



Organization Science

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Why Do Firms Fail to Engage Diversity? A Behavioral Strategy Perspective

Chengwei Liu

To cite this article:

Chengwei Liu (2021) Why Do Firms Fail to Engage Diversity? A Behavioral Strategy Perspective. Organization Science

Published online in Articles in Advance 19 Feb 2021

. <https://doi.org/10.1287/orsc.2020.1425>

Full terms and conditions of use: <https://pubsonline.informs.org/Publications/Librarians-Portal/PubsOnLine-Terms-and-Conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

Copyright © 2021, The Author(s)

Please scroll down for article—it is on subsequent pages



With 12,500 members from nearly 90 countries, INFORMS is the largest international association of operations research (O.R.) and analytics professionals and students. INFORMS provides unique networking and learning opportunities for individual professionals, and organizations of all types and sizes, to better understand and use O.R. and analytics tools and methods to transform strategic visions and achieve better outcomes.

For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Why Do Firms Fail to Engage Diversity? A Behavioral Strategy Perspective

Chengwei Liu^a

^a European School of Management and Technology Berlin, 10178 Berlin, Germany

Contact: chengwei.liu@esmt.org,  <https://orcid.org/0000-0001-9901-9438> (CL)

Received: July 3, 2017

Revised: September 23, 2020

Accepted: October 8, 2020

Published Online in Articles in Advance:
February 19, 2021

<https://doi.org/10.1287/orsc.2020.1425>

Copyright: © 2021 The Author(s)

Abstract. The persistent failure of organizations to engage diversity—to employ a diverse workforce and fully realize its potential—is puzzling, as it creates labor-market inefficiencies and untapped opportunities. Addressing this puzzle from a behavioral strategy as arbitrage perspective, this paper argues that attractive opportunities tend to be protected by strong behavioral and social limits to arbitrage. I outline four limits—cognizing, searching, reconfiguring, and legitimizing (CSRL)—that deter firms from sensing, seizing, integrating, and justifying valuable diversity. The case of *Moneyball* is used to illustrate how these CSRL limits prevented mispriced human resources from being arbitrated away sooner, with implications for engaging cognitive diversity that go beyond sports. This perspective describes why behavioral failures as arbitrage opportunities can persist and prescribes strategists, as contrarian theorists, a framework for formulating relevant behavioral and social problems to solve in order to search for and exploit these untapped opportunities.



Open Access Statement: This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. You are free to download this work and share with others, but cannot change in any way or use commercially without permission, and you must attribute this work as “*Organization Science*. Copyright © 2021 The Author(s). <https://doi.org/10.1287/orsc.2020.1425>, used under a Creative Commons Attribution License: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.”

Keywords: behavioral strategy • diversity • behavioral failures • strategic opportunities • CSRL limits to arbitrage

1. Introduction

Although firms are supposed to evaluate employees based on merit, many studies show that well-qualified workers may not be hired or promoted for reasons irrelevant to merit (Galinsky et al. 2015, van Dijk et al. 2017, Eberhardt 2019). Some suboptimal evaluations result from explicit, taste-based discrimination (Becker 1971), whereas others derive from automatic, implicit biases, such as stereotyping or homophily (Fiske and Taylor 2013). Many scholars urge firms to overcome discrimination and engage diversity (i.e., to employ a diverse workforce and fully realize its potential), with justifications based either on a justice-centric view (e.g., including disadvantaged candidates is the right thing to do to address decades of prejudice) or a performance-centric view (e.g., recruiting team members with nonoverlapping cognitive diversity improves performance of complex tasks). Regardless of the mechanisms by which discrimination operates and the tactics used to counteract it, research shows that many firms still fail to engage diversity (Dobbin et al. 2015, McDonald et al. 2017), undervaluing qualified but atypical individuals while favoring those who fit positive stereotypes.

Less favorable treatment of counter-stereotypical but valuable human resources is puzzling from a

strategy point of view because it implies an inefficient labor market in which money is being left on the table (Denrell et al. 2003). Firms that discriminate are likely to pay a performance penalty for failing to recruit the most qualified workers, whereas firms that overcome discrimination may gain advantages (Becker 1971) from recruiting atypical workers undervalued by rivals (Liu et al. 2017, Siegel et al. 2018). Over time, competition should select out biased firms, correcting for this labor-market inefficiency. Why do many firms nonetheless continue to fail to engage diversity? In other words, why are valuable but counter-stereotypical human resources, as untapped opportunities, not yet competed away?

This paper addresses persistent failure to engage diversity from a behavioral strategy as arbitrage¹ perspective, which posits that attractive strategic opportunities tend to be protected by strong behavioral and social limits to arbitrage. Building on prior works in behavioral strategy (Powell et al. 2011, Gavetti 2012, Denrell et al. 2019), I integrate various behavioral failures outlined in the literature using an analogy from behavioral finance (Barberis and Thaler 2003, Zuckerman 2012a), which states that price-value gaps of certain assets as arbitrage opportunities may persist when “limits to arbitrage” deter exploitation and

hence preserve market inefficiencies² (Shleifer and Vishny 1997). I propose four limits to arbitrage—cognizing, searching, reconfiguring, and legitimizing (CSRL)—in strategic contexts. The CSRL limits help explain the mechanisms that allow biases against valuable resources to persist and illuminate approaches to overcoming these limits in order to exploit the biases as opportunities.

I illustrate the application of the CSRL limits to arbitrage using a case from Major League Baseball (MLB) described in *Moneyball* (Lewis 2003). An MLB team's advantage is strongly associated with its ability to recruit superior players, yet most MLB teams historically judged players based on their look—whether they fit the stereotype of a successful player. In the late 1990s, the Oakland Athletics (the “A’s”) and their manager, Billy Beane, exploited this opportunity by acquiring undervalued players (e.g., counter-stereotypical players with more competence than implied by their salaries) from rivals. Consequently, between 1999 and 2003, the team achieved impressive winning percentages with one of the lowest payrolls in the MLB. *Moneyball* is often portrayed as a triumph of data analytics, yet this fails to fully explain the A’s success; after all, data on MLB players and sabermetric analytic methods had been publicly available for decades. A greater puzzle is why such exploitation did not occur sooner.

As I will elaborate, data analytics is only one of the factors that helped the A’s address the searching limit by identifying undervalued players, and particularly unconventional ones. Other CSRL limits deterred MLB teams from appreciating, imitating, and justifying Beane’s approach, reducing ex post competition to such an extent that they allowed the A’s to enjoy competitive advantage (Peteraf 1993) until Michael Lewis’s (2003) book helped eliminate several of these limits. This case has important implications beyond professional sports, note Thaler and Sunstein (2003, p. 1390): “If Lewis is right about the blunders and the confusions of those who run baseball teams, then his tale has a lot to tell us about blunders and confusions in many other domains.” In the MLB, the economic stakes of flawed recruitment are extremely high, and there is no obvious economic barrier to exploiting inefficiencies. If the labor market can be inefficient there, one might expect labor markets outside sports to entail larger mispricing, greater CSRL limits, and more untapped opportunities.

Applying a behavioral strategy as arbitrage perspective to the debate on diversity generates interesting theoretical and practical contributions. First, it complements the growing literature on diversity by providing a novel lens that views failure to engage diversity as being protected by various behavioral and social limits to arbitrage. Firms fail to engage

diversity not necessarily because they disagree with the reasons for hiring a diverse workforce, such as those based on a normative, justice-centric view (e.g., including workers with disadvantaged identities) or a pragmatic, performance-centric view (e.g., complex tasks require diverse teams with nonoverlapping cognitive repertoires); rather, such failures may result from context-dependent factors that prevent firms from overcoming CSRL limits. For example, diverse candidates may be ruled out because they do not look qualified, or their contributions/outputs may be discounted by important stakeholders, such as the media, investors, and customers. More generally, this perspective complements normative and pragmatic mainstream views: Overcoming CSRL limits is essential for doing the right thing and for improving performance.

This paper also contributes to the strategy literature. Sustainable competitive advantage is usually attributed to firms’ control over valuable, rare, non-imitable, and nonsubstitutable resources (Barney 1991). Instead of obtaining these resources via luck, endowment, or path-dependent cumulation processes (Dierickx and Cool 1989, Makadok and Barney 2001, Helfat and Lieberman 2002, Denrell et al. 2003, Andriani and Cattani 2016), firms can search a vast reservoir that includes latent resources, alternative uses of existing resources, and their combinations (Lippman and Rumelt 2003a, b). To simplify such a search, Felin and Zenger (2017) propose that strategists should start with a contrarian theory that guides problem formulation and key experimentation. A behavioral strategy as arbitrage perspective posits that not all contrarian theories are associated with attractive opportunities (Pontikes and Barnett 2017). Attractive opportunities tend to be protected by strong CSRL limits to arbitrage. This perspective guides strategists to identify the relevant behavioral and social problems to solve in order to locate and exploit valuable resources. Fortune favors strategists who apply this perspective to refine their contrarian theory and search for viable opportunities.

Finally, presenting failure to engage diversity as an attractive opportunity has interesting practical implications. Compared with prevalent but ineffective debiasing and training approaches to engaging diversity (Kalev et al. 2006), a behavioral strategy as arbitrage perspective (with *Moneyball* as an analogy) may nudge more strategists to evaluate diversity differently and engage in the arbitrage activities needed to eliminate market inefficiencies (Zuckerman 2012b). This by no means suggests that exploiting behavioral opportunities is easy; as Gavetti (2012, p. 14) writes, “what is strategically attractive is so precisely because it is extremely difficult to achieve.” Understanding the four limits will help strategists assess their

context-dependent constraints and develop feasible exploitation strategies more systematically. One ambition is for the idea of strategy as arbitrage to be diffused to such an extent that it will eliminate inefficiencies and allow merit to determine pay and career prospects in the long run, as demonstrated by the diffusion of the *Moneyball* strategy in many professional sports after 2003 (Lewis 2016). A behavioral strategy perspective may provide a surprisingly effective approach to help nonsports industries fix their persistent failure to engage diversity.

The structure of this paper is as follows. Section 2 reviews the theoretical foundation of behavioral strategy as arbitrage. Section 3 applies CSRL limits to the context of diversity and illustrates how they preserve labor-market inefficiencies using the case of *Moneyball*. Section 4 discusses how Billy Beane and the A's overcame CSRL limits and the scope conditions necessary to exploit behavioral arbitrage opportunities. The paper concludes by discussing the broader implications of the CSRL framework, including how hype surrounding artificial intelligence (AI) may strengthen rather than weaken various limits to engaging diversity.

2. The Theoretical Foundation of Behavioral Strategy as Arbitrage

The behavioral strategy as arbitrage perspective posits that an opportunity is more attractive when it is protected by stronger behavioral and social limits to arbitrage. This perspective is more applicable to resources that can be priced and traded. For strategic resources that are nontradeable or unpriced (such as human resources subject to noncompete clauses or firm-specific resource combination), this perspective can still be applied in the following sense: The difficulties of pricing and trading these resources preserve possible misvaluations as arbitrage opportunities for a strategist who can overcome these difficulties as limits to arbitrage (e.g., valuing these resources and making them transferable). Stated differently, the infeasibility of arbitrage does not exclude an arbitrage opportunity, according to this perspective, but moderates the extent to which this opportunity is fleeting or attractive.³ Since the idea of behavioral strategy as arbitrage builds on, but also deviates from, the common understanding of arbitrage, I first review the idea of arbitrage in financial markets before extending this analogy to strategic contexts.

2.1. Market Efficiency and Arbitrage

The scope for arbitrage—defined as exploitations of price-value difference (Barberis and Thaler 2003, Knorr Cetina and Preda 2012, Zuckerman 2012b)—in financial market depends on the extent to which the

market is efficient. The well-known efficient market hypothesis (EMH) posits that prices accurately reflect assets' intrinsic value. Whether EMH is a realistic (or even useful) description of the market has been a central debate in economics and finance for decades (Thaler 2015). These arguments can be summarized by three competing perspectives (Zuckerman 2012b).

The first perspective, which supports the EMH, posits that prices in financial markets are generally correct because of arbitrage activities (Fama 1970). Asset mispricing may occur temporarily but cannot persist because traders will identify mispricing as profit opportunities and arbitrage them away.

The second perspective, which rejects the EMH and posits that prices are socially constructed, is best captured by Keynes's (1936) beauty contest, in which market and prices are entirely speculation-driven and price bears no relation to intrinsic value.

These two perspectives represent two ends of a spectrum of how price represents (or is decoupled with) intrinsic value. Interestingly, they share the same actionable implication: that arbitrage is futile. For social constructivists, price-value differences do not exist by definition. For true believers of the EMH, there is no incentive to arbitrage because any given price-value difference as opportunity is too fleeting to pursue. Paradoxically, the EMH is self-defeating in the sense that the market cannot be efficient if all investors believe in the EMH and, in turn, dismiss arbitrage activities.

The third perspective provides a synthesis to these two extremes. Built on Benjamin Graham's (1959) value-investing paradigm, this perspective posits that price-value difference can occur but will converge because the market is like a voting machine in the short run (i.e., prices are unreliable because of investors' biases and sentiments), but a weighing machine in the long run (i.e., mispricing will be corrected because the market will figure it out). According to this perspective, arbitrage is not futile: Mispricing as arbitrage opportunities can exist and favor investors who have superior insights in valuation. Value investors should be contrarian: Instead of following or opposing the market (or the crowd), they should come up with an independent valuation of an asset and invest in the asset when its estimated value is higher than the market price (i.e., buy low) or short-sell the asset when the estimated value is lower than the market price (i.e., sell high). Profit will be realized when the estimated value is correct and market price converges to this value.

The development of the limits to arbitrage concept (Shleifer and Vishny 1997) strengthens the third perspective in addressing the challenges from the other two perspectives. Arbitrage opportunities are not as fleeting as the EMH predicts because investors

who identify a price-value difference are not always able to exploit the difference. This implies that the price-value difference as a profitable opportunity may persist until the limits to arbitrage disappear or are overcome. This creates incentives for value investors to search for arbitrage opportunities in the first place. On the other hand, social constructivists often cite dotcom and housing bubbles to emphasize the speculative nature of price and as an existing proof that the market cannot figure it out (MacKenzie et al. 2007). An asymmetry in limits to arbitrage explains why arbitrages cannot always eliminate mispricing: Arbitrages are more effective at correcting underestimation (i.e., mispricing is eliminated when the demand for an underpriced asset increases) than at correcting overestimation (e.g., mispricing persists when the demand for borrowing an overpriced asset to short-sell it cannot be satisfied) (Massey and Thaler 2013, Turco and Zuckerman 2014). The implication is that price-value differences often occur and tend to converge, thanks to arbitrage activities, but the difference (as well as market inefficiency) can persist for a long time when limits to arbitrage are strong.

2.2. CSRL Limits to Arbitrage in Strategic Contexts

The idea of limits to arbitrage in financial markets can be extended to strategic contexts. Barney (1986) argues that abnormal returns would not exist if the strategic factor market were efficient because the price of acquiring a resource would reflect the value this resource could create. Since firms' traits and actions are enabled by various resources, which are ultimately acquired in the factor market, one has to assume the factor market's failure to allow the possibility of strategic opportunities (Denrell et al. 2003). Recent advances in behavioral strategy revisit this assumption and illustrate how behavioral failures may preserve factor market inefficiency (Gavetti 2012). For example, Fang and Liu (2018) highlight how cognitive biases, such as the status quo and homophily biases, can be translated into approaches that enable firms without resource advantages to disrupt industry incumbents. Denrell et al. (2019) argue that the way in which people are fooled by randomness creates an alternative source of opportunity, but highlight the sociocognitive complications of pursuing such opportunities.

Building on these prior works, this paper proposes a framework that integrates various behavioral failures under the idea of limits to arbitrage and applies it to the context of diversity in order to search for untapped opportunities in the labor market. To illustrate some of these behavioral failures, consider a thought experiment. Let us assume that resource X is valuable, as obtaining X will increase a firm's sales revenue, decrease its production cost, or both. Much

of the strategy research focuses on how firms may develop the capacity to sense, seize, and integrate resource X as a profit opportunity (Teece et al. 1997). However, Barney's (1986) critique holds that resource X's expected profit-generation capacity will approach zero if many firms can sense, seize, and integrate resource X. For resource X to remain attractive, one must focus on failures—namely, why many firms fail to sense, fail to seize, or fail to integrate resource X to such an extent that resource X remains mispriced or underutilized relative to the value it can generate.

Because of various bounds on rationality, firms may fail to recognize resource X's value. I label this type of failure as resulting from cognizing limits. Boundedly rational individuals and firms may overlook resource X because they simplify the world during learning processes (Levinthal and March 1993) or through cognitive shortcuts, such as decision heuristics, simple rules, or mental representations (Davis et al. 2009, Gavetti 2012, Csaszar and Levinthal 2016). These simplifications serve as fast-and-frugal heuristics when decision makers modify them over time through immediate and reliable feedback (Gigerenzer and Goldstein 1996). Otherwise, they are likely to generate biases shared by many individuals and firms. For example, firms tend to cluster around a few strategic groups, and firms within such groups usually develop and share similar mental models, such as how to compete in their industry (Porac et al. 1995). If resource X is cognitively proximate to these firms, most of them will sense and compete for it, making its superior profit-generating capacity self-defeating. A necessary condition for resource X to remain valuable is that it is cognitively distant from these firms, so they will systematically overlook it owing to the bounds of their shared mental model. Importantly, “[o]rganizations and the individuals in them are notoriously reluctant to give up such mental models” (Levinthal and March 1993, p. 99). This predicts that many firms, particularly incumbents that take a mental model for granted, will make the similar mistake of ignoring resource X, preserving it as an untapped opportunity.

Even when firms sense a valuable resource may exist, they may fail to seize it (i.e., the right resource X) because of various learning failures. I label this type of failure as resulting from searching limits. For example, firms may not profit from resource X if they cannot overcome information asymmetry and distinguish it from the lemons in the market (Akerlof 1970). Firms may learn from experience to undervalue resource X when its value cannot be accurately estimated without complementary resources (Cohen and Levinthal 1990, Mosakowski 1997) or substantial experience (Denrell and March 2001). Moreover, firms may develop bias in favor of their own resource,

resource Y, if it has led to prior successes (Audia et al. 2000). Salient success in an industry may also generate halo effects and fads, making some resources more popular than justified by their value (Rosenzweig 2007, Pontikes and Barnett 2017). These are just some of the traps documented in the literature on experiential and social learning. A shared feature of these failures is that they tend to lead firms to persistently seize less valuable resources, abandon the more valuable resource X prematurely, or both, preserving resource X as an undervalued opportunity.

Even when firms sense resource X and avoid seizing the wrong resource X, they may fail to integrate and realize its potential value or competence because of organizational dynamics. I label this type of failure as resulting from reconfiguring limits. Resources can be acquired, but competences—efficiency potentials that are leveraged from the firm’s resources—need to be realized through effective organizational processes (Barney 1995, Teece 2007). Firms may own valuable resource X but fail to realize its competence for many reasons. Firms may not be motivated to integrate resource X when their current performance is coded as successful. Even when motivated to change, firms may underutilize resource X if it is competency-destroying (Henderson and Clark 1990). For example, it may create new products that cannibalize existing products’ market share, or the innovation enabled by resource X may challenge a firm’s existing power and status hierarchy. Strong resistance to integrating novel resources is to be expected from well-managed firms (Nelson and Winter 1982, Hannan and Freeman 1984). Even when resource X promises improvement in the long run (a positive content effect from adopting resource X), firms may not survive the cascading disruptions to routines in the short run (a negative process effect from adopting resource X). Underutilization, failures, or abandonments after seizing resource X may stigmatize it on the market, preserving it as an apparently unattractive opportunity.

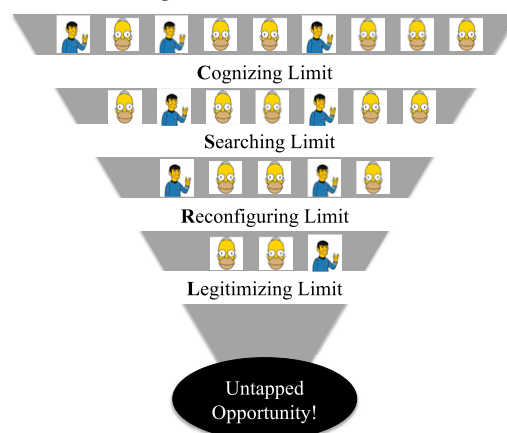
Even when firms have the capacity to sense, seize, and integrate resource X, they may choose not to if doing so would be socially destructive (Benner and Zenger 2016, Correll et al. 2017). I label this type of failure as resulting from legitimizing limits. For example, firms may not profit from resource X if important stakeholders discount the output value owing to its uniqueness or incomprehensiveness (Zuckerman 1999, Litov et al. 2012). Firms may distance themselves from resource X if using it implies deviation from taken-for-granted norms or institutional logic (Oliver 1997). Using resource X may be so detrimental to the reputation and status of a firm and its managers that they ignore what appear to be obvious opportunities (Jonsson and Regnér 2009). Interdependency

may also create pluralistic ignorance around valuable resources, where many recognize resource X’s value but no one is daring enough to break the “iron cage” (DiMaggio and Powell 1983). In this manner, low-hanging fruit can be protected like the emperor’s new clothes.

The four limits introduced—cognizing, searching, reconfiguring, and legitimizing—deter firms from sensing, seizing, integrating, and justifying the valuable resource X. These limits operate like filters (see Figure 1): Some firms may fail to sense resource X because of cognitive distance; for those that sense it, some may fail to seize the truly valuable resource X owing to the difficulty of overcoming learning traps when experimenting with atypical resources; for those that sense and seize resource X, some may fail to integrate it because of internal resistance to changing or disrupted routines; for those that sense, seize, and integrate resource X, some may fail to justify to important stakeholders that using this resource is legitimate. These CSRL limits may be so strong that no firm can overcome them all, thereby protecting resource X as an untapped opportunity from being arbitrated away. This is bad news for factor market efficiencies, but good news for strategists who understand CSRL limits when searching for untapped strategic opportunities.

The perspective of behavioral strategy as arbitrage aims to integrate existing behavioral science findings. To use an analogy, Porter’s Five Forces framework turned industrial economics on its head by showing how well-known economic forces that are detrimental to perfect competition can help predict an industry’s profitability. Similarly, behavioral strategy as arbitrage uses knowledge developed in behavioral sciences to illuminate how well-known behavioral failures may help predict when noneconomic limits create and sustain strategic opportunities.

Figure 1. (Color online) In Search of Untapped Opportunities Using CSRL Limits as Filters



Finally, the perspective of behavioral strategy as arbitrage is context independent, but applying the theory to search for opportunities arising from particular behavioral failures is context dependent. Given the prevalence of documented behavioral failures, inefficiencies might be predicted in many markets. However, context-dependent information and knowledge are required to identify how exactly these behavioral failures generate price-value gaps locally⁴ and how to overcome these limits. In the next section, I will apply this perspective to the context of diversity using *Moneyball* as an illustrative example.

3. CSRL Limits to Arbitrage in the Context of Diversity: The Case of *Moneyball*

Here, I apply the behavioral strategy as arbitrage perspective and the CSRL limits to the context of diversity and explore why many firms fail to engage diversity. I follow the definition of diversity by Jackson et al. (2003, p. 802) as “the distribution of personal attributes among interdependent members of a work unit.” Failing to engage diversity means that managers or firms, knowingly or unknowingly, fail to recruit atypical but qualified members when assembling a team to fulfil its goals. Note that the definition of qualified is often dependent on a team’s composition and goals. For example, the performance bonus of engaging diversity is greatest when a team faces a complex task and its members have non-overlapping cognitive diversity (Page 2017). Since measuring cognitive diversity and judging the interdependent merit of team members is challenging, these difficulties create precisely the limits that prevent firms from reliably sensing, seizing, and integrating sufficiently diverse team members.⁵ As illustrated by the case of *Moneyball*, qualified but atypical individuals may be underestimated even when their merit is only weakly dependent on team composition and when the task is not complex. Greater failures can therefore be predicted when judging merit depends on more factors. These behavioral failures to engage diversity suggest the persistence of unrealized performance bonuses as untapped opportunities. I illustrate the application of the CSRL limits using *Moneyball* before discussing examples beyond sports.

3.1. The Cognizing Limit

The cognizing limit to arbitrage relates to how boundedly rational individuals and firms make systematic, suboptimal decisions when they simplify the complex world through decision shortcuts or mental representations. In the context of diversity, this limit focuses on the possibility of overlooking valuable but counter-stereotypical candidates (or overly favoring stereotypical candidates). A stereotype is an

overgeneralized belief about the warmth and competence of a certain category of people that is usually based on easily observable traits, such as gender, race, age, build, or sexual orientation (Fiske and Taylor 2013). Which stereotypes are favored is context dependent, but the presence of a widely acknowledged stereotype suggests that many individuals and firms share a similar mental model in that context, which creates and preserves similar blind spots in their evaluations.

3.1.1. Moneyball. Identifying skilled players is one of the most important sources of competitive advantage in the MLB. The most reliable basis for predicting skills is track record. Thus, players should ideally be hired based on whether they have performed better and more reliably than their peers. However, an important limitation of this approach is that players with strong and reliable track records, such as incumbent MLB and college baseball players, are expensive. Most teams are unable to win bidding wars for these players when competing against richer teams, such as the New York Yankees. Thus, many are forced to search for talent among those with less reliable track records, such as high schoolers.

MLB teams identify talents with limited track records by sending their scouts to observe high school games and report potential draft picks to the team manager. However, it is very difficult to judge better players simply by observing their performance: “One absolutely cannot tell, by watching, the difference between a .300 hitter and a .275 hitter. The difference is one extra hit every two weeks” (Lewis 2003, p. 68). As a result, scouts (largely retired baseball players) tend to use a representative heuristic based on their prior experience (Tversky and Kahneman 1974): Good players tend to have a certain look, the main feature being that they look like fit, powerful players. This suggests that some competent players, particularly those who are overweight, slower, or shorter than average baseball players, may be passed over by default. In contrast, young players who look similar to prototypical MLB players are judged to have greater potential to succeed in the MLB.

Judging talents using a representative heuristic is likely to be a fast-and-frugal decision shortcut. After all, many stereotypes emerge from a strong correlation between displaying such traits and superior performance. MLB scouts usually have to travel to hundreds of high schools per year and spend limited time at each school. The representative heuristic helps them screen hundreds of candidates at a glance.

However, this heuristic may become ineffective, particularly when it diffuses to become a dominant mental model for scouts predicting high school talents’ future performance. Stereotypical predictions

are based on correlations, and judgments based on imperfect correlations will inevitably lead to omission and commission errors (Christensen and Knudsen 2010, Csaszar and Levinthal 2016). A commission error occurs when players are drafted based on having the look but cannot perform as the stereotype predicts. This had been the case for the A's manager, Billy Beane, who had the look in high school but never lived up to expectations in the MLB. Detecting commission errors is not particularly difficult in the MLB, because self-fulfilling processes are relatively weak as compared with other professional sports, such as basketball (Mauboussin 2012). That is, an overrated baseball player is unlikely to meet performance expectations simply because his manager, teammates, and fans falsely believe he will meet them.

A stronger cognizing limit in the MLB is the detection of omission errors. Some promising players may be mistakenly dismissed because they are too counter-stereotypical. This may happen even to individuals with a strong track record, such as “submarine pitcher” Chad Bradford (Lewis 2003). Bradford played for the Charlotte Knights (Chicago White Sox's Triple-A affiliate) and was briefly promoted to the major league thanks to a pitcher's injury. Bradford's excellent performance continued, but the White Sox manager demoted him to the minor league when the teammate recovered. The White Sox manager attributed Bradford's wins to good luck, despite his track record. Rejecting competent players despite clear evidence of their competence may result from the diffusion of representative heuristic applications. Over time, fewer competent but counter-stereotypical players will be available for observation in the MLB, making it increasingly difficult to correct omission errors. For example, a successful submarine pitcher like Bradford was probably a sample of one to the White Sox manager. He may have been right to dismiss this atypical case, but this sensible judgment was built on a larger sampling bias: Team managers could not see Bradford's merit because he was too “cognitively distant” (Gavetti 2012). Yet the distance was created because too many team managers adopted the same mental model, to such an extent that it reinforced a conventional, though flawed, wisdom that players without the stereotypical look cannot be good. Counter-stereotypical but competent players like Bradford remain undervalued because many experienced managers are blind to their merit, owing to their oversimplified representations of the world.

3.1.2. Beyond Sports. This discussion suggests that recognizing counter-stereotypical merit to organizations outside the world of professional sports is likely to be more challenging, because it is less about evaluating individuals' physical traits and more about

their invisible cognitive diversity. Imagine that an executive wants to assemble a team to address a complex task: Whom should they recruit to join the team? According to the logic of generating a diversity bonus (Page 2017), they should first evaluate the nature of the task, in terms of the types of knowledge, tools, or experience required to address it. They should then recruit members with nonoverlapping cognitive resources that match the task requirements. This ideal scenario suggests the presence of cognizing limits that deter the executive from recruiting a sufficiently diverse team to address the complex task.

For example, the executive is likely to take a cognitive shortcut by predicting cognitive diversity based on identity diversity, just as MLB managers predict merit using the representative heuristic. Identity diversity may contribute a diversity bonus, but its influence is likely to have a mediating or moderating effect on cognitive diversity. For example, identity diversity in teams may positively moderate the expression of cognitive diversity: People are more likely to appreciate an opposing opinion if it comes from a person of a different social category (e.g., status or race) than a similar one (Dumas et al. 2013). On the other hand, people may have idiosyncratic experiences because of the social categories to which they belong. The resulting differences in experiences, rather than their differing social belonging, may be useful cognitive resources for generating diversity bonuses. This suggests that identity diversity in teams is, at best, an unreliable indicator of a team's cognitive repertoire.

However, people, organizations, and policymakers usually mistakenly equate identity diversity with cognitive diversity because the former is more easily recognizable and measurable than the latter. This occurs even though research shows that demographically diverse crowds (by gender and race) are typically not wiser than homogeneous crowds (de Oliveira and Nisbett 2018). A shared mechanism of many decision biases is a substitution effect (Kahneman 2011): Humans usually substitute a difficult question (e.g., Does this candidate have different cognitive resources from existing team members?) with an easier question (e.g., Does this candidate “look” different from existing team members?). This implies that the cognitive diversity of an identity-diverse team may be overrated unless the executive resists the temptation to apply oversimplified mental models when evaluating team members and their cognitive repertoire.

In summary, the cognizing limit to arbitrage may deter firms from engaging valuable human resources when qualified candidates deviate from what a stereotypical, competent employee should look like. The limit may be so strong that managers deny clear evidence contrary to their mental representations

(e.g., the case of Bradford). Thus, valuable but atypical human resources remain untapped opportunities.

3.2. The Searching Limit

The searching limit to arbitrage concerns how individuals and firms systematically fail to identify and seize valuable but cognitively distant resources because of various learning failures. In the context of diversity, this limit focuses on the difficulty of identifying undervalued human resources among counter-stereotypical ones and overvalued ones among stereotypical ones. Even when firms manage to apply a different mental model and recognize the possibility of labor-market inefficiencies, identifying and seizing the right “hidden gems” (or dismissing the right “overrated stars”) is nontrivial. For example, the data or metrics necessary to measure the value of atypical resources may not exist (Litov et al. 2012), suggesting that managers may fail to compute the correct values critical to evaluate opportunities. Moreover, to find the “hidden gems,” one usually needs to experiment with many atypical candidates. This, in turn, creates variances in performance sufficient to deter many managers from continuing on the path of more distant search and exploration (Denrell and March 2001). Valuable human resources may thus remain mispriced, even when firms sense the presence of inefficiencies.

3.2.1. Moneyball. The case of *Moneyball* is usually portrayed as a triumph of data analytics. Yet the A’s and Billy Beane were not the first team or manager to recognize the inefficiencies in MLB hiring and attempt to use data and statistical methods to search for valuable but mispriced players. Many MLB teams had evaluated players using available data since the 1980s. The challenge was not that data were difficult to acquire, but that many performance measures in the existing data were, in fact, misleading. Applying statistics to existing data may strengthen misevaluations because the results look scientific, but doing so enhances only confidence, not competence. Managers need to experiment with alternative measures to overcome the searching limit. However, such activities entice them into various learning traps that deter them from seizing the right hidden gems.

Take hitters’ statistics, for example. Hitters are evaluated on both their offensive and defensive capacity, and two performance measures are widely used. On the offensive side, a good hitter is expected to have a high average runs-batted-in (RBI) score, which credits a hitter for making a play that allows runs to be scored. The problem with this measure is that it correlates not only with the hitter’s offensive capacity but also with his teammates’ capacity. To gain a higher RBI, a hitter needs more of

his teammates to be on base in the first place. A good hitter may be undervalued if he happens to be on a less resourceful team with fewer competent teammates, whereas a mediocre hitter may be overvalued if he is fortunate enough to be on a stronger team. On the defensive side, a good player (as fielder) is expected to make fewer errors. According to the MLB official website, an error refers to a judgment by the official scorer that a fielder “fails to convert an out on a play that an average fielder should have made.”⁶ The problem with this measure is that it is vague and subjective. To make an error, a fielder needs to be close enough to where the ball falls to allow a miss or catch to be recorded in the first place, implying that a fielder with poorer judgment or slower movement may make fewer errors than a better fielder. Moreover, the record of errors is determined entirely by the official scorer, who receives no feedback on these judgments and is unlikely, in a few seconds, to have the cognitive capacity to compare an observed miss against all counterfactuals that an average fielder might have made. The implication is that searching for a valuable hitter based on existing metrics may create systematic over- and underestimations because many measures are confounding, imprecise, and subjective.

Now consider pitchers’ statistics. Many sabermetricians agree that performance measures for pitchers are more reliable than those for hitters (Lewis 2003). An exception is for closing pitchers, or closers, who specialize in getting the final outs in a close game when their team is leading. When a closer is used and the team wins, it is framed as the closer saving the game; otherwise it is framed as a blown save. The problems with this measure are twofold: First, it is based on a small sample size; second, the framing makes the outcome sound more important than it actually is. Closers are used mainly in final innings, meaning that their performance is based on much smaller samples than those for starting or relief pitchers. However, their less reliable performances may be exaggerated by the phrase “save”: They may receive too much credit for wins (or blames for losses), even though many outcomes may have been achieved largely without their intervention.

Another learning trap occurs when these misevaluations lead to disappointing performance. That is, social learning and benchmarking may encourage inefficient metrics to persist in the MLB. When underperforming, most teams follow a standard search strategy of learning from the most successful teams (Haunschild and Miner 1997), such as the New York Yankees. However, rich teams such as the New York Yankees can afford to keep players who not only do well on existing measures (such as high RBIs, low errors, or more saves) but also perform reliably well.

Learning from these salient successes seems to confirm the robustness of existing performance metrics, but this strategy may only work for the richest teams that have no need to make trade-offs.

3.2.2. Beyond Sports. A specific searching limit in the context of diversity is a misplaced belief in meritocracy. According to the “no test exists” rule to assembling a diverse team, “no test applied to individuals will be guaranteed to produce the most creative groups” (Page 2017, p. 95). Complex tasks require a cognitively diverse team; however, the team’s cognitive diversity cannot be recognized in isolation or ex ante, but must be identified along with the team composition and expansion. A candidate’s cognitive resource is useful only when it produces additional ideas or perspectives that differ from those of existing team members. Yet cognitive differences that are useful for filling the gap are only recognizable after an existing team has tackled the task and realized its own shortcomings.

Rather than appreciating the no test exists rule and hiring team members sequentially, organizations often believe they can solve complex problems by recruiting the “best individuals,” according to objective criteria. This belief holds when addressing noncomplex tasks, as the most able and creative individuals are expected to master all the skills and ideas needed to solve the task (e.g., a difficult mathematical problem). However, this belief in meritocracy becomes a searching limit that deters the executive from recognizing that a better team could potentially have been assembled. Importantly, the no test exists rule does not undermine individual ability or creativity. This limit highlights that the common practice of recruiting the best candidates according to objective criteria may create a searching limit. Teams cannot discover their mistakes unless they experiment with candidates who are sufficiently different from existing members, or even unqualified based on objective criteria.

Finally, even an executive who correctly identifies that the assembled team is insufficiently diverse may be trapped by the “hot stove effect” when searching nonlocally (Denrell and March 2001). Executives may be shocked by hiring errors, because attempts to hire a cognitively diverse member usually entail experimenting with many atypical hires. Such experiments may lead to long-term performance improvement, but specific hires may cause immediate disasters that prompt the premature termination of searching.

In summary, the searching limit to arbitrage may deter firms from seizing the right hidden gems, even when they sense labor-market inefficiencies. Existing data and measures may be systematically misleading, but various experiential and social learning traps may

deter managers from discovering these flaws or from experimenting with alternative measures and candidates. As a result, valuable human resources may remain under the radar.

3.3. The Reconfiguring Limit

The reconfiguring limit to arbitrage describes firms’ systematic failure to integrate valuable resources because of a resistance to change or failure to reorganize routines. In the context of diversity, this limit focuses on the difficulty of fully realizing the potential of atypical hires in teams. Even when firms manage to sense and seize the right hidden gems, this does not necessarily mean that other employees or team members will appreciate their value, particularly when the acquired resources are unconventional. This may lead to underutilization of these resources or even a self-fulfilling prophecy, whereby they fail to create value because many falsely believe that they cannot do so. Valuable human resources may remain underutilized or abandoned prematurely, even when firms sense and seize them.

3.3.1. Moneyball. Billy Beane and the A’s were not the first MLB general manager and team to overcome the cognizing and searching limits. Many MLB fans, particularly Bill James (author of the famous *Historical Baseball Abstract*; James 1985), recognized the inefficiencies in the MLB and created alternative, more effective measures to evaluate players. Most MLB teams ignored these advances in sabermetrics. Some did follow them but, because of the reconfiguring limit, failed to overcome resistance from internal stakeholders.

Take, for example, John Henry, who was briefly the owner of the MLB’s Miami Marlins. Having made a fortune by exploiting the inefficiencies of financial markets, Henry believed he could replicate his success in the MLB:

People in both fields operate with beliefs and biases. To the extent you can eliminate both and replace them with data, you gain a clear advantage . . . Many people think they are smarter than others in baseball and that the game on the field is simply what they think it is through their set of images/beliefs. Actual data from the market means more than individual perception/belief. The same is true in baseball. (Lewis 2003, p. 56)

Based on his belief that he could profit from inefficiencies in the MLB, Henry acquired the Marlins in 1999 and adopted more efficient metrics for evaluating, recruiting, and managing players. However, the Marlins had some of the worst performances in their history under Henry, and he sold his shares in the team in 2002. Henry’s problem was social and political: His approach was so different from the

conventional MLB playbook, and how he implemented it as an outsider was so radical, that the entire team (manager, coach, scouts, and players) resisted the changes through noncooperation. As past successful MLB players themselves, many of these internal stakeholders benefited from the existing value system, such as having the right look or high performance on popular (but misleading) measures. They hesitated to adopt an approach that might harm their self-identification, even though it would clearly help them identify the best resources in the business. These internal stakeholders defended their value system so strongly that it seemed they would rather lose games than sacrifice their identity.

Similar challenges had occurred at the A's before Beane became general manager. Beane's predecessor, Sandy Alderson, had also adopted sabermetrics to improve player recruitment. However, the A's coach instructed many acquired players to do the opposite of what they had been hired to do. Traditionally, base-on-balls was considered a pitcher's error and an irrelevant measure of wins. The sabermetrics approach suggests that this (as well as the on-base rate) is an important measure because it is more highly correlated with wins than other popular measures, such as batting averages. More importantly, high base-on-balls should be credited to hitters, who are likely to have unusual patience and superior judgment that exploits pitchers' weaknesses. But the hidden gems trained or acquired by Alderson lost their patience or judgment because their coach, Tony La Russa, told them to unleash their natural aggression and swing freely. Alderson never challenged La Russa for ruining the recruitment strategy, as quoted in Lewis (2003, p. 60): "There was no very good reason for this; it's just the way it was, because the guys who ran the front office typically had never played in the big leagues." La Russa overgeneralized from his experience as an MLB player and rejected insights from outsiders like Alderson who had never played with the league. The A's had embraced sabermetrics long before Beane became general manager, but they failed to overcome the reconfiguring limit because possible improvements were blocked by powerful gatekeepers who disallowed changes that contradicted their worldview.

3.3.2. Beyond Sports. Hiring cognitively diverse team members does not necessarily imply that their cognitive diversity will be effectively expressed, communicated, assimilated, and integrated. Even when a sufficiently diverse team is assembled, unique perspectives and knowledge may be left unassimilated unless the team has a culture or norm that encourages people to challenge the status quo and value differences. Worse, existing team members may not

understand the logic of generating diversity bonuses and may interpret atypical hiring that deviates from objective criteria as discrimination or favoritism, leading to hostility to the new recruit. This may generate a diversity penalty rather than a bonus (Leslie 2018). For example, recent studies show that when females or racial minorities are hired as executives or chief executive officers (CEOs), they may perform less well than expected because male or white executives may withdraw support owing to their perceived loss of identity (McDonald et al. 2017). This implies that simply including diverse team members is insufficient because of reconfiguring limits.

When a firm's goal is to achieve critical mass from scaling up, diversity is not always beneficial (Dierickx and Cool 1989). Instead, homogeneity of knowledge, experience, and connections may facilitate communication and create trust among team members. These qualities are essential when a team's main task is less about creating innovative ideas and more about selecting and developing the best among them (Reagans et al. 2005, Keum and See 2017). Diversity is important when the task requires substantial cognitive diversity rather than social cohesion and harmony among team members, and the firm needs to avoid possible mismatches.

In summary, the reconfiguring limit to arbitrage may deter firms from integrating atypical resources, even when they manage to sense and seize these valuable resources. Resistance from existing members may be so strong that the valuable resources may be set up to fail. As a result, unconventional but valuable human resources may be underutilized or even stigmatized in the labor market.

3.4. The Legitimizing Limit

The legitimizing limit to arbitrage relates to how firms fail to justify to external stakeholders that the output from unconventional resources is indeed valuable or the process of generating the output is legitimate. In the context of diversity, this limit focuses on how external stakeholders may dismiss the performance bonus from engaging diversity if they discount or refuse to acknowledge the process or output.

3.4.1. Moneyball. One might think that the number of wins is the most important performance measure to MLB teams. But whereas team wins are indeed important to their fans (who contribute to revenues via ticket sales), they are not necessarily the most relevant consideration for team owners and management. Instead, following the norm is considered paramount to many of them. Deviating from conventional wisdom about how an MLB team should be run may attract disapproval from the MLB "social

club” (Lewis 2003). Problematically, according to sabermetrician Voros McCracken:

[The MLB is] a self-populating institution. Knowledge is institutionalized. The people involved with baseball who aren’t players are ex-players . . . They aren’t equipped to evaluate their own systems. They don’t have the mechanisms to get rid of the bad. They either keep everything or get rid of everything, and they rarely do the latter. (Lewis 2003, p. 239).

The implication is a separation of brains and capital, as highlighted in the limits to arbitrage in financial markets (Shleifer and Vishny 1997). Even if managers recognize efficient approaches to winning more games and making more money, they cannot convince their owners, who listen to those who appear to be more legitimate in the sport, even when their knowledge is outdated or flawed.

The social cost of adopting an unconventional approach may outweigh the economic benefits of doing so. Managers who adopt unconventional approaches may not get credit when they succeed. For example, the A’s unusual success—winning many games with a limited budget—became so salient that the MLB organized a committee to study this aberration, but its conclusion was mainly that “they’ve been lucky” (Lewis 2003, p. 122). Many guards of the “MLB club” (such as ex-players as commentators) criticized Beane’s approach and questioned why, if his approach was so effective, the A’s didn’t win the World Series. Such criticisms are not fact based but taste based. Many professional sport seasons are structured to mock rationality; success during the long regular season is much more reliable than success during the brief playoffs (Denrell et al. 2015). Yet teams and fans care much more about the playoffs, despite outcomes depending more on luck. MLB insiders didn’t acknowledge the A’s success because how it was produced was not to their taste. Pointing out flaws in their criticisms would be unlikely to change their evaluations, but rather would enhance “anti-intellectual resentment” (Lewis 2003, p. 99), which was based in the belief that MLB outsiders know nothing except how to produce numbers on computers and thus have no right to challenge the MLB’s norms. Billy Beane was criticized precisely because his unconventional approach led to successes that humiliated insiders and because, as an ex-player himself, he “betrayed” this club. Other teams and managers may have hesitated to follow in Beane’s footsteps for fear of a social backlash.

On the other hand, managers who adopt unconventional approaches may become scapegoats when they fail to meet expectations. This happened to Paul DePodesta, an A’s assistant of Beane’s who was good at analyzing players’ value using sabermetric principles. He was hired as general manager of the Los

Angeles Dodgers in 2004 but fired shortly after, following a terrible season. The reason for his termination was mainly bad luck: Several players whom DePodesta hired later proved valuable, but six of them were injured in 2005. The Dodgers’ 2005 season resulted in the team’s worst record since 1992, and its owner, partly influenced by two strong anti-Moneyball sports columnists at the *Los Angeles Times*, fired DePodesta as a result. The implication is a typical agency problem: Achieving mediocre performance by following convention is a more reliable survival strategy for MLB managers, even though some are aware of more efficient approaches.⁷

3.4.2. Beyond Sports. Even when a team is able to sense, seize, and integrate unconventional resources, the legitimizing limit may still impede realization of the diversity bonus. The executive must convince relevant stakeholders that the diversity bonus is real. Research shows that if performance measurement is based on subjective evaluation or is socially constructed, evaluations are likely to reflect evaluators’ biases (Becker 1971). For example, a diverse team may generate a novel artistic innovation that spans multiple categories in a surprising way. However, if there are no objective criteria for evaluating this artistic output, evaluators may use other cues, such as judgments based on creators’ stereotypes, or may conform with high-status colleagues’ evaluations. This suggests that diversity bonuses may be generated but discounted so heavily that they are no longer profitable. Venture capitalists (VCs), for example, may correctly identify the uniqueness of undervalued start-ups, such as having entrepreneurs from atypical backgrounds or developing an unconventional innovation. However, they may be unable to profit from this superior insight if they cannot convince other investors of its value. If VCs rightly foresee this legitimizing limit, they may forgo this start-up, failing to realize the diversity bonus despite recognizing it. Similarly, analysts may not understand a firm’s atypical strategy and may discount it (Benner and Zenger 2016), limiting the acquisition of diverse assets (Zuckerman 1999).

In summary, the legitimizing limit to arbitrage may deter firms from engaging in valuable diversity even when they privately know that doing so might lead to superior performance. Self-interested managers may choose not to pursue obvious opportunities that may appear illegitimate to important stakeholders if their incentives are structured to punish unconventional successes and reward legitimized mediocrity or even failures.

4. Overcoming the CSRL Limits to Arbitrage Mispriced Diversity

The case of *Moneyball* illustrates how CSRL limits deter many MLB teams and managers from sensing,

seizing, integrating, or justifying valuable but atypical players. These strong limits preserve behavioral failures and labor-market inefficiencies, such that undervalued players remain untapped opportunities. Teams that are able to supersede these limits more effectively than their rivals can monopolize the opportunity and earn contrarian profit. This was the case for the A's and Billy Beane from 1999 to 2003. They exploited an untapped opportunity in the MLB—recruiting and using valuable but atypical players to gain more wins—because they managed to overcome all the CSRL limits more effectively than their rivals. As discussed, some teams, such as the Miami Marlins under John Henry, overcame some CSRL limits, but remaining limits still effectively deterred them from allowing *Moneyball* to occur sooner. As will be elaborated, overcoming all the CSRL limits usually depends not only on becoming more rational or strategic, but also on being in the right place at the right time: If strategists happen to have “preferential access to the missing piece of the puzzle, identifying the opportunity might be easy” (Denrell et al. 2003, p. 985).

In terms of cognizing limits in the MLB, a shared mental model may have been so popular that many teams and their management could not see how atypical players (such as Chad Bradford) might actually be competent. What motivated Beane to pay attention to, and eventually adopt, a different mental model was largely his personal, idiosyncratic experience. Beane had been a promising high schooler, but his MLB career had been disappointing. He knew from experience that the conventional practice of drafting stereotypical players with the right look was flawed. In fact, Beane turned his experience on its head by using his antitheses as a guide. That is, he sought players unlike himself, such as young men “not looking good in a uniform . . . couldn't play anything but baseball . . . had gone to college” (Lewis 2003, p. 117). Hundreds of high schoolers were mistakenly drafted into the MLB because they, like Beane, had a stereotypical look, but only Beane took advantage of this blunder and turned it into a contrarian theory (Felin and Zenger 2017) that allowed him to see what his rivals failed to see.

The searching limit in the MLB is about identifying the right hidden gems among atypical candidates. This task is nontrivial, because most atypical players are not competent, as rightly predicted by the representative heuristic. Teams searching for the truly undervalued among atypical players face many learning traps. As discussed, the challenge is not only about analyzing data, but also about collecting and analyzing more reliable data. This limit was not particularly challenging to Beane. His predecessor at the A's, Sandy Alderson, had adopted sabermetrics principles

in the 1990s (including collecting, purchasing, and analyzing unconventional but more reliable performance metrics), suggesting that Beane had already gone through part of the learning curve when he took over the team in late 1997. Hiring Paul DePodesta, a Harvard-trained economist, as his assistant improved the A's efficiency in identifying undervalued players, but was probably not essential for the A's success, since many fans would have loved to contribute equivalent skill and knowledge freely to any MLB team willing to listen to them.

What is more surprising is Beane's strategic exploitation of rivals being constrained by the searching limit. As discussed, many closing pitchers are overvalued because their performance is based on a small sample size and is sensitive to framing. Beane reasigned some of the A's above-average relief pitchers as closers, and many soon seemed more valuable than they actually were. Rivals that persisted in using the number of games saved were fooled and became overenthusiastic when Beane proposed deals to trade these closers. The A's benefited from this sell high strategy and winner's curse in trades. Good deals based on apparent but misleading superior performance were engineered to allow the A's to gain more resources to recruit undervalued players.

The reconfiguring limit deterred some teams (such as the Marlins) from exploiting inefficiencies in the MLB ahead of Beane. In fact, the A's had been deterred by the same limit before Beane took over because Coach Tony La Russa had refused to make use of the atypical players hired by Alderson. The solution was to replace him with a low-profile coach, Art Howe, who “was hired to implement the ideas of the front office” (Lewis 2003, p. 61). Beane also ensured that incentives were structured to reward players for delivering what they were hired for, such as high base-on-balls, and to punish them if they followed the conventional playbook, which actually harmed performances, such as stealing bases or sacrificing strikes. Importantly, unlike Alderson, Beane had the authority to implement this unconventional strategy: He was known as “the guy destined for the Hall of Fame who never panned out” (Lewis 2003, p. 57). That is, he was a living example of the inadequacy of the conventional MLB playbook for A's scouts and players. Beane also facilitated the integration of atypical players by reducing the influence of his own biases. Knowing that his own judgments might also be influenced by stereotypes, Beane tended to meet the players he hired infrequently. By reducing his exposure to salient but misleading cues, he set himself up to evaluate and use players based on their contributions to wins, rather than by their look.

Finally, the legitimizing limit was very strong in the MLB. The MLB playbook probably only worked

for the richest teams, but other teams felt pressure to follow these rules, even though some may have privately known that they were not the most efficient (Correll et al. 2017). The fact that Beane managed one of the poorest teams in the MLB and could not afford to go after the same players as other teams probably enabled the A's to overcome the legitimizing limit more effectively than their rivals. Owing to the resource constraint, the A's owner ignored journalists' criticisms of Beane's approach and allowed him to experiment with different types of players to enhance performance, effectively relaxing this limit. Moreover, Beane used the A's underdog status to his advantage: He justified his acquisition of apparently flawed players by his lack of resources. A's management got excited when they realized that the flaw that caused rivals to discount some players in the deals was "something that just doesn't matter" (Lewis 2003, p. 116). The A's deal counterparts were fooled because they believed that pursuing flawed players was a legitimate move for resource-poor teams like the A's.

In summary, Billy Beane and the A's managed to overcome all the CSRL limits in the MLB and monopolize an untapped opportunity. Despite having one of the lowest payrolls, the A's thrived by systematically acquiring players from rivals at a lower price than implied by their contributions to winning. Beane's idiosyncratic experiences and the A's circumstances made them less blind and constrained, which allowed them to exploit the opportunity. How Beane strategized with his experience and circumstances also played an important role in integrating and justifying the atypical resources more effectively than their predecessors. Overall, planned and unplanned behavioral asymmetry between Beane, the A's, and other MLB teams and managers explains why it was Beane who successfully exploited this opportunity.

The case of *Moneyball* also highlights how overcoming the CSRL limits generates sustainable competitive advantage for a strategist (Peteraf 1993), as these limits can create effective isolation mechanisms (Rumelt 1984) that deter ex post competitions (e.g., many MLB teams attributed the A's success to luck and did not bother to study or imitate their approach) and mobility (e.g., rivals had limited interest in hiring the A's atypical players, no matter how good their performances were). In the case of *Moneyball*, the A's sustainable competitive advantage became fleeting when the CSRL limits were eliminated by Michael Lewis's bestseller. Still, this case highlights how strong CSRL limits can preserve attractive opportunities: Strategists who can overcome these limits can enjoy competitive advantage when rivals continue to be deterred by these limits.

5. In Search of Behavioral Arbitrage Opportunities

Searching for viable strategic opportunities is like searching for a needle in many haystacks (Lippman and Rumelt 2003a). Felin and Zenger (2017) propose that strategists can simplify the process by developing a contrarian theory to reduce the number of haystacks that need to be searched. This paper presents a perspective that can refine the search by positing that attractive opportunities tend to be protected by strong behavioral and social limits to exploiting them. This perspective thus helps strategists locate the most promising—and most overlooked—haystack. The proposed CSRL limits help a contrarian strategist formulate specific behavioral and social problems and experimentation in order to identify and overcome these limits. More generally, this perspective provides a template for searching for persistent behavioral failures and, in turn, untapped opportunities. I illustrated the application of this perspective in the context of diversity and human resources. Future research might use this approach to outline the specific limits that preserve opportunities in other strategically relevant contexts.

Importantly, untapped strategic opportunities are not necessarily tied to any particular approach (e.g., wisdom of the crowd trumps experts), method (e.g., data analytics trumps conventional evaluations), or presumption (e.g., diversity enhances performance). *Astroball* (Reiter 2018), an update of the evolution of the *Moneyball* strategy, illustrates how one of the worst-performing MLB teams, the Houston Astros, won the 2017 World Series by rediscovering the value of scouts' judgment. Untapped opportunities emerge when too many people share similar enthusiasms for a particular approach, method, or presumption (e.g., replacing scouts with data analytics) to such an extent that all alternatives become too cognitively distant to them. For example, when the *Moneyball* strategy became a fad after 2003, scouts' input into hiring decisions was severely marginalized and underestimated. Thus, opportunities existed for those willing to try (and capable of) becoming contrarian (Felin and Zenger 2017), as the Houston Astros did. Nevertheless, the Astros' success may trigger another cycle of diffusion, imitation, and socialization, and a new set of CSRL limits as well as strategic opportunities. To paraphrase Mark Twain, as a strategist, whenever you find yourself on the side of the majority, it is time to search for contrarian opportunities.

Behavioral strategy as arbitrage also contributes to the diversity literature by providing a distinct perspective that complements the two mainstream views of why firms should engage diversity. Much research and many practices address diversity from a normative,

justice-centric perspective (Nkomo et al. 2019), stipulating that firms should encourage the inclusion of individuals with certain disadvantaged social identities, such as female, black, or immigrant. Others emphasize a pragmatic, performance-centric view (Page 2017), stating that firms that engage diversity—solving complex tasks by assembling cognitively diverse teams—are likely to earn a performance bonus. Behavioral strategy as arbitrage suggests that both perspectives are incomplete. Taking a normative but behaviorally naïve perspective on organizations has been shown to backfire: Doing the right thing, such as fixing historical social injustice through affirmative action, without considering the CSRL limits may reinforce rather than attenuate the disadvantages of certain identity groups (Dobbin et al. 2015). One challenge is that many who take a normative stance believe that “pragmatic logics carry less weight than normative arguments” (Page 2017, p. 6). This belief may also create greater CSRL limits, because those who have a perceived moral high ground are more likely to make biased judgments and discount viable alternatives when something does not fit their moral values—the so-called paradox of meritocracy (Castilla and Benard 2010). On the other hand, the pragmatic view does not yet address the behavioral and social limits associated with exploiting the performance bonus from engaging diversity. The logic of generating a diversity bonus may be clear theoretically, but behavioral failures prevent these bonuses from being exploited practically. The perspective of behavioral strategy as arbitrage illuminates the importance of studying the forces that generate behavioral failures when engaging diversity in order to do the right thing, improve performance, or both. Organizations should also clearly distinguish between normative and pragmatic perspectives, because being stuck in the middle creates greater CSRL limits.

Recent hype around AI serves as an interesting illustration of the relevance of CSRL limits. Many AI algorithms, similar to human cognitions, predict behaviors or categories based on simplifications of complex reality and generalizations of the inferences obtained. Although effective in many ways, this simplification may create overgeneralization and predictable blind spots. For example, algorithms can only optimize what can be quantified, but many subtle characteristics, such as cognitive diversity in teams, cannot yet be measured reliably, leading to systematic misvaluations by naïve AI users. Moreover, AI is only as smart as the data it is fed, but existing data may reflect decades of accumulated human biases and social injustice. This is why Amazon ditched its AI recruiting tool, which favored males for technical jobs. This incident also suggests that less salient biases than gender stereotypes may be

utilized by algorithms, creating subtle iron cages that trap future generations. Even if strategists overcome the cognizing and searching limits in algorithms, it is still challenging for existing organizations to integrate and adapt to AI. For example, who should be held accountable when AI predictions go wrong, particularly when the algorithms are too sophisticated to be comprehended by managers and stakeholders, such as predictions based on deep-learning algorithms? Although some managers appreciate these concerns about AI, they may be forced to adopt it prematurely when investors or the media uncritically believe that AI, combined with big data, is the solution to every problem. Unfortunately, taken together, the hype surrounding AI may actually reinforce existing CSRL limits that deter firms from engaging diversity. However, the good news is that these limits also preserve attractive, untapped opportunities for firms that are able to predict results based on algorithms that allow enriched representations, to sanitize big but polluted data, to redesign organizational structures to adapt to AI, and to rebel against the myths of AI and their true believers.

Finally, the discussion of factors contributing to the success of the A's and Beane also potentially reconciles two competing views on the origin of great strategies and performance. Many strategy researchers consider great strategies to be “rooted in meaningful departures from a prevailing status quo—the cognitions, practices, routines, and institutions that stabilize a market or competitive order at any given point in time” (Gavetti and Porac 2018, p. 354). They suggest systematic pathways to greatness, such as by deepening, extending, or replacing the existing market or competitive order (p. 364). An alternative, more pessimistic view is that there is no such systematic pathway (Denrell et al. 2003, March 2006, Andriani and Cattani 2016). As *Moneyball* illustrates, Beane's and the A's departure from the status quo was a mixture of luck (happening to be in a poor team with an enlightened predecessor as mentor and a hands-off team owner) and strategy (e.g., Beane maximized returns from his (un)fortunate experiences and his team's limited resources). Exceptional performance is likely to occur in exceptional circumstances (Denrell and Liu 2012), implying that great strategies can improve performance, but are insufficient to achieve great performance. Great performance, such as radical innovation, exceptional growth/return, or unprecedented achievements, is more likely to occur in contexts where most firms are deterred by various limits in cognitions, practices, routines, and institutions, except for a few that happen to overcome these limits by being closer to the right time and right place.

This view should not discourage strategists, as it simply adds one more clue to solving the strategic

paradox that attractive opportunities should not be easy to exploit. Popular strategy theories teach us that attractive industry opportunities are protected by strong limits that deter entry (Porter 1980), and that attractive resource opportunities are protected by strong limits that deter imitation and substitution (Barney 1991). The behavioral strategy as arbitrage perspective resembles this logic and suggests that attractive behavioral opportunities cannot be low-hanging fruit, but must be protected by strong limits that deter deliberation, learning, changes, and being contrarian. Whoever can overcome all these limits will monopolize the contrarian profit. By looking for sticky behavioral failures, one may be able to identify untapped strategic opportunities. Fortune favors the strategists prepared with an acute awareness of behavioral and social dynamics.

Acknowledgments

The author acknowledges the major contributions of Jerker Denrell and Christina Fang to the ideas expressed here. He is grateful for comments from Raina Brands, Florian Ellsaesser, Koen Heimeriks, Ozgecan Kocak, Daniella Laureiro Martinez, Sheen Levine, James March, Pinar Ozcan, Hazhir Rahmandad, Ray Reagans, Christian Stadler, Maciej Workiewicz, and Ezra Zuckerman. He is also grateful to senior editor Thorbjørn Knudsen and the reviewers for their thoughtful guidance and suggestions.

Endnotes

¹ Arbitrage is about exploitations of price-value gaps (Barberis and Thaler 2003, Zuckerman 2012b). In Section 2, I elaborate on how I extend this concept to strategic contexts. In financial markets, arbitrage describes how rational traders take advantage of less rational investors' biased evaluations. For example, suppose that Firm A's fundamental value is \$10 per stock share. Imagine that a group of irrational traders, or "noise traders" (DeLong et al. 1990), becomes overly pessimistic about Firm A's prospects, pushing its stock price down to \$5. A rational trader, Trader X, can profit by acquiring the undervalued Stock A and can hedge the risk by shorting a substitute stock—for example, stock of Firm B operating in the same industry with a similar prospective cash flow as Firm A. If Firm A's stock price subsequently bounces back to its fundamental value of \$10 (i.e., when the market recovers from the overreaction), the profit earned by Trader X is the temporary price difference (\$10 – \$5 = \$5) times the volume of Stock X acquired, minus the cost of the hedge. If Firm A's stock price subsequently deviates further from its fundamental value of \$10—for example, because of a piece of industry news that negatively impacts both Firm A and Firm B, and hence pushes Firm A's price, say, from \$5 to \$3 and Firm B's price from \$10 to \$8, then Trader X can attenuate the loss (i.e., the decrease of \$2 in Firm A's share price times the acquired volume) through the hedge. That is, Trader X can sell Stock B at \$10, with the acquisition cost equal to its current price of \$8.

² In financial markets, traders may identify a mispriced asset, but arbitraging the mispricing may be infeasible because of at least three types of limits to arbitrage. First, there is a hedging risk because the substitute stock is rarely perfect. Following the example from endnote 1, Stock B's price may not decrease enough (or at all) when negative industry news is announced, suggesting a failed or insufficient hedge. Second, there is a capital risk because traders rarely invest their own

money. "A separation of brains and capital" (Shleifer and Vishny 1997) exposes traders to the risk that they may lose capital support if their investors are not immune to the misvaluations upon which the arbitrage opportunity is based, as illustrated by Michael Lewis's book, *The Big Short* (Lewis 2011). The third type of risk concerns implementation: Mispricing may occur, but it may not lend itself to a feasible arbitrage strategy, or the cost of implementation, such as the borrowing cost to implement sufficient short selling in a hedge, may be too high. As Keynes put it, "[t]he market can stay irrational longer than you and I can remain solvent" (Shilling 1993, p. 236). Overall, these limits suggest that although an arbitrage opportunity may exist, it may be too costly or risky to be feasible. A mispricing may be identified, but with no profitable investment strategy (i.e., no free lunch), allowing the mispricing and market inefficiencies to persist (i.e., prices are incorrect).

³ This argument is consistent with how Barney (1989) responded to the critique of Dierickx and Cool (1989) that important strategic resources are often cumulated within firms and not tradeable on strategic factor market. Barney argues that tradability is an nonissue in his 1986 strategic factor market framework because the framework "applies in the analysis of the return potential of these assets" (1989, p. 1512). Similarly, misvaluation of assets creates potential arbitrage opportunities. They are more difficult to exploit if the assets under consideration are nontradeable or firm specific, but this does not mean that the potential does not exist. Of course, an arbitrage opportunity may only exist counterfactually and could never be realized because of limits that are impossible to overcome. This is a practical rather than theoretical constraint of this perspective. Also, its application may still offer useful guidance for strategists considering whether an opportunity is worth pursuing.

⁴ In contrast to financial arbitrage, which relies on a general equilibrium framework, a behavioral strategy as arbitrage perspective, consistent with the resource-based view of the firm (Peteraf 1993; Lippman and Rumelt 2003a, b), relies on a partial equilibrium framework.

⁵ This is consistent with the idea that many strategic resources are difficult to price, as they involve combinations of firm-specific resources. The fact that they are difficult to value suggests that their misvaluation, as well as the resulting opportunities, may be protected by strong limits to arbitrage.

⁶ See <http://m.mlb.com/glossary/standard-stats/error> (accessed February 15, 2021).

⁷ Or, as John Maynard Keynes (1936, p. 158) put it, "Worldly wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally."

References

- Akerlof GA (1970) The market for "lemons": Quality uncertainty and the market mechanism. *Quart. J. Econom.* 84(3):488–500.
- Andriani P, Cattani G (2016) Exaptation as source of creativity, innovation, and diversity: Introduction to the special section. *Indust. Corporate Change* 25(1):115–131.
- Audia PG, Locke EA, Smith KG (2000) The paradox of success: An archival and a laboratory study of strategic persistence following radical environmental change. *Acad. Management J.* 43(5): 837–853.
- Barberis N, Thaler R (2003) A survey of behavioral finance (Chapter 18). Constantinides GM, Harris M, Stulz R, eds. *Handbook of the Economics of Finance*, vol. 1 (Elsevier North Holland, Amsterdam), 1053–1128.
- Barney J (1991) Firm resources and sustained competitive advantage. *J. Management* 17(1):99–120.
- Barney JB (1986) Strategic factor markets: Expectations, luck, and business strategy. *Management Sci.* 32(10):1231–1241.
- Barney JB (1989) Asset stocks and sustained competitive advantage: A comment. *Management Sci.* 35(12):1511–1513.

- Barney JB (1995) Looking inside for competitive advantage. *Acad. Management Perspect.* 9(4):49–61.
- Becker GS (1971) *The Economics of Discrimination* (University of Chicago Press, Chicago).
- Benner MJ, Zenger T (2016) The lemons problem in markets for strategy. *Strategy Sci.* 1(2):71–89.
- Castilla EJ, Benard S (2010) The paradox of meritocracy in organizations. *Admin. Sci. Quart.* 55(4):543–676.
- Christensen M, Knudsen T (2010) Design of decision-making organizations. *Management Sci.* 56(1):71–89.
- Cohen WM, Levinthal DA (1990) Absorptive capacity: A new perspective on learning and innovation. *Admin. Sci. Quart.* 35(1):128–152.
- Correll SJ, Ridgeway CL, Zuckerman EW, Jank S (2017) It's the conventional thought that counts: How third-order inference produces status advantage. *Amer. Sociol. Rev.* 82(2):297–327.
- Csaszar FA, Levinthal DA (2016) Mental representation and the discovery of new strategies. *Strategic Management J.* 37(10):2031–2049.
- Davis JP, Eisenhardt KM, Bingham CB (2009) Optimal structure, market dynamism, and the strategy of simple rules. *Admin. Sci. Quart.* 54(3):413–452.
- Delong JB, Shleifer A, Summers LH, Waldmann RJ (1990) Noise trader risk in financial-markets. *J. Political Econom.* 98(4):703–738.
- Denrell J, Liu C (2012) Top performers are not the most impressive when extreme performance indicates unreliability. *Proc. Natl. Acad. Sci. USA* 109(24):9331–9336.
- Denrell J, March JG (2001) Adaptation as information restriction: The hot stove effect. *Organ. Sci.* 12(5):523–538.
- Denrell J, Fang C, Liu C (2015) Chance explanations in the management sciences. *Organ. Sci.* 26(3):923–940.
- Denrell J, Fang C, Liu C (2019) In search of behavioral opportunities from misattributions of luck. *Acad. Management Rev.* 44(4):896–915.
- Denrell J, Fang C, Winter SG (2003) The economics of strategic opportunity. *Strategic Management J.* 24(10):977–990.
- de Oliveira S, Nisbett RE (2018) Demographically diverse crowds are typically not much wiser than homogeneous crowds. *Proc. Natl. Acad. Sci. USA* 115(9):2066–2071.
- Dierckx I, Cool K (1989) Asset stock accumulation and sustainability of competitive advantage. *Management Sci.* 35(12):1504–1511.
- DiMaggio PJ, Powell WW (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *Amer. Sociol. Rev.* 48(2):147–160.
- Dobbin F, Schrage D, Kalev A (2015) Rage against the iron cage: The varied effects of bureaucratic personnel reforms on diversity. *Amer. Sociol. Rev.* 80(5):1014–1044.
- Dumas TL, Phillips KW, Rothbard NP (2013) Getting closer at the company party: Integration experiences, racial dissimilarity, and workplace relationships. *Organ. Sci.* 24(5):1377–1401.
- Eberhardt JL (2019) *Biased: Uncovering the Hidden Prejudice That Shapes What We See, Think, and Do* (William Heinemann, New York).
- Fama EF (1970) Efficient capital markets: A review of theory and empirical work. *J. Finance* 25(2):383–417.
- Fang C, Liu C (2018) Behavioral strategy: In search of an alternative source of profitability. *Adv. Strategic Management* 38(1):209–219.
- Felin T, Zenger TR (2017) The theory-based view: Economic actors as theorists. *Strategy Sci.* 2(4):258–271.
- Fiske ST, Taylor SE (2013) *Social Cognition: From Brains to Culture* (Sage, New York).
- Galinsky AD, Todd AR, Homan AC, Phillips KW, Apfelbaum EP, Sasaki SJ, Richeson JA, Olayon JB, Maddux WW (2015) Maximizing the gains and minimizing the pains of diversity: A policy perspective. *Perspect. Psych. Sci.* 10(6):742–748.
- Gavetti G (2012) Toward a behavioral theory of strategy. *Organ. Sci.* 23(1):267–285.
- Gavetti G, Porac J (2018) On the origin of great strategies. *Strategy Sci.* 3(1):352–365.
- Gigerenzer G, Goldstein DG (1996) Reasoning the fast and frugal way: Models of bounded rationality. *Psych. Rev.* 103(4):650–669.
- Graham B (1959) *The Intelligent Investor* (Harper & Brothers Publishers, New York).
- Hannan MT, Freeman J (1984) Structural inertia and organizational change. *Amer. Sociol. Rev.* 49(2):149–164.
- Haunschild PR, Miner AS (1997) Modes of interorganizational imitation: The effects of outcome salience and uncertainty. *Admin. Sci. Quart.* 42(3):472–500.
- Helfat CE, Lieberman MB (2002) The birth of capabilities: Market entry and the importance of pre-history. *Indust. Corporate Change* 11(4):725–760.
- Henderson RM, Clark KB (1990) Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Admin. Sci. Quart.* 35(1):9–30.
- Jackson SE, Joshi A, Erhardt NL (2003) Recent research on team and organizational diversity: SWOT analysis and implications. *J. Management* 29(6):801–830.
- James B (1985) *The Bill James Historical Baseball Abstract* (Villard Books, New York).
- Jonsson S, Regné P (2009) Normative barriers to imitation: Social complexity of core competences in a mutual fund industry. *Strategic Management J.* 30(5):517–536.
- Kahneman D (2011) *Thinking, Fast and Slow* (Penguin, London).
- Kalev A, Dobbin F, Kelly E (2006) Best practices or best guesses? Assessing the efficacy of corporate affirmative action and diversity policies. *Amer. Sociol. Rev.* 71(4):589–617.
- Keum DD, See KE (2017) The influence of hierarchy on idea generation and selection in the innovation process. *Organ. Sci.* 28(4):653–669.
- Keynes JM (1936) *General Theory of Employment, Interest and Money* (Harcourt Brace and Co, New York).
- Knorr Cetina K, Preda A (2012) *The Oxford Handbook of the Sociology of Finance* (Oxford University Press, Oxford, UK).
- Leslie LM (2018) Diversity initiative effectiveness: A typological theory of unintended consequences. *Acad. Management Rev.* 44(3):538–563.
- Levinthal DA, March JG (1993) The myopia of learning. *Strategic Management J.* 14(8):95–112.
- Lewis M (2003) *Moneyball: The Art of Winning an Unfair Game* (WW Norton & Company, New York).
- Lewis M (2011) *The Big Short: Inside the Doomsday Machine* (WW Norton & Company, New York).
- Lewis M (2016) *The Undoing Project: A Friendship That Changed the World* (Penguin, London).
- Lippman SA, Rumelt RP (2003a) A bargaining perspective on resource advantage. *Strategic Management J.* 24(11):1069–1086.
- Lippman SA, Rumelt RP (2003b) The payments perspective: Micro-foundations of resource analysis. *Strategic Management J.* 24(10):903–927.
- Litov LP, Moreton P, Zenger TR (2012) Corporate strategy, analyst coverage, and the uniqueness paradox. *Management Sci.* 58(10):1797–1815.
- Liu C, Vlaev I, Fang C, Denrell J, Chater N (2017) Strategizing with biases: Engineering choice contexts for better decisions using the Mindspace approach. *Calif. Management Rev.* 59(3):135–161.
- MacKenzie DA, Muniesa F, Siu L (2007) *Do Economists Make Markets?: On the Performativity of Economics* (Princeton University Press, Princeton, NJ).
- Makadok R, Barney JB (2001) Strategic factor market intelligence: An application of information economics to strategy formulation and competitor intelligence. *Management Sci.* 47(12):1621–1638.
- March JG (2006) Rationality, foolishness, and adaptive intelligence. *Strategic Management J.* 27(3):201–214.

- Massey C, Thaler RH (2013) The loser's curse: Decision making and market efficiency in the National Football League draft. *Management Sci.* 59(7):1479–1495.
- Mauboussin MJ (2012) *The Success Equation: Untangling Skill and Luck in Business, Sports and Investing* (Harvard Business School Press, Cambridge, MA).
- McDonald M, Keeves GD, Westphal J (2017) One step forward, one step back: White male top manager organizational identification and helping behavior toward other executives following the appointment of a female or racial minority CEO. *Acad. Management J.* 61(2):405–439.
- Mosakowski E (1997) Strategy making under causal ambiguity: Conceptual issues and empirical evidence. *Organ. Sci.* 8(4):414–442.
- Nelson F, Winter S (1982) *An Evolutionary Theory of Economic Change* (Harvard University Press, Cambridge, MA).
- Nkomo SM, Bell MP, Roberts LM, Joshi A, Thatcher S (2019) Diversity at a critical juncture: New theories for a complex phenomenon. *Acad. Management Rev.* 44(3):498–517.
- Oliver C (1997) Sustainable competitive advantage: Combining institutional and resource-based views. *Strategic Management J.* 18(9):697–713.
- Page SE (2017) *The Diversity Bonus: How Great Teams Pay Off in the Knowledge Economy* (Princeton University Press, Princeton, NJ).
- Peteraf MA (1993) The cornerstones of competitive advantage: A resource-based view. *Strategic Management J.* 14(3):179–191.
- Pontikes EG, Barnett WP (2017) The non-consensus entrepreneur organizational responses to vital events. *Admin. Sci. Quart.* 62(1):140–178.
- Porac JF, Thomas H, Wilson F, Paton D, Kanfer A (1995) Rivalry and the industry model of Scottish knitwear producers. *Admin. Sci. Quart.* 40(2):203–227.
- Porter ME (1980) *Competitive Strategies: Techniques for Analyzing Industries and Competitors* (Free Press, New York).
- Powell TC, Lovallo D, Fox CR (2011) Behavioral strategy. *Strategic Management J.* 32(13):1369–1386.
- Reagans R, Argote L, Brooks D (2005) Individual experience and experience working together: Predicting learning rates from knowing who knows what and knowing how to work together. *Management Sci.* 51(6):869–881.
- Reiter B (2018) *Astrobball: The New Way to Win It All* (Crown/Archetype, New York).
- Rosenzweig P (2007) *The Halo Effect* (Free Press, New York).
- Rumelt R (1984) Toward a strategic theory of the firm. Lamb RB, ed. *Competitive Strategic Management* (Prentice Hall, Englewood Cliffs, NJ), 556–570.
- Shilling AG (1993) Scoreboard: A frank self-appraisal of where I went wrong and where I went right in the year just past. *Forbes* 151(4):236.
- Shleifer A, Vishny RW (1997) The limits of arbitrage. *J. Finance* 52(1):35–55.
- Siegel J, Pyun L, Cheon B (2018) Multinational firms, labor market discrimination, and the capture of outsider's advantage by exploiting the social divide. *Admin. Sci. Quart.* 64(2):370–397.
- Teece DJ (2007) Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management J.* 28(13):1319–1350.
- Teece DJ, Pisano G, Shuen A (1997) Dynamic capabilities and strategic management. *Strategic Management J.* 18(7):509–533.
- Thaler RH (2015) *Misbehaving: The Making of Behavioral Economics* (WW Norton & Company, New York).
- Thaler RH, Sunstein CR (2003) Market efficiency and rationality: The peculiar case of baseball. *Michigan Law Rev.* 102(6):1390–1403.
- Turco C, Zuckerman E (2014) So you think you can dance? Lessons from the US private equity bubble. *Sociol. Sci.* 1:81–101.
- Tversky A, Kahneman D (1974) Judgment under uncertainty: Heuristics and biases. *Science* 185(4157):1124–1131.
- van Dijk H, Meyer B, van Engen M, Loyd D (2017) Microdynamics in diverse teams: A review and integration of the diversity and stereotyping literatures. *Acad. Management Ann.* 11(1):517–557.
- Zuckerman EW (1999) The categorical imperative: Securities analysts and the illegitimacy discount. *Amer. J. Sociol.* 104(5):1398–1438.
- Zuckerman EW (2012a) Construction, concentration, and (dis)continuities in social valuations. *Annual Rev. Sociol.* 38(1):223–245.
- Zuckerman EW (2012b) Market efficiency: A sociological perspective. Knorr Cetina K, Preda A, eds. *The Oxford Handbook of the Sociology of Finance* (Oxford University Press, Oxford, UK).

Chengwei Liu is an associate professor of strategy and behavioral science at the European School of Management and Technology. He received his PhD from the University of Cambridge. His research interests include the role of luck in management, behavioral strategy as arbitrage, and organizational learning in the age of artificial intelligence.