Exhibit 1). Actions active funds are taking in response include reducing fees, which has created a competitive cycle that is compressing margins. Some funds (such as Allianz Global Investors and Fidelity) are changing their fee and pricing structures to make them more dependent on outperformance through the use of fulcrum-type fee structures in their funds.

To push back on these trends, some investment managers are broaching the topic of bias in investment decisions. They are seeking a competitive edge and—perhaps more important—to improve the value proposition of active management. Evidence from within and outside the industry strongly suggests that even the leading asset managers in top-performing funds could improve their investment performance by applying debiasing techniques. Our recent experience working with investment managers has shown that enhancing these techniques with analytics can improve performance significantly.

Bias and debiasing in action

Bias is a risk in all business decision making—the more significant the decision, the greater the risk. Particular biases have been behind many costly missteps by companies and institutions in every sector. Consequently, behavioral scientists and business leaders have developed methods for

The debiasing nudge

In October 2017, the Nobel Committee awarded its prize in Economic Sciences to Richard H. Thaler of the University of Chicago, who has thought deeply about rational and irrational behaviors in economic decision making. He and his colleagues in the field of behavioral economics—including Dan Ariely, Amos Tversky, and Daniel Kahneman (a previous Nobel winner)—analyze the psychological dimension of economics, partly leaning on insights from the field of cognitive psychology. Their research reveals patterns that did not align with the rational assumptions embedded in prevailing descriptions of economic systems and individual financial actions. They found that especially under conditions of risk and uncertainty, individuals as well as institutions fail to behave as might be expected when making financial decisions. Assumed universal principles, such as actual self-interest and a sure grasp of dynamic inputs including time and probability, often give way to irrational and unpredictable actions, based on narrow or flawed data and personal experiences.

In their book, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (2008), Thaler and coauthor Cass Sunstein reveal ways that rational

decision making is undermined by biases. Among the biases the authors analyzed are the stability biases to which investment decision making is highly susceptible: *anchoring*, for example—the tying of actions to an initial value and failure to adjust to take into account new information. *Loss aversion* is another such bias—the familiar fear that makes us more risk averse than logic would allow. Where human decision making is more prone to bias than to reasonable deliberation, Thaler and Sunstein recommend the debiasing “nudge”—a benign, often small adjustment that counters irrational impulses. The authors discuss many examples of successful nudges; reviews of *Nudge* most often cited the opt-in default for employee retirement savings plans. In this example, many more employees will save for retirement when they are automatically enrolled in a plan. That is, the nudge of requiring employees to save unless they opt out of the plan gets better results than an approach that requires them to opt in. Everyone recognizes the need to save for retirement, but not everyone acts on it. The opt-in nudge is in fact a form of debiasing for those irrationally ignoring their own future financial well-being.

debiasing decision making. Many of the companies that have adopted these methods can attest to their effectiveness in improving outcomes:

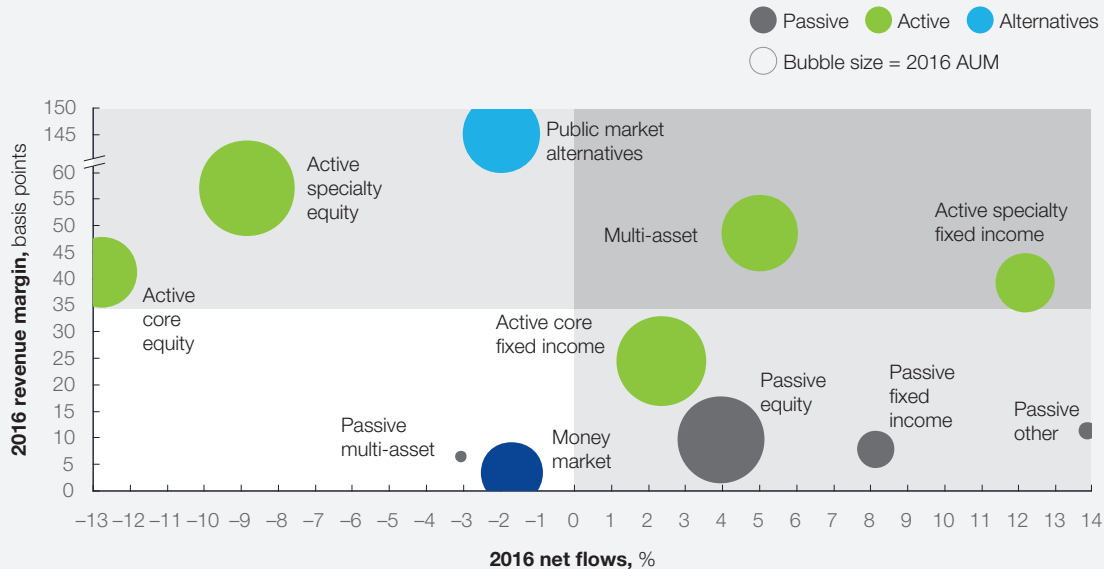
- *McKinsey cross-sector research* has suggested that one of the most prevalent irrational biases, the form of stability bias known as anchoring, undermines optimal capital reallocation. The research compared capital allocation and total shareholder returns over a 20-year period (1990 to 2010) at more than 1,500 publicly traded companies in the United States. The

top performers were those that least anchored their capital-allocation decisions to decisions made the previous year. “Dynamic reallocators” achieved a median return that was nearly four percentage points higher than that of “Dormant reallocators.”

- *An executive at the German electric utility* RWE recently discussed his experience leading a debiasing effort.¹ Like most of its peers, the company had until recently based capital-investment decisions on ever-rising commodity

Exhibit 1 Customers are migrating to passive equity funds, which have lower margins.

North America net flow growth and revenue margin by asset class¹



¹ Active core equity includes US large cap and yield/income equity; active core fixed income includes core, core plus, and municipal bonds; active specialty equity includes foreign, global, EM and US small/mid-cap; active specialty fixed income includes global, EM, high yield, TIPS, and unconstrained.

Source: 2016 McKinsey Performance Lens Global Asset Management Survey and Global Growth Cube

and power prices. RWE leaders realized that debiasing efforts could have challenged their earlier assumptions, enabling them to hedge potential adverse effects. For future decisions, they implemented a farsighted cultural change program to identify and counter cognitive biases throughout the organization. Care was taken to ensure that dissenting and outside analyses were fully articulated. For important moves, a “devil’s advocate” was appointed; for the company’s most pressing strategic problem, separate internal and external teams—a “red team–blue team” approach—were assigned to develop solutions independently of each other. (The devil’s advocate and the red team–blue team approach are defined, along with other debiasing techniques, toward the end of this article.)

- *A global investment bank* reviewed its traders’ decisions on equity position weighting. The bank recognized overcommitment to positions and suboptimal execution due to endowment effects and confirmation bias. The endowment effect, discussed in the research of Richard Thaler and other behavioral economists, refers to the psychological effects that prejudice owners in favor of retaining their assets despite changing conditions. Confirmation bias is a form of pattern-recognition bias, causing us to see nonexistent patterns in information: evidence supporting a favored belief is overvalued, while evidence to the contrary is discounted. To counteract these biases, the bank implemented “premortem” evaluations before each trading stage, with checklists to ensure that the stages were investigated fully.²

- *A global asset management company* likewise identified confirmation bias in the decisions of its investment managers. The company used devil's advocates to develop opposing views on investment decisions.³
- *A leading pharmaceutical company* tackled overconfidence bias in the proposals of its researchers by using premortems to challenge research proposals and renewals before investing in any project.⁴
- *In the healthcare industry* in the United States, research revealed that anchoring and stability biases significantly undermined diagnostic accuracy and effective treatment in hospitals. According to one widely cited study, errors occurred in 6.5 percent of hospital admissions in 2000–10. NIH and other research further suggests that diagnostic and other errors were causing as many as 200,000 avoidable deaths annually.⁵ In response, leading hospitals implemented a strong debiasing culture, including requisite consideration of “must not miss” diagnoses, checklists for ICU, surgery, and diagnostic procedures, the presentation of evidence in support of alternative diagnoses, and group discussions to encourage others’ opinions in complex situations.

Debiasing in asset management

In the asset management sector, investment decisions are being analyzed in light of debiasing experiences in other industries. A few leading funds have employed analytics in this effort, to improve effectiveness in diagnosing bias and its drivers. Working with analytics experts and behavioral scientists, they applied machine-learning algorithms to their historical investment data. They discovered clusters of suboptimal investment decisions that showed potential biases. By looking more closely at these suboptimal decisions, the funds identified consistent bias in the processes by which the decisions were reached and the accompanying emotions experienced by the decision makers. Having exposed the patterns of bias with the help of analytics, these

investment managers could now select and apply debiasing methods to greater effect in their investment decisions.

The analytics edge

The approach requires the creation of an integrated data set covering the investment portfolio. Included are all stock decisions since a fund’s inception. Security selection, security weighting, and selling timing are captured, as are the activities and actors that developed and maintained the portfolio. Data is thus compiled for the processes and decisions made by the individual investment managers and their teams. This history includes team communications and, insofar as possible, the behavior, reasoning, and emotions associated with individual decisions.

The funds deploy machine learning, guided by hypotheses developed jointly by fund managers and experts about the biases that might have negatively affected their investment decisions. Typical biases afflicting asset management performance are overconfidence, loss aversion, or the false analogy—the logical fallacy in which inductive reasoning is simulated through invalid comparisons. The hypothetical biases are tested by building an exploratory model to understand emotions and processes associated with trading decisions. Emotions behind biased decisions are diagnosed in the data through K-means cluster analysis—an iterative vector analysis enabled by machine-learning algorithms, which can isolate patterns in highly complex data sets (Exhibit 2).

The use of analytics in this way, to discover biases and their sources, is new. The biases themselves are familiar and susceptible to the debiasing methods elaborated in the scholarly literature and practical approaches.

Initial performance decomposition analysis

The approach starts with performance decomposition analysis, the relatively simple diagnostic tool long used in the industry. This initial step is followed by further analyses, aimed at discovering the processes and emotions surrounding specific investment decisions as well

Exhibit 2 To detect and correct for biases in investment decisions, some funds have successfully applied analytics to large sets of historical data.

Ingoing data and analyses

Portfolio

- All security decisions since inception of fund
- Decomposition of performance attributed to security selection, weighting, and selling timing

Team communications and processes

- Decision-making processes of the fund managers and their analysts
- Security selection, weighting, and selling processes
- Individual behavior and traits

Individual fund-manager behavior

- Decision-making processes by stock
- Individual behavior and traits at point of decision/nondecision

Analytics: apply machine learning by developing hypotheses

- Find patterns of bias and their drivers
- Find clusters where suboptimal security decisions and drivers of bias are consistent

Outputs

- Diagnoses of individual fund managers' decision-making biases and underlying drivers, consistently associated with specific security characteristics
- Plans and methods for debiasing future decisions

as the periods when fund managers did not make such decisions.

For the portfolio as a whole and for each constituent security, decomposition analysis shows the performance contribution of three types of decisions: security selection (including purchase timing), security weighting, and the timing of security selling. From this approach, simple patterns of suboptimal decision making can be generally discerned. Fund managers can then prioritize the patterns, making them the basis for more complex analyses of decision bias. For example, portfolio segments might be identified for which skills in the three types of decisions have significant impact on the total return of a fund.

At one high-performing equities fund, performance decomposition analysis revealed that over an eight-year period, superior stock-selection decisions were driving most of the returns. While both stock weighting and stock-selling timing were acting as drags on performance, in the years since the financial crisis the main negative performance factor was selling timing. Consequently, this factor was prioritized for more advanced analysis (Exhibit 3).

Suboptimal timing and the contributing biases

Through analysis of historic selling timing, asset managers discovered that approximately three out of ten stocks were sold too early or too late, according to the fund's own standards. To identify the biases that likely influenced these decisions, a detailed questionnaire was developed,

probing what might be called the structural and emotional environment surrounding each trade. The structural environment includes such factors as stock returns, valuation, M&A and capital discipline, ESG (environment, social, and corporate governance), trading conditions, the investment case, portfolio construction, and alternative investment opportunities. The structural values spark emotions associated with individual trades and groups of trades. These can be positive, negative, or neutral, ranging from optimism and confidence to fear or impatience.

An analysis of the emotions that led to particular types of repetitive suboptimal decisions identified

such biases as anchoring, loss aversion, or the endowment effect. In a number of instances, positions in strong-performing stocks were sold too early. More often than not, the fund learned that these sales took place in an emotional environment defined by pride and optimism. The usual source of this mood was a fund manager's conviction in the original investment case and valuation. Convictions of this kind are connected to the bias known as anchoring—the tendency to allow one's actions to be governed by a fixed logic, regardless of changing conditions. Sometimes, however, managers were reluctant to hold on to strongly performing stocks for a different reason: aversion to losing profits made so far. Here the operative bias is known as

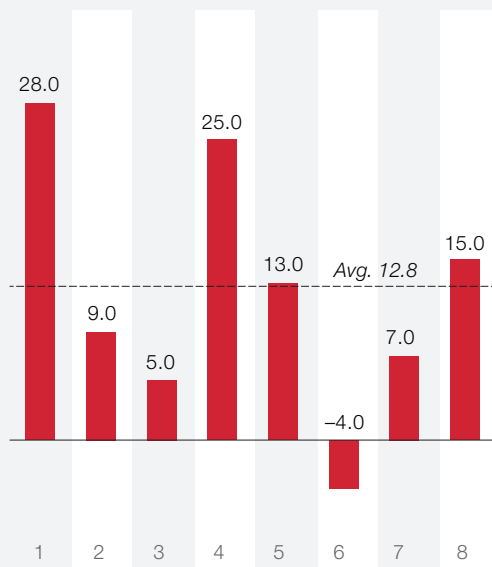
Exhibit 3 At one fund, the data revealed that success was due to superior stock selection, while selling timing had become the main negative factor.

Contribution to fund performance versus market index, total returns to shareholders (TRS), percentage points

DISGUISED EXAMPLE

The fund's overall outperformance of the market index was driven by exceptional stock selection.

Stock selection, TRS by year



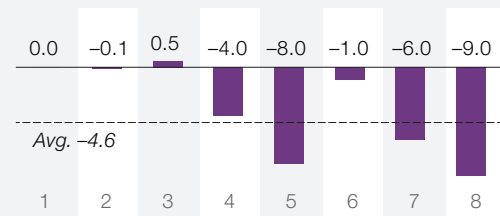
Both weighting and selling-timing skills contributed negatively to performance.

Stock weighting, TRS by year



Timing was prioritized for further analysis based on impact and manager hypotheses.

Stock-selling timing, TRS by year



loss aversion—referring to the strong preference to avoid loss despite favorable odds.

The biases underlying the inaction that leads to stocks being sold too late were identified as anchoring, the endowment effect, and regret aversion (a fear that in hindsight any choice will appear to be suboptimal). Overconfidence and loss aversion were the biases associated with selling too early. The entire analytics-based approach, including K-means cluster analysis, is sketched in Exhibit 4.

Tailoring debiasing methods

Once the funds in question could see the biases behind the clusters of suboptimal trades in the past, steps were taken to ensure that future decisions would undergo debiasing when certain conditions were present. Metrics were established, called “triggers,” that would signal the presence of those conditions. The triggers included such events as a 25 percent movement of the stock price within a three-month period, an investment reaching its fair value, a fund manager thinking of selling a position, the failure to add to a position during a 60-day period when the stock is drifting down, or a negative attribution to fund performance of over 50 basis points within a year.

Debiasing techniques that will most effectively change the decision-making process to reduce the presence and impact of bias can then be selected by the fund manager. The techniques themselves are not specific to the asset management sector but have been used to help companies and institutions make more effective and profitable decisions throughout the private and public sectors. What is specific to the industry is the way the methods are selected and applied, taking into account the investment process, the fund’s mandate, its culture, and the personality traits of those involved in the decisions.

The following list describes some of the debiasing techniques that can be tailored for the needs of funds and the specific circumstances in which they will be applied:

- **Checklists** have been proven to be very efficient in slowing down decision making. They have been used widely in medicine and law. For fund managers, a checklist of factors beyond valuation is reviewed before the final decision is made. These factors could include strong external buy recommendations or the relative strength of the stock in comparison to peers.
- **Clean sheet redesign.** In this approach, the manager takes a fresh look at the investment, revising the strategy as much as needed in light of current conditions and rebasing contemplated moves on the new analysis. Essentially this technique encourages decision makers to treat a decision as if it is a new investment.
- **Devil’s advocate.** This is a formal role assigned to an individual before a final decision is made. The job of the devil’s advocate is to challenge the current view of the fund manager, marshaling as much pertinent contrary evidence as possible. Accordingly, the person in this role establishes the deciding factors in such a way that most convincingly supports the opposite outcome.
- **Premortem** analysis is a method for understanding the potential causes of failure. The approach encourages people to express the doubts, criticisms, and second thoughts that might otherwise be suppressed due to organizational biases. In medicine, for example, an assumption is made that a patient has died, and the team then seeks to discover how it happened. A premortem approach has been used in many academic, professional, and business settings, since it has been practically proven to reduce failure.
- **Red team–blue team.** In this widely used debiasing approach, two independent groups (or individuals) are assigned to represent opposing positions, for and against, on contemplated decisions. The fund manager does not participate in the discussions but only observes as each side challenges the other’s analysis and arguments.

Exhibit 4 Repetitive patterns of selling timing and behavioral bias were uncovered with machine learning.

Advanced analytics can isolate biases underlying suboptimal trades

INVESTMENT-FUND EXAMPLES

K-means cluster analysis

K-means cluster analysis, an advanced-analytics technique, can be used to identify clusters of trading decisions with similar emotional profiles.

Structural analysis

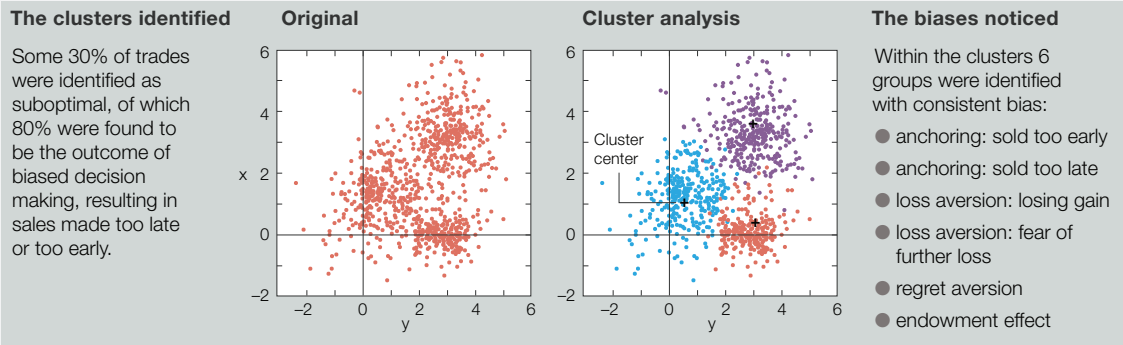
The structural factors for each cluster can then be analyzed, including the decision-making processes, prevailing conditions in the industry and region, the basket of stocks, and stock weights.

Emotional patterns

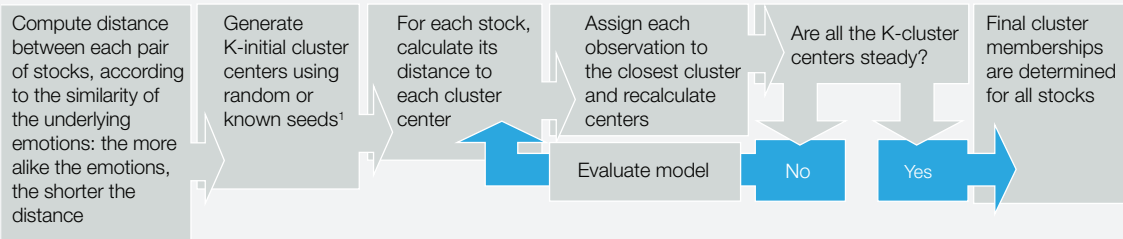
Particular emotions can be related to clusters of suboptimal decisions and consistent trading patterns.

Comparison

The emotions associated with each cluster are compared to those that behavioral scientists expect for certain biases.



How K-means cluster analysis is used to identify clusters



¹“Seeds” are the values used as starting points to generate numbers for simulations; the starting points can be random or known.

- Visual nudging.** In keeping with the principles discussed in Richard Thaler and Cass Sunstein’s book, *Nudge* (see sidebar, “The debiasing nudge”), this debiasing technique presents fund managers with alternative metrics to consider before making a decision. Typically, these metrics reveal the structural environment in greater detail—for example,

analysts’ upgrades, price performance relative to other stocks in the sector or region, or changes to the risk model.

As the foregoing discussion indicates, suboptimal decisions can have a significant impact on performance. Our initial analysis suggests that, even under conservative assumptions, debiasing

will allow funds to undo this negative impact and reap the performance rewards. In looking at actual funds, we saw potential improvements of between 100 and 300 basis points.

In addition to the debiasing exercises, asset managers are also applying change programs to reinforce informed and well-reasoned decision making. These programs include role modeling, awareness building around bias, and capability building to support improved decision making, as well as more formal procedures. As with debiasing, programs to address mind-sets and behaviors have been widely used in the public and private sectors. The experience with such cultural-change programs demonstrates that, while they may not ensure a successful transformation, success is much less likely without them.



Real investment managers have used these debiasing techniques to create real performance improvements. These leaders are gaining a competitive edge over their peers, while generally improving the value proposition for active funds. The advantages of debiasing are compelling and inexpensive. Even a devil's advocate would find it hard to argue against starting your debiasing program now. ■

¹ See "A case study in combating bias," *McKinsey Quarterly*, May 2017, McKinsey.com.

² See Iris Bohnet, *What Works: Gender Equality by Design*, Cambridge, Mass.: Harvard University Press, 2016. Like devil's advocate and red team-blue team, premortem analysis is one of the debiasing techniques defined toward the end of this article.

³ See Chuck Widger and Daniel Crosby, *Personal Benchmark: Integrating Behavioral Finance and Investment Management*, Hoboken, NJ: John Wiley & Sons, 2014.

⁴ See Michael D. Mumford and Michael Frese, editors, *The Psychology of Planning in Organizations: Research and Applications*, New York: Routledge, 2015.

⁵ See Charles Andel, Stephen L. Davidow, Mark Hollander, and David A. Moreno, "The economics of health care quality and medical errors," *Journal of Health Care Finance*, Fall 2012, Volume 39, Number 1, pp. 39–50.

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