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Guoli CHEN
INSEAD

Sterling HUANG
Singapore Management University, SHUANG@smu.edu.sg

Philipp MEYER-DOYLE
HEC Paris

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Generalist versus specialist CEOs and acquisitions: Two-sided matching and the impact of CEO characteristics on firm outcomes

Guoli Chen[1] | **Sterling Huang**[2] | **Philipp Meyer-Doyle**[1] | **Denisa Mindruta**[3]

[1]Strategy Area, INSEAD, Singapore, Singapore

[2]School of Accountancy, Singapore Management University, Singapore, Singapore

[3]HEC Paris, Strategy & Business Policy Department, Jouy-en-Josas, France

Correspondence
Philipp Meyer-Doyle, Strategy Area, INSEAD, Singapore, Singapore.
Email: philipp.meyer@insead.edu

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Abstract

Research Summary: To address endogeneity concerns stemming from firm-CEO matching, we deploy a two-sided matching model that identifies the complementarities arising from the CEO-firm match and subsequently account for these complementarities in empirical tests. Applying this approach, we examine how the nature of CEOs' human capital affects the acquisition behavior and performance of firms. We find that generalist CEOs (CEOs with a broader set of knowledge and skills) are more likely to engage in unrelated acquisitions than specialist CEOs (CEOs with a narrower but deeper set of knowledge and skills). We also find that the fit between the nature of CEOs' human capital and the type of acquisitions they undertake is associated with stronger performance. Our paper contributes to research on CEOs, human capital, M&As, and microfoundations.

Managerial Summary: We deploy an empirical approach that takes into account the complementarities that arise from the matching of CEOs and firms when testing hypotheses on how CEO attributes shape firm

outcomes. Based on this approach, our study finds that CEOs with a broader set of managerial knowledge and skills (generalist CEOs) are more likely to engage in unrelated acquisitions (acquisitions outside a firm's main industry) than CEOs with a narrower but deeper set of knowledge and skills that is more closely tied to a particular industry, firm, or domain (specialist CEOs). We also find that the fit between the nature of CEOs' human capital and the type of acquisitions they engage in is associated with stronger performance.

KEYWORDS

acquisitions, CEOs, human capital, microfoundations, two-sided matching

1 | INTRODUCTION

The human capital of managers is an important factor that can shape the success of firms (e.g., Coff & Kryscynski, 2011; Crook, Todd, Combs, Woehr, & Ketchen Jr, 2011; Hitt, Bierman, Shimizu, & Kochhar, 2001). Within this line of research, a substantial body of prior research suggests that the nature or type of human capital matters (e.g., Castanias & Helfat, 2001; Chatain & Meyer-Doyle, 2017; Hatch & Dyer, 2004; Mayer, Somaya, & Williamson, 2012). Yet comparatively little is known about how the nature of the human capital of managers shapes the strategic behavior of firms and how the fit between the human capital of managers and the strategic behavior they undertake shapes firm performance. However, such knowledge is important to better explain heterogeneity in firm behavior and performance, and it appears particularly relevant in the context of the nature of the CEO's human capital, given the substantial impact that CEOs can have on firms (Finkelstein, Hambrick, & Cannella, 2009; Liu, Fisher, & Chen, 2018; Meyer-Doyle, Lee, & Helfat, 2019).

When testing hypotheses related to how CEO attributes affect firm-level outcomes, the sorting of CEOs into firms can potentially create an endogeneity bias. Methods used by the prior strategic leadership literature to deal with this issue include propensity score matching (PSM) and the Heckman two-step method. However, these methods do not easily account for the *complementarities* that the matching of CEOs and firms creates (Mindruta, Moeen, & Agarwal, 2016; Pan, 2017), which may confound the estimates of the impact of CEO attributes on firms. While two-sided matching models can identify the complementarities between CEOs and firms, such models have rarely been used in the CEO literature and it is nontrivial to address the endogeneity concerns arising from a nonrandom selection of CEOs into firms through an empirical approach that accounts for the complementarities of the firm-CEO match when examining how CEO attributes affect firm-level outcomes.

Building on the above theoretical and empirical gaps, this paper explores how the nature of CEOs' human capital affects the strategic behavior of firms, whether CEOs engage in opportunities that correspond to the nature of their human capital, and whether the fit between the nature of CEOs' human capital and the strategic actions they engage in is associated with

stronger performance. To study these issues, we focus on the distinction between generalist and specialist CEOs (Custódio, Ferreira, & Matos, 2013), and on the context of acquisitions. Specifically, we examine whether generalist CEOs (CEOs with a broader set of managerial knowledge and skills) are more likely to engage in acquisitions than specialist CEOs (CEOs with a narrower but deeper set of knowledge and skills that are more closely tied to a particular industry, firm, or domain). We also examine what type of acquisitions generalist and specialist CEOs are more likely to engage in, and whether the fit between CEOs' human capital and the type of acquisitions they undertake is associated with better performance. Importantly, to alleviate endogeneity concerns that arise from the matching of CEOs and firms, we use a two-sided matching model (Fox, 2010; Fox, 2018) to identify the complementarities arising from the CEO-firm match, and then adopt an empirical approach that accounts for these complementarities when examining how the nature of the CEO's human capital shapes the type of acquisitions they engage in and how the fit between the human capital of the CEO and the acquisition type affects performance.

Our initial and preliminary results suggest that, on average, generalist CEOs are more acquisitive than specialists. Furthermore, conditional on their engaging in acquisitions, generalist CEOs are more likely to undertake diversifying (unrelated) acquisitions than their specialist CEO counterparts. These results are consistent with the idea that CEOs engage in strategic behavior that corresponds to the nature of their human capital. We also observe that the fit between the nature of CEOs' human capital and the type of acquisitions they engage in is associated, on average, with stronger performance. Interestingly, our subsequent analyses that account for the complementarities of the CEO-firm match suggest that our initial finding that generalist CEOs engage in more acquisitions is at least in part driven by the matching of generalist CEOs and firms with generalist boards. However, the rest of our findings remain robust to accounting for the complementarities of the CEO-firm match.

Our paper contributes to the strategic leadership literature by using a two-sided matching model to identify the complementarities of the firm-CEO match and subsequently accounting for these complementarities when examining how CEO characteristics shape firm outcomes. Future research in this field that aims to understand how CEO characteristics shape firm outcomes can utilize this empirical approach to alleviate endogeneity concerns that stem from the matching of firms and CEOs. Our paper also contributes to the literature on human capital and to research on microfoundations in strategy by highlighting how the nature of CEOs' human capital may affect the strategic behavior of firms. We show that managers tend to engage in strategic actions that correspond to their human capital, and that such a fit is associated with stronger performance. Further, our findings also contribute to the literature on acquisitions by highlighting an important factor—the nature of the CEO's human capital and how it is deployed to acquisition opportunities—that can affect acquisition behavior and performance.

2 | GENERALIST VERSUS SPECIALIST CEOS AND FIRM ACQUISITION OUTCOMES

An important characteristic of the nature of the human capital of top managers is the extent to which they have gained general managerial knowledge and skills that are not specific to a particular industry, firm, or domain (e.g., Custódio et al., 2013; Custódio, Ferreira, & Matos, 2019; Li & Patel, 2019), with studies making a distinction between *generalists* (i.e., those with a broader set of managerial knowledge and skills which are not specific to a particular industry,

firm, or domain) and *specialists* (i.e., those with a narrower but deeper set of knowledge and skills that is more closely tied to a specific industry, firm, or domain). In this regard, there is an inherent tradeoff between CEOs' possession of a broader set of managerial knowledge and skills and their possession of a narrower specialist set of skills that are specific to an industry, firm, or domain. While prior research suggests that the firm-specificity of human capital is important (Coff & Kryscynski, 2011; Hatch & Dyer, 2004), the knowledge and skills of managers that are not specific to a firm may still be valuable for that firm and have an important impact on firm outcomes.[1]

The CEO of a firm plays an important role and his/her human capital can be a key factor shaping firm outcomes. Despite prior important contributions (e.g., Crossland, Zyung, Hiller, & Hambrick, 2014; Custódio et al., 2019; Custódio & Metzger, 2013), we still lack a more comprehensive understanding of how the nature of a CEO's human capital (e.g., being a generalist or specialist) affects the type of strategic behavior the CEO engages in and how the fit between the CEO's human capital and the strategic behavior undertaken shapes firm performance. An important type of strategic behavior is the acquisitions a firm engages in. Accordingly, in this paper we develop hypotheses on how being a generalist CEO or specialist CEO influences a firm's acquisition behavior and performance.

We first argue that generalist CEOs engage in a greater number of acquisitions than their specialist counterparts. At the CEO level, acquisitions can benefit from CEOs commanding a broader set of managerial knowledge and skills that are not specific to a particular industry, firm, or domain (i.e., generalist CEOs). Specifically, acquisitions can benefit from CEOs holding general managerial knowledge and skills about when to engage in acquisitions, how to find suitable acquisition opportunities, how to evaluate and value companies, how to negotiate and structure acquisition deals, how to finance and execute corporate transactions, and how to obtain the backing from stakeholders. On the contrary, successfully choosing, planning, and executing an alternative path of corporate growth—internal development initiatives—often requires CEOs' substantial in-depth knowledge of the industry and firm (i.e., knowledge and skills that are typically associated with specialist CEOs).

We expect that CEOs select strategic actions that correspond to the nature of their human capital for two reasons: First, a good fit between the nature of the CEO's human capital and the strategic actions he or she undertakes has the potential to create more value from the CEO's human capital for the firm, allowing the CEO to potentially share some of the greater value created (see also Castanias & Helfat, 1991). Second, following a behavioral logic, a CEO is also more likely to engage in activities that correspond to his or her knowledge and skills as this reduces the effort and risk involved in devising and executing unfamiliar strategic actions. Thus, we argue that generalist CEOs are more likely to engage in acquisitions than their specialist counterparts, who are more likely to engage in internal development.

Hypothesis (H1). *Generalist CEOs engage in a greater number of acquisitions than specialist CEOs.*

To further examine whether CEOs engage in strategic actions that correspond to the nature of their human capital and whether the fit between their human capital and the strategic

[1]Murphy and Zabojnik (2004, 2007) suggest an increasing relative importance of general managerial skills at the top-management level, and Custódio et al. (2013) show that generalist CEOs are paid more than their specialist counterparts, which implies that their human capital is valuable and that it may have an important impact on firms.

initiatives they choose affects performance, we explore the type of acquisitions CEOs undertake when they acquire, and the performance implications thereof. An important characteristic of an acquisition is whether it is an unrelated (i.e., diversifying) or a related (i.e., non-diversifying) acquisition (e.g., Chakrabarti & Mitchell, 2016; Haleblian, Pfarrer, & Kiley, 2017; Singh & Montgomery, 1987).

An acquisition is typically considered an unrelated acquisition if the target operates in a different industry from the acquirer. In such acquisitions, the acquirer and target are usually different in terms of their products, markets, or technology; in unrelated acquisitions, the level of integration between the acquirer and target following the acquisition is typically low since the companies often do not have a high need for interdependence and since such acquisitions may benefit from greater levels of autonomy provided to the target (see also Datta & Grant, 1990; Haspeslagh & Jemison, 1991). Important ways in which the CEO can add value in an unrelated acquisition include the selection of a good investment opportunity, the negotiation with the parties involved, the design of an effective deal structure, and the possession of superior management skills. The knowledge and skills which are relevant to diversifying acquisitions are largely associated with the CEO's general managerial knowledge and skills. Thus, we argue that unrelated acquisitions can benefit from CEOs with a broad set of managerial knowledge and skills that is not specific to a particular industry, firm, or domain (i.e., from generalist CEOs).

In contrast, an acquisition is usually considered a related acquisition if the target operates in the same industry as the acquirer. In such acquisitions, the acquirer and target are typically more similar in terms of their products, markets, or technology than in unrelated acquisitions, and the pursuit of operational synergies is an important factor in related acquisitions (Datta, Pinches, & Narayanan, 1992; Singh & Montgomery, 1987). At the CEO level, related acquisitions benefit from greater knowledge about the firm and industry as the CEO of the acquirer needs to be able to assess the complementarities and overlap between the capabilities and resources of the acquirer and those of potential targets within the industry to facilitate the selection of an appropriate target. Further, related acquisitions are typically associated with higher levels of integration between the acquirer and target following the acquisition since one of the chief concerns in related acquisitions is the creation of operational synergies which may require greater interdependence between the companies (see also Chakrabarti & Mitchell, 2016; Haspeslagh & Jemison, 1991; Zollo & Singh, 2004). In related acquisitions, top managers thus need to be very familiar with the resources and capabilities of their own firm to better understand how to integrate the resources and capabilities of the target with their own. Hence, related acquisitions benefit from a CEO's better knowledge of the firm and industry, and a broader set of managerial knowledge and skills may have a *relatively* lower impact on the value creation in such acquisitions. Thus, related acquisitions may benefit relatively less from generalist CEOs and relatively more from specialist CEOs.

As argued above, CEOs are more likely to engage in strategic actions that correspond to their own human capital profiles, and the appropriate deployment of their human capital to strategic initiatives that match the nature of their human capital is more likely to lead to greater performance than its deployment to initiatives that do not correspond to the nature of their human capital. Thus, we propose the following two related hypotheses:

Hypothesis (H2). *Conditional on their engaging in an acquisition, generalist CEOs are more likely to engage in unrelated acquisitions than specialist CEOs.*

Hypothesis (H3). *Acquisition performance is better if there is fit between the nature of the CEO's human capital and the type of acquisitions the CEO engages in* (*i.e., generalist CEOs engaging in unrelated acquisitions and specialist CEOs engaging in related acquisitions*) *than if there is no fit* (*i.e., generalist CEOs engaging in related acquisitions and specialist CEOs engaging in unrelated acquisitions*).

3 | THE NEED TO ACCOUNT FOR TWO-SIDED MATCHING IN CEO RESEARCH

Since Hambrick and Mason (1984) published their seminal work, there has been a surge of studies examining the effect of CEO and top management team characteristics on organizational choices and outcomes (Finkelstein et al., 2009; Liu et al., 2018). This line of research typically examines the association between CEO characteristics and various firm-level strategic decisions and outcomes (e.g., Chatterjee & Hambrick, 2007; Chin, Hambrick, & Treviño, 2013; Wiersema & Bantel, 1992). Yet, drawing causal inferences about the impact of CEOs in observational data is challenging because empirical testing can be affected by potential endogeneity problems. The most salient source of endogeneity is that of "confounders"—factors that affect both the appointment of CEOs with the characteristics of interest and the outcomes of interest, but that may be unaccounted for in the analysis.[2] For instance, executives may be drawn to and promoted in contexts that fit their expertise (Chen & Hambrick, 2012), such as when certain types of firms (e.g., firms with a diversified R&D program) hire certain types of CEOs (e.g., executives with a science degree). In such a situation, it is plausible that the CEO pursues strategies aligned with the firm's needs because of the context-CEO fit and not because of the CEO's characteristics and preferences. Thus, even if a strategy mirrors the CEO's characteristics, such an effect may not be driven by the CEO profile (which is the argument of upper echelons theory), but simply because CEOs implement strategies that are aligned with firm attributes and with the mandate given to them by the board (Hambrick, 2007). For instance, in our example, if the CEO announces a new technological direction for the firm, this may be explained by the firm's ability to deploy existing knowledge in a new area and the board's desire to go on this path, and not by the CEO's science degree. What makes things more complicated is that executives' ability to carry out a strategy may depend on or be reinforced by the type of firm she manages. Thus, firm-related factors may constitute alternative explanations for either the appointment of CEOs, the differential performance of CEOs in firms, the outcomes under examination, or all of these. If these firm-related factors are not modeled in the analysis both directly and via their interaction with CEO attributes (or are unobservable to the researcher), the estimation of the effect of CEO attributes is subject to selection bias and may lead to incorrect conclusions. At the root of these endogeneity problems is the nonrandom selection of the treatment: CEOs are not appointed randomly by firms.

Estimating unbiased coefficients requires econometric methods that account for selection. In panel data, scholars often use CEO-firm fixed effects to control for unobservable time-invariant characteristics of the CEO-firm match (Custódio et al., 2019). However, this approach limits the estimation of the effects of CEO characteristics to *within*-CEO-firm variation in the CEO characteristic(s) of interest, and researchers still need to consider the possibility that the

[2]Our discussion here is not meant to be an exhaustive review of endogeneity issues in CEO research but a description of the most salient issues. Endogeneity can have other roots which are beyond the scope of this paper.

within-firm changes in CEO type may not be exogenous. Beyond fixed effects, the available methods aim to directly tackle the endogeneity of firms' decision to appoint CEOs of a certain type. One solution is to collect data where the assignment of CEOs to firms is known to be exogenous, such as changes in laws or death events (Shi, Hoskisson, & Zhang, 2017). Here, the identification of causal effects of executive influence is done via a difference-in-differences analysis. The main constraints to the implementation of this approach arise from finding appropriate exogenous shocks that generate enough observations. Another solution is to use the Heckman two-step method, which requires researchers to directly model the selection of subjects into the treatment group (see e.g., McDonald & Westphal, 2011). As often noted, the main challenge of using the Heckman method is the difficulty in finding valid instruments (Wolfolds & Siegel, 2019). Studies have also used statistical matching techniques such as PSM and coarsened exact matching (CEM) to address endogeneity (e.g., Chen, Crossland, & Huang, 2020; Connelly, Shi, & Zyung, 2017). The CEO characteristic being examined plays the role of a "treatment" or an "intervention." The statistical matching methodology generally aims to create a treatment and a control group that are as similar as possible on a set of observable relevant characteristics other than the treatment variable (Guo & Fraser, 2010). Although matching techniques reduce the imbalance in the covariates between the treated and control groups, the endogeneity problem may persist if the matching variables do not absorb all outcome-relevant heterogeneity between groups.

Fundamentally, all these approaches propose corrective measures to make observational data become more akin to experimental data, wherein randomization ensures that the assignment of the units of observation into the treatment conditions (treatment vs. nontreatment) is independent of the potential outcomes, conditional on observable covariates. This property, known as the ignorable treatment assignment assumption (also referred to as conditional independence, unconfoundedness, selection on observables, or simply, exogeneity) is key to the statistical exploration of causal effects. However, it is not possible to directly test if the treatment assignment that gave rise to the observed data is "ignorable" (Guo & Fraser, 2010). The tenability of this causality condition in observational studies remains subject to how convincingly researchers rule out potential sources of differential selection into the treatment conditions (Roberts & Whited, 2013). In particular, researchers have cautioned against merely using a broad range of variables as controls or matching covariates in the hope that some of those will be highly correlated with the true confounders (Steiner, Cook, Shadish, & Clark, 2010). Ultimately, the performance of methods designed to mitigate the endogeneity bias caused by non-ignorable selection depends more on the identification of the right covariates—including potential confounders—based on theoretical and empirical grounds than on a mechanical application of technical solutions.

However, the choice of the variables to predict the treatment variable in the first stage in these methods (and the definition of controls in the second stage) is often poorly guided or sometimes highly subjective, which undermines the efficacy of these methods. Further, and more important, the mainstream methods that have been used to address the selection of CEOs into firms (PSM, CEM, the Heckman two-step selection method) aim to identify the effect of CEO characteristics independently of the attributes of the firm, and they largely ignore the potential interaction and complementarities between CEO and firm attributes.

In this paper, we embrace the view that addressing the endogeneity problems in the studies that aim to assess how CEO attributes affect firm outcomes calls for a theoretical and econometric solution for the identification of sorting patterns of CEOs into firms. Sorting, defined as a market-wide outcome where social and economic agents form discrete groupings according to

their choices, can be the result of self-selection if agents make unilateral decisions regarding which "category" to belong to (see, e.g., Belenzon & Schankerman, 2015, on sorting in open source innovation). Alternatively, it can be the result of a process where bilateral or multi-sided preferences interact and constrain the choices of participating agents. CEO hiring falls squarely in the latter category (Gabaix & Landier, 2008; Pan, 2017; Tervio, 2008). A firm's ability to recruit its most preferred candidate depends on its choice set (i.e., the set of candidates willing to join the firm) and is constrained by the willingness of other firms to extend a more attractive offer to the same individual. It is the interaction of preferences and choices made by all other firms and candidates competing in the process of filling a position that determines who hires whom.

If firms were unilaterally able to hire the CEO of their choice, their preferences for a certain CEO type could be estimated using discrete choice methods such as logit and probit variants used in PSM or CEM. However, these methods cannot accommodate rival and interdependent choices, and if applied to such situations may lead to wrong inferences altogether (Akkus, Cookson, & Hortacsu, 2016; Mindruta et al., 2016). Studying the impact of CEOs' characteristics thus calls for an empirical strategy that embeds the distinctive features of the CEO labor market and provides an econometric solution for the identification of two-sided sorting patterns of CEOs into firms.

The standard theoretical framework that accommodates these features of CEO hiring has been developed in the literature that analyses hiring processes through the lenses of formal matching models. Within this literature, Fox's (2010, 2018) maximum score estimator provides an econometric solution to the identification problem that appears in the context of multi-sided, multi-dimensional market sorting. We adopt this approach here.[3] As we will explain in more detail, the estimator allows us to exploit the information revealed by the outcome of CEO-firm matching—that is, the sorting of CEOs into firms—to uncover the underlying set of attributes that participants have perceived as jointly relevant to the mutual selection process that led to hiring. Building on this analysis, we then lay out an empirical strategy that takes into account the drivers of CEO-firm matching when testing hypotheses on how CEO human capital shapes firm outcomes.

4 | DATA, MEASURES, AND BASELINE ANALYSIS

4.1 | Data

We sourced data on CEO human capital from the CEO General Ability Index data provided by Custódio et al. (2013), which cover U.S. S&P 1500 firms from 1998 to 2007. We merged these data with corporate financial data from Compustat and the Center for Research in Security Prices (CRSP). We then used the Securities Data Company (SDC) database to gather details on all firms' M&A deals within this sample frame,[4] and used BoardEx and Capital IQ to gather

[3]The first application of the estimator to the labor market of senior executives (including CEOs) is by Pan (2017) and it examines how sorting influences executive compensation. See Black (2019), Shelef and Nguyen-Chyung (2015), and Honoré and Ganco (forthcoming) for other estimation approaches to two-sided matching.

[4]Following Masulis, Wang, and Xie (2007), we included acquisitions: (a) that had been completed; (b) in which the acquirer controlled less than 50% of the target's shares prior to the announcement and 100% of the target's shares after the transaction; and (c) in which the deal value exceeded US $1 million.

data on the human capital of each firm's board members.[5] The final sample used to test H1 at the firm-year level comprised 7,782 observations, while the final sample used to test H2 and H3 at the deal-year level comprised 1,723 observations.

4.2 | Measures

4.2.1 | Dependent variables

We used different dependent variables to test our hypotheses. To test H1, we defined *Acquisitiveness* as the number of acquisitions a firm engaged in during a given year. To test H2, we created two measures to capture whether the acquisitions a firm engaged in were unrelated acquisitions, conditional on the firm engaging in an acquisition in the given year. First, we measured whether the firm had engaged in any unrelated acquisitions in that year (*D(Diversify)*). Second, we measured the number of unrelated acquisitions (*Num Diversify*) that a firm engaged in, in a given year. For both measures, we considered an unrelated acquisition to be one not in the acquirer's primary industry (measured at the SIC 2-digit level). We also ran robustness checks with relatedness measured at the SIC 4-digit level and using an alternative measure of relatedness based on Coff (1999); our inferences remained the same. To test H3, we captured acquisition performance as the abnormal announcement return over various windows. *CAR [x,y]* is the cumulative abnormal return (CAR) measured over day *x* to day *y* where day 0 is the announcement date of the acquisition.[6] CARs reflect the market's sentiment and assessment of an acquisition at the time of the acquisition announcement, and they are widely used as a measure of acquisition performance.

4.2.2 | Independent variables

Our main independent variable is *Generalist CEO*, which was measured based on the Custódio et al. (2013) CEO General Ability Index. It captures the extent to which a CEO has a broad set of knowledge and skills and is obtained by considering five aspects of his or her professional career: (a) The number of past positions the CEO has held during his or her career, (b) the number of firms the CEO has worked for in his or her career, (c) the number of industries in which a CEO has worked during his or her career, (d) whether the CEO has held a CEO position at a different firm (captured by a dummy variable), and (e) whether the CEO has worked for a conglomerate during his or her career (captured by a dummy variable). The first three indicators are continuous variables with higher scores suggesting that a CEO has a broader set of managerial knowledge and skills. The last two indicators are measured by dummy variables with a value of 1 indicating a CEO holds a broader set of knowledge and skills, and 0 otherwise.

[5]As we required prior career information on all directors of the board to capture and control for their level of general managerial knowledge and skills, our main analysis excluded observations where at least one director's prior career information was missing. Results remained robust when these observations were included in the analysis and the missing data in these observations were replaced with the sample-mean of the board human-capital variable, alongside a missing data dummy indicator.

[6]The benchmark model is a market model with a value-weighted market index; its parameters are estimated from day −230 to day −30.

Using principal component analysis, these five factors were combined into a single measure that proxied for the CEO's knowledge and skill set (Custódio et al., 2013). We conducted a robustness check to ensure that any combination of four components or any one component would lead to comparable results; this is discussed in the robustess check section. Like Custódio et al. (2013), we then divided the CEOs into two categories, specialist and generalist, by creating the dummy variable *Generalist CEO*, which was coded as 1 if a CEO's general managerial knowledge and skills measure was above the median for all CEOs, and 0 otherwise. We used a dichomotomous variable (*Generalist CEO*) rather than a continuous variable to test our hypothesis for two reasons: First, our test of H3 required a dichotomization of CEOs into categories in order to create a fit variable. Second, our *Generalist CEO* measure was based on Custódio et al. (2013), who dichotomized their variable; our use of this variable was thus consistent with theirs.

It is important to note that at the CEO level, there is an inherent trade-off between the broader set of managerial knowledge and skills gained by having worked in multiple domains, firms, or industries and the more specialized human capital gained through longer tenure in a particular domain, firm, or industry. Further, given that CEOs typically accumulate a substantial amount of experience before they become CEOs (Schoar & Zuo, 2017), a CEO with a low measure of general managerial knowledge and skills will have a human capital profile that is more specialized in a particular domain, industry, or firm, especially when keeping the age of the CEO constant. Indeed, our empirical analysis controlled for the age of the CEO; we also ran a robustness check in which we adjusted the measure of the *Generalist CEO* by the CEO's age. These efforts help to alleviate concerns that our analysis may be affected by measurement bias in which a young CEO has a low level of general managerial knowledge and skills (because of age and limited working experience) and a high level of specialized experience due to the nature of our measure.[7]

To test H3, we created a dummy variable, *Fit*, coded as 1 if a generalist CEO engaged in an unrelated acquisition or a specialist CEO engaged in a related acquisition, and 0 otherwise.

4.2.3 | Control variables

We included a comprehensive list of control variables. In all of our empirical tests, we controlled for *CEO age*, *CEO tenure*, and whether the board was a *Generalist board* (using same methodology as the *Generalist CEO* measure, based on the average knowledge and skills of independent board members; *Generalist board* is a continuous measure). We controlled for *CEO prestige*, which took the value of 1 if the CEO worked for an S&P 500 firm, and 0 otherwise (Chen, Hambrick, & Pollock, 2008). Further, we controlled for *Firm size* (logged total assets) and firm performance *(Return on assets [ROA]* and logged *Tobin's Q*), whether the firm was a diversified firm (*Multiple segments*), or in a high-tech industry[8] (*High tech*). We also included

[7]To futher alleviate this concern, notice the CEOs in our sample had an average age of 56 (and were, on average, 48 years old when they became CEOs). Moreover, the chance of having an inexperienced CEO with a low level of general managerial knowledge and skills has been further reduced by a trend in executive careers that suggests that more recent generations of CEOs tend to have worked for more firms and industries, while older generations of CEOs tend to have had longer tenures in the firms they worked for. For instance, even the youngest CEO in our sample, at 34 years of age, had held seven positions prior to becoming CEO. This trend introduced a conservative bias into our analysis.

[8]Following Kile and Phillips (2009), the following SIC 3-digit industries were defined as high-tech industries: 283, 357, 366, 367, 382, 384, 481, 482, 489, 737, and 873.

the firm's *Free cash flow* and *Leverage ratio*. We controlled for governance conditions, including *Board independence* (outside director ratio), *Board size* (number of directors), *Director ownership* (a dummy variable indicating that at least one director held more than 5% of shares), *CEO duality* (whether the CEO was also the board chair), and *CEO ownership* (the percentage of firm shares held by the CEO). We also controlled for board diversity: *Age diversity* and *Ethnicity diversity* (operationalized using the Blau index, calculated as $1\text{-}\sum_{i=1}^{S} P_i^2$, where s is the number of categories and p the proportion of directors on a board that belongs to category i).[9]

We also controlled for several characteristics that might influence a board's approach to acquisition decisions, including the average age of directors (*Average age of board*), the *Number of deals last year*, the *Average deal size last year* (total value of all transactions in a given firm-year, scaled by the annual sales of the acquirer), and the firm's prior acquisition experience (*Firm acq exp*). Finally, we also included *Year fixed effects* and *Industry fixed effects* in all models.[10] We ran robustness checks with *Firm fixed effects* which we discuss in the robustness checks section.

In our tests of H2 and H3, the level of analysis was the deal transaction, so in addition to the above control variables, we added a list of binary controls capturing deal characteristics: cash versus stock as means of payment (*Cash deal*), *Tender offer* (the bid involved a tender offer to target shareholders), *Target termination fee* (there was a target termination fee included in the takeover agreement), *Poison pill* (a poison pill had affected the bidder's acquisition attempt), *Competing bidder* (one or more competing bidders), and *Public target*. Table A1 in the Appendix provides an overview of the main variables used in our analysis.

4.3 | Results of the baseline analysis

Our baseline analysis tests the hypotheses based on simple regression analysis that does not take into account the two-sided matching, but includes a wide range of controls and fixed effects.[11] As mentioned previously, given the significant endogeneity concerns arising out of the sorting of CEOs into firms, we consider this analysis largely correlational. We conducted this baseline analysis not only as a robustness check to our main two-sided matching analysis, but also to highlight differences with our two-sided matching analysis which will be of interest when evaluating the importance of the proposed method.

Model 1 of Table 1 presents the results of our analysis to test H1. The coefficient of *Generalist CEO* is positive and statistically significant ($\beta = 0.166$; $p = .011$), providing support for H1, suggesting that generalist CEOs are more acquisitive than specialist CEOs. Models 2 and 3 of Table 1 present the results of our analysis to test H2. The dependent variable in Model 2 is *Num Diversify*, and in Model 3 is *D(Diversify)*. In both models, the coefficient of *Generalist CEO* is

[9]The age category for the computation of the board *Age diversity* variable was measured in terms of birth cohorts, specifically 10-year periods starting in 1910, 1920, 1930, 1940, 1950, and 1960. Ethnicity was coded using five categories: Asian, Black/African-American (incl. Other), Caucasian, Hispanic/Latino, and Native American.

[10]We implemented industry fixed effects via the Fama–French industry classifications (Fama & French, 1997).

[11]To test H1, we used Poisson regression models because the dependent variable (*Acquisitiveness*) was a count variable. To test H2, we used a logit model when the dependent variable was a binary variable, *D(Diversify)*, and Poisson models when the dependent variable was a count variable, *Num Diversify*. To test H3, we used OLS regression models because the dependent variables used to test this hypothesis were continuous. Across all regression models the standard errors were robust standard errors, clustered at the firm level.

TABLE 1 Analysis to test H1 and H2

	Model 1 Acquisitiveness	Model 2 Num diversify	Model 3 D(diversify)
Generalist CEO	0.166	0.775	0.456
	(.011)	(.000)	(.001)
Cash deal		0.035	0.389
		(.595)	(.004)
Tender offer		0.083	0.773
		(.508)	(.003)
Target termination fee		−0.038	0.191
		(.717)	(.340)
Poison pill		0.152	0.034
		(.181)	(.815)
Competing bidder		−0.859	−0.616
		(.003)	(.121)
Public target		−0.206	−0.674
		(.126)	(.002)
Board independence	−0.156	−0.305	−0.320
	(.488)	(.242)	(.471)
Board size	−0.039	−0.036	−0.032
	(.033)	(.086)	(.323)
Director ownership	−0.211	−0.325	−0.271
	(.088)	(.061)	(.185)
Generalist board	−0.349	0.579	0.860
	(.238)	(.180)	(.066)
CEO duality	−0.059	−0.230	0.174
	(.410)	(.067)	(.248)
CEO ownership	−0.010	−0.013	−0.016
	(.218)	(.429)	(.399)
CEO age	−0.001	−0.007	−0.018
	(.909)	(.527)	(.114)
CEO tenure	−0.007	−0.003	−0.001
	(.306)	(.774)	(.945)
CEO prestige	−0.074	0.117	0.107
	(.407)	(.366)	(.523)
Ethnicity diversity	−0.177	0.037	−0.019
	(.331)	(.881)	(.957)
Age diversity	−0.230	0.070	−0.676
	(.375)	(.889)	(.258)

TABLE 1 (Continued)

	Model 1 Acquisitiveness	Model 2 Num diversify	Model 3 D(diversify)
Average age of board	−0.005	0.039	0.040
	(.605)	(.007)	(.046)
Deal size last year	−0.033	−0.168	−0.268
	(.343)	(.333)	(.141)
Number of deals last year	0.187	0.048	0.087
	(.000)	(.180)	(.155)
Firm size	0.220	0.097	0.046
	(.000)	(.054)	(.455)
Multiple segments	0.304	0.232	0.366
	(.000)	(.029)	(.014)
Tobin's Q	0.161	0.322	0.085
	(.068)	(.026)	(.668)
Free cash flow	1.107	−0.812	0.284
	(.029)	(.595)	(.852)
ROA	0.077	−0.091	−0.060
	(.796)	(.214)	(.613)
Leverage ratio	0.516	−0.466	0.042
	(.017)	(.237)	(.939)
Firm acq exp	0.014	0.015	0.006
	(.001)	(.005)	(.389)
High tech	0.249	−0.417	−0.784
	(.139)	(.067)	(.013)
Constant	−5.715	−4.401	−2.711
	(.000)	(.000)	(.097)
Observations	7,782	1,723	1,723
Industry and year fixed effects	Yes	Yes	Yes

Note: *p*-values in parentheses; *SE* are clustered at the firm level.

positive and statistically significant ($\beta = 0.775$, $p = .000$ in Model 2; $\beta = 0.456$ $p = .001$ in Model 3), providing support for H2. The results suggest that, conditional on engaging in an acquisition, generalist CEOs are more likely to engage in unrelated acquisitions than specialists.

In Table 2, we test H3, whether the fit between the nature of the CEO's human capital and the type of acquisitions he or she engages in (generalist CEOs engaging in unrelated acquisitions and specialist CEOs engaging in related acquisitions) is associated with stronger acquisition performance than the absence of fit (generalist CEOs engaging in related acquisitions and specialist CEOs engaging in unrelated acquisitions). Panel A presents the univariate analysis where we compare the means by group. Across different CAR time windows (*CAR[−1, 1]; CAR*

TABLE 2 Analysis to test H3

Panel A univariate analysis			
	[1]	**[2]**	**[2]–[1]**
	Not fit	Fit	*p*-value
CAR[−1,1]	−0.27%	0.35%	.002
CAR[−2,2]	−0.12%	0.58%	.004
Panel B multivariate analysis			
	(1) *CAR[−1,1]*	**(2) *CAR[−2,2]***	**(3) *CAR[−20,20]***
Fit	0.006	0.005	.013
	(.015)	(.090)	(.080)
Controls	Yes	Yes	Yes
Observations	1,723	1,723	1,723
Industry and year fixed effects	Yes	Yes	Yes

Note: p-values in parentheses; Panel B contains the same set of control variables as Model 3 in Table 1. *SE* are clustered at the firm level.

[−2, 2]) we find that if there is fit between the nature of the CEO's human capital and the type of acquisitions he or she engages in, the acquisitions the CEO engages in generate positive CARs on average; if there is no fit, the acquisitions the CEO engages in generate negative CARs on average. The difference in CAR is statistically significant across the two groups. Panel B presents the results of the multivariate regression analysis, and across different CAR time windows we find consistent support for H3, suggesting that the fit between the nature of the CEO's human capital and the type of acquisitions he or she engages in is associated with stronger acquisition performance (*CAR[−1,1]*: $\beta = .006$, $p = .015$; *CAR[−2,2]*: $\beta = .005$, $p = .090$; *CAR [−20;20]*: $\beta = .013$, $p = .080$).[12]

5 | TWO-SIDED MATCHING: ASSUMPTIONS, ESTIMATION, MODELS, AND RESULTS

We now turn to examine whether generalist CEOs sort into firms whose characteristics support or reinforce the acquisition behavior or outcomes discussed in our hypotheses. Sorting in two-sided matching markets can create endogeneity problems to the extent that the interaction of

[12]It is important to note that a diversifying acquisition is an acquisition of a target firm that operates in a different industry from the acquirer. If an acquirer wants to acquire a firm in an industry that is distant from its industry and wants to hire a new CEO to pursue this strategy, our results in support of H2 and H3 above do not necessarily suggest that the firm hires a specialist CEO with highly specialized expertise in that distant industry before diversifying into that industry. Instead, our results are more consistent with the view that the firm would hire a generalist CEO (who had some experience in that distant industry) before entering the distant industry.

CEO attributes and firm characteristics are captured by the error term instead of being controlled for in the analysis.[13] To address these issues, we use the maximum score estimator, a statistical method developed to estimate the underlying drivers of match formation (Fox, 2010, 2018) in a large class of matching processes, namely those involving monetary transfers among parties. This approach will allow us to subsequently account for CEO-firm complementarities in our hypothesis testing. We begin by discussing the key features of the formal matching models that lie behind the estimation and the main assumptions that researchers must decide if they hold in their data. For a full technical discussion we refer readers to Fox (2010, 2018). We then describe and apply the estimator in the context of CEO-firm matching. Lastly, we exploit the information revealed by the maximum score estimator to refine our inferences about the role of CEO human capital in shaping firm acquisition strategies and performance.

5.1 | Main assumptions and estimation of two-sided matching models

We assume that firms only hire one CEO at a time and our exposition refers to a model of one-to-one matching. Matching can be multi-sided and the estimator can handle such situations (see e.g., Fox, 2018). While in the empirical application we focus on generalist versus specialist CEOs, below we refer to CEOs in more general terms.

Consider N the number of open positions in a given market; $X_i = (x_i^1, x_i^2,..., x_i^m)$, $i \in \{1,..,N\}$ the bundle of *m* attributes that describe CEO *i*'s quality (such as reputation, experience, age, etc.); and $Y_j = (y_j^1, y_j^2,..., y_j^k)$, $j \in \{1,..,N\}$, the bundle of *k* attributes that describe firm j's quality (such as size, financial standing, industry sectors, etc.). Both sides, CEOs and firms, are inherently heterogenous. The joint value created by any given $\{CEO_i (X_i), Firm_j (Y_j)\}$ pairing, denoted by $v(X_i, Y_j)$, depends directly on the "fit" between the attributes X_i of the CEO_i and attributes Y_j of the $Firm_j$. Below, we use an identical index to indicate that agents are matched (e.g., CEO_i and $Firm_i$ are matched and we denote by {i,i} their pairing) and different indices otherwise.

The specification of the joint value function is a key step in the estimation. The goal is to understand which of the CEO and firm attributes matter *jointly* for their matching. As discussed in other papers (Mindruta, 2013; Pan, 2017) and dating back to Milgrom and Roberts (1995), the mathematical notion of complementarity (and the substitution counterpart) provides a formal definition for the idea of "fit" or synergy between matched agents. The sign of the cross-partial derivative of the value function with respect to combinations of attributes $x^m \in X$ and $y^k \in Y$ indicates if the attributes are complements (positive sign) or substitutes (negative sign). Our exposition focuses on explaining how the estimator identifies these relationships. We will also explain the connection between complementarity/substitutability and sorting.

[13]For instance, if large firms value the knowledge breadth of generalist CEOs more than the focused experience of specialist CEOs and if generalist CEOs themselves value large firms because they can apply their knowledge more productively in larger rather than smaller organizations, then, on the whole, and absent other considerations, we can expect generalist CEOs to manage larger firms. Now, suppose also that large firms tend to make more (unrelated) acquisitions. If the role of firm size is not modeled, the estimate of the (average treatment effect of the) CEO generalist variable in the acquisition outcome regression will be biased upwards. Further, it is plausible that CEO generalists have a larger impact on firm acquisition behavior at larger firms or even that their impact is conditional on working at larger firms (giving rise to a heterogenous treatment effect). The concern in these situations is that the estimate of CEO impact on the acquisition outcomes reflects the match between generalist CEOs and firm size (and their associated complementarity) and not the true effect of CEO human capital, as previously hypothesized.

The joint value $v(X_i, Y_j)$ can be decomposed in two parts: $c(X_i, Y_j)$, the compensation (salary and other perquisites) the CEO_i receives from the $Firm_j$, and $p(X_i, Y_j)$, the private payoff that is appropriated by the firm:

$$v(X_i, Y_j) = c(X_i, Y_j) + p(X_i, Y_j) \tag{1}$$

Given that CEOs and firms are heterogenous in their attributes, not all pairings create the same value. Thus, participants on the same side of the market—executives and firms, respectively—compete among each other to be in a more valuable match. A match between CEO_i (X_i) and $Firm_i$ (Y_i) occurs when the firm is not willing to pay the compensation required to attract a different executive and the executive is not willing to accept the compensation offered by a different firm. Formally, this means that the market-level structure of CEO-firm pairings observed in the data (i.e., the assignment of CEOs to firms) is *pairwise stable*: the value generated by any potential pairing of unmatched agents is less than or equal to the payoffs received by agents in their current match. Take two observed matches indexed {i,i} and {j,j} and two counterfactual pairings {i,j} and {j,i}. The pairwise stability property can be expressed as follows:

$$v(X_i, Y_j) <= c(X_i, Y_i) + p(X_j, Y_j) \tag{2}$$

$$v(X_j, Y_i) <= c(X_j, Y_j) + p(X_i, Y_i) \tag{3}$$

An interesting feature of the matching equilibrium makes the connection between the sorting patterns in the market and the drivers of joint value. As shown by Becker (1973), in one-to-one matching situations, any two attributes $x^m \in X$ and $y^k \in Y$ that are complementary inputs in the joint value function v will lead to positive assortative matching, or a top-down sorting along these dimensions (e.g., assuming that CEOs and firms are each characterized by one attribute only—x^m and y^k, respectively—then we will observe CEOs and firms ranking similarly along these dimensions forming a match). Conversely, any two attributes x^m and y^k that are substitute inputs in the joint value function will lead to negative assortative matching (e.g., the executive ranking highest on x^m will match with the firm ranking lowest on y^k, the executive ranking second highest on x^m will match with the firm ranking second lowest on y^k, etc.). However, there is no general characterization of the sorting patterns in the data when agents match on multiple dimensions, some being complements and others being substitutes. As we will see below, the estimator can recover, ceteris paribus, the nature of the relationship (complementarity vs. substitution) between any two attributes entering the value function and the relative importance of the relationship to matching. The following assumptions are being made:

Assumption 1. The CEO-firm pairings observed in the data are the equilibrium outcome of a matching process.

In our context, we will assume that CEO hiring is a two-sided matching process that generates the observed appointment of CEOs to firms in the data. Based on this assumption, definition (1) and relationships (2) and (3) yield the following inequality:

$$v(X_i, Y_i) + v(X_j, Y_j) \geq v(X_i, Y_j) + v(X_j, Y_i) \quad (4)$$

Relationship (4), known as the *local value maximization condition*, is at the core of the estimation procedure. As we have shown above, this condition is satisfied by any pairwise stable assignment. Intuitively, it stipulates that if we draw randomly any two CEO-firm matches observed in the data, then switching partners across pairs would not lead to higher value (otherwise, CEOs and firms would have sorted differently and been better off). Maximum score estimator exploits this inequality between the value created by observed matches and counterfactual pairings to identify the joint value creation function v(X, Y). Fox (2010) provides the proofs for identification proof and Fox (2018) for consistency. Notice that the estimator does not require calculating an equilibrium outcome and does not require information on CEO compensation, even if this is subsumed in the process and built into the model. Because it relies on inequalities, the estimator does not require observing the value per se, but just the right-hand side of the regression.

The empirical counterpart of the theoretical match value $v(X_i, Y_j)$ is the match production function $f(X_i, Y_j| \beta)$ that we aim to estimate, where β denotes the vector of parameters of interest. The deterministic part of the match production function $\Pi(X_i, Y_j)$ can take the form of a general polynomial function of complex combinations between CEO and firm attributes:

$$f(X_i, Y_j|\beta) = \beta\Pi(X_i, Y_j) + \xi_{Xi} + \xi_{Yj} + \varepsilon_{ij} \quad (5)$$

Notice that preferences over whom to match with appear in the equation under $\Pi(X_i, Y_j)$, as characteristics that both sides perceive as being relevant in combination. The terms ξ_{Xi} and ξ_{Yj} indicate CEO and firm fixed effects, respectively. These are attributes observed by participants but not necessarily by the econometrician. The term ε_{ij} captures the match-specific error (or the private value of a pairing). The following additional assumptions must hold:

Assumption 2a. ε_{ij} are i.i.d. and independent of all X_i, Y_j, ξ_{Xi}, ξ_{Yj}.

Assumption 2b. The fixed effects of agents on one side of the market are not correlated with the observable characteristics of agents on the other side: corr $(X_i, \xi_{Yj}) = 0$; corr $(Y_j, \xi_{Xi}) = 0$.

Assumption 2a means that the estimator does not impose a distribution on the error terms but relies on the standard assumption that the error term is independent of the other covariates in the model. Assumption 2b states that any unobserved characteristics that may characterize agents on one side of the market are not part of the bilateral preferences for matching. Thus, the estimator is robust to fixed effects, although they are not estimated. Indeed, the terms ξ_{Xi}, ξ_{Yj} cancel out when replacing $v(X_i, Y_j)$ by $f(X_i, Y_j| \beta)$ in the local maximization condition (4), and we have:

$$\beta\Pi(X_i, Y_i) + \beta\Pi(X_j, Y_j) \geq \beta\Pi(X_i, Y_j) + \beta\Pi(X_j, Y_i) \quad (6)$$

More generally, the method estimates only bilateral preferences via interaction terms and not independent, one-sided characteristics that may affect the value of the match. Furthermore, because any positive monotonic transformation of the value function will satisfy the local maximization condition, the scale of the production function (5) cannot be identified. A standard approach in the literature is to set the value of one element of the vector β to be equal to ± 1.

When applied to all matches observed in the data, relationship (6) yields a system of inequalities. In practice, data can come either from a large market or from multiple independent markets. Coefficient estimates are those that maximize the total number of inequalities across all markets. Thus, β estimates are obtained by finding the maximum of the following score function:

$$\sum_{h=1}^{M} \sum_{1<i,j<N_h} 1\left[\beta\Pi\left(X_i, Y_i\right) + \beta\Pi\left(X_j, Y_j\right) \geq \beta\Pi\left(X_i, Y_j\right) + \beta\Pi\left(X_j, Y_i\right)\right] \quad (7)$$

where 1[.] is an indicator function which takes a value of 1 if the inequality in the bracket is true, h is a market index taking value from 1 up to M (the total number of markets observed in the data), and N_h denotes the number of matches observed in a market h. Because the score function is a step function, computing its maximum requires using specific numerical optimization routines, such as differential evolution or simulated annealing (Fox, 2018). The significance is assessed by examining the confidence intervals of the estimates via subsampling techniques.

5.2 | Specification of CEO-firm two-sided matching

The estimator allows us to directly test which sets of CEO-firm attributes are complements in the CEO-firm matching function against the null alternative that an interaction term between CEO and firm attributes does not act as a significant driver of their matching. We are particularly interested in the firm-level attributes that may be complementary to the generalist CEO dimension. While the prior literature has not addressed this question directly, we draw upon relevant studies to argue that firm size, firm diversification, firm acquisition experience, and a board whose members' human capital type is similar to that of the CEO may enhance the value of generalist CEOs, who in turn will prefer managing firms with such capabilities. Indeed, larger firms and diversified firms typically involve more complex operations, coordination, and decisions (e.g., Aggarwal, 1981; Henderson & Fredrickson, 1996; Michel & Hambrick, 1992), and CEOs with broad knowledge may be more valuable to and prefer working for such firms (Pan, 2017). Furthermore, the prior acquisition experience of the firm is more likely to be relevant to executives who aim to engage in acquisitions because this experience enables organizational routines that are more consistent with executive cognitive styles in implementing the acquisition strategy (Finkelstein et al., 2009; Nelson & Winter, 1982). Finally, generalist boards are more likely to hire generalist CEOs because of social preference and homophily effects (McPherson, Smith-Lovin, & Cook, 2001; Zajac & Westphal, 1996); and likewise, it is easier for these CEOs to align their strategic preference with a board whose members also have a broader domain of knowledge. We thus expect complementarity between a generalist CEO and a generalist board.[14]

[14]In performing this analysis, we started from a theoretically-informed specification that we deemed relevant to the discussion of how the sorting of generalist CEOs into firms may affect the relationships hypothesized in H1 and H2. As a robustness check, we performed additional tests in which we included, one at a time, other firm performance measures (ROA; Altman's Z score; free cash flow) and board characteristics (age and ethnicity diversity). On the CEO side we also considered education prestige (MBA or Ivy League degree) and tenure within the firm as these are typical characteristics that firms may consider when making a hiring decision (Chen & Hambrick, 2012; Finkelstein et al., 2009). None of these considerations were significant.

Beyond the knowledge- and experience-related aspects of CEO human capital, the literature suggests that a dominant characteristic of the executive labor market is the sorting of more prestigious and talented CEOs into larger and more performant firms (D'Aveni, 1990; Gabaix & Landier, 2008; Tervio, 2008). We thus include in the matching function two additional interaction terms, with *CEO prestige* variable on one side and firm size and firm performance (Tobin's Q) on the other side. Further, another dimension of possible CEO-firm "fit" involves executive age and firm risk profile. Older CEOs, being closer to retirement, are more likely to prefer situations posing lower cognitive challenges (Barker & Mueller, 2002; Matta & Beamish, 2008) and lower risk (such as firms with lower R&D investments), and they are therefore more likely to select themselves out of firms operating in high-tech industries.[15]

To run the estimator, we need to define the matching markets that are relevant to our setting. Following conventional wisdom, we consider firms in the same main industry and hiring in the same year to be in more direct competition for CEOs than other firms, and we define as a "matching market" all hiring events taking place in an industry-year. This definition strikes a good balance between the risk of including irrelevant comparisons in the score function (7) and the risk of too narrow assumptions about who competes with whom. We observed 775 hiring events and 55 markets in the data. The local maximization condition yields 5,131 inequalities. To maximize the score function (7), we use the differential evolution maximization method in Mathematica.[16]

5.3 | The identification of complementarities in the CEO-firm match

Table 3 shows the parameter estimates produced by the maximum-score estimator. Only interaction terms are estimated: CEO and firm attributes and the fixed effects drop out in equilibrium (see relationship (6) above), as matching is driven, by definition, by the combination of the two sides' attributes. There is systematic empirical evidence in the prior literature that CEO prestige and firm size are strong determinants of executive-firm matching (Gabaix & Landier, 2008; Tervio, 2008) and we use the interaction between these two variables serves as a scale normalization. We set this coefficient to +1 because, as expected, the positive value +1 satisfies more inequalities than −1. Overall, the model fits well, and 81.5% of inequalities are satisfied. To test the significance of the estimates, we generated 95% confidence intervals by drawing subsamples of 22 markets over 1,500 rounds.

Interestingly, the estimates show that the only firm attribute that enhances the value of a CEO generalist is the nature of the human capital of the firm's board of directors; this suggests that mutual preferences for homophily in the type of CEOs' and board directors' human capital is a significant sorting dimension. When put to a stronger statistical test of multidimensional matching, all other terms in the model where the generalist CEO attribute interacts with firm attributes are small and insignificant. Specifically, we do not find that generalist CEOs sort into larger firms or into firms operating in multiple segments or firms with prior experience with

[15]*CEO prestige* and *Generalist CEO* are dummy variables. We transformed *CEO age* into a dummy variable (over 55) because it captures the idea of CEOs being close to retirement better than using a continuous variable, which would imply a monotone linear relationship between age and the *High tech* firm dummy. When the continuous variable is included in the model, the relationship *CEO age*High tech* firm is statistically significant but fewer inequalities are satisfied. To facilitate the interpretation of results, we rescaled the *Generalist board* variable from 0 to 1 (from the lowest to highest generalist board values in the sample). Results are robust to not rescaling.

[16]The code is provided by Jeremy Fox on his webpage: http://fox.web.rice.edu/.

TABLE 3 Maximum score estimator of the two-sided matching model

Matching predictors	Point estimate	Confidence interval	*S.D.* of covariate	Relative importance of the estimate
*CEO prestige*firm size*	1	Superconsistent	4.279	1
*Generalist CEO*multiple segments*	0.029	{−0.486, 0.108}	1.322	0.009
*Generalist CEO*firm acq exp*	0.007	{−0.045, 0.030}	5.702	0.009
*Generalist CEO*generalist board*	1.370	{0.874, 4.380}	0.245	0.079
*Generalist CEO*firm size*	0.130	{−0.017, 0.566}	4.123	0.125
*CEO prestige*Tobin's Q*	1.046	{0.255, 2.005}	0.397	0.097
*CEO old (over 55)*high tech*	−0.965	{−4.864, −0.252}	0.352	−0.079
Statistical fit	The model predicts 81.5% of 5,131 inequalities			

Note: The percentage of satisfied inequalities (81.5%) is a measure of statistical fit. The 95% confidence intervals were obtained by extracting subsamples of 22 markets (of the 55), over 1,500 rounds. The *CEO prestige*firm* size relationship serves to normalize the scale and its coefficient is set to +1; the parameter estimate is superconsistent and there is no need to calculate a confidence interval for this covariate. We applied the differential evolution method for maximization, using 150 initial points chosen randomly in the search-space. We checked the robustness of results by re-running the maximization over 500 rounds, each time starting from a random seed. The results across these runs maximized a very similar number of inequalities.

acquisitions. However, the statistical test shows that two other considerations are highly relevant: more prestigious CEOs match with better performing firms (as measured by Tobin's Q), and older CEOs are less attracted to and less valued by high-tech firms.

The relative importance of each relationship in the matching can be assessed by taking into account differences in covariate variation in the sample. To this end, we multiplied each coefficient estimate by the ratio between the *S.D. (standard deviation)* of the corresponding covariate and the *S.D.* of the baseline relationship (see the last two columns in Table 3). Strikingly, the most important relationship is the baseline *(CEO prestige*Firm size)* and it dominates by far all other sorting considerations. The variation in the generalist CEO–generalist board relationship is roughly 8% as important in explaining the match value as the variation in the CEO prestige–firm size relationship. The other two significant relationships have a comparable small impact (9.7% for *CEO prestige–Tobin's Q* and 7.9% for *CEO old–High tech* firm).[17]

[17]Coefficients represent the cross-partial derivative of the match production function, with respect to the two attributes in the corresponding covariate. As a reminder, for dummy variables, a unit increase means a change from 0 to 1. Firm size and Tobin's Q are logged and a unit increase corresponds to one percent increase. A one unit increase (from 0 to 1) in the *Generalist board* variable means a change from the least to the most generalist board in the sample. The scale of the estimated production function is expressed in the hypothetical marginal unit of value created when a high-prestige CEO (vs. a low-prestige CEO) is hired by a firm that is 1% larger. We will refer to this as the "unit value created by the baseline." Prior work by Tervio (2008) shows that it is economically significant. Accordingly, the interpretation of estimates is that, ceteris paribus: (a) the marginal value created by a generalist CEO (relative to a specialist CEO) if hired by the "most generalist" versus the "most specialist" board is 1.370 times larger than the unit value created by the baseline; (b) the marginal value created by a high-prestige versus a low-prestige CEO when being hired by a firm that has a 1% higher Q ratio is comparable to the value created by the baseline (i.e., the coefficient is 1.046); (c) the marginal value destroyed when an older CEO (relative to a younger CEO) is matched with a high tech versus a non-high-tech firm is only slightly lower, that is, 0.965 times smaller, than the unit value created by the baseline (we talk about value being destroyed because the coefficient is negative).

5.4 | Empirical strategy to account for two-sided matching in hypotheses testing

We now turn to the consequences of the evidence on the complementarity between generalist CEOs and generalist boards for our baseline analysis.[18] The standard interpretation of the complementarity result is that a generalist CEO is more productive when joining a firm with a generalist board than when joining an otherwise identical firm with a board that is more specialized. Generalist CEOs join these firms because they anticipate support from generalist board members; boards value the management style of generalist CEOs. The match increases the likelihood that the management and the board converge toward a similar strategic direction. Under this interpretation, the matching process corroborates our theory and hypotheses, as generalist CEOs pursue strategies that are consistent with their ability and, in turn, are also endorsed by the board.

The validity of this interpretation rests on the premise that generalist CEOs would pursue acquisitions consistent with their type of human capital, as hypothesized in H1 and H2, even when acting independently of the board type (including in the presence of a less generalist board). The ideal setting to disentangle the CEO-firm matching effects from the impact of CEO characteristics is a random allocation of generalist CEOs across firms. Absent such a setting, another complication is that we cannot create treatment and control groups of firms that are similar in all relevant dimensions (including the matching complementarities) other than the treatment variable *(Generalist CEO)*. Indeed, the relationship that is most likely to confound our analysis (i.e., *Generalist CEO* matched with *Generalist board*) contains the key independent variable (*Generalist CEO*) necessary to test H1/H2, and thus it is not feasible to conduct a CEM or PSM analysis with all the complementarities as predictors in the first stage.

To further probe our results in H1 and H2, we have taken an alternative approach that exploits the multidimensionality of CEO-firm matching. Essentially, to the extent that CEO prestige and age do not correlate perfectly with the CEO being a generalist in our sample (and they do not!) and that generalist boards are not observed exclusively at large, profitable, or high tech firms (and they are not!), there will be observations in the sample where considerations other than the "generalist CEO–generalist board" complementarity have prevailed in the match formation. For example, a generalist board in a high-tech firm faces a trade-off between selecting a more generalist CEO and a younger executive. Importantly, there are no theoretical reasons to believe that these other matching considerations, found to be significant in our empirical analysis, are likely to confound the effects of generalist CEOs on firm acquisition behavior. The multidimensionality of matching thus creates enough variation in the sample, which we use to tackle the question of whether CEO generalists still make choices consistent with our predictions in H1 and H2 even when *not* matched perfectly with firms whose board directors are themselves generalists.

We performed this analysis by splitting the sample into two subsamples, those observations with generalist board values above the median and those with generalist board values below the median. We re-ran the baseline analysis in these subsamples to examine whether generalists were more likely than specialists to pursue the hypothesized acquisition strategy in firms with different

[18]The results of the main analysis continue to indicate a significant CEO generalist effect when baseline regressions are re-run to include the interaction terms describing CEO-firm complementarities. However, in a two-sided market, it is incorrect to interpret the interaction terms from a simple regression as complementarities. As explained, these can be identified only via an analysis that follows the theoretical constraints imposed by interdependent choices.

types of boards. Of particular interest is the behavior of generalist CEOs in firms whose boards had *lower* generalist values, because here the synergy between the CEO and firm in the dimension of "generalist CEO–generalist board" was lower. Apart from the prior controls, we also included in the regression the other complementarities identified in the two-sided matching analysis.

To the extent that CEO-firm complementarities affect the value-creation potential of strategic initiatives, such as pursuing unrelated acquisitions, we also need to examine the degree to which CEO-firm matching drives the results in H3. To address this problem, we conducted a PSM analysis that used the identified complementarities from the two-sided matching analysis as predictors of our independent variable underlying H3 (*Fit* between the nature of the CEO's human capital and the type of acquisition the CEO engages in). Relative to CEM, which can restrict the number of variables to be matched on in the first stage, PSM analysis allows us to include all theoretically relevant variables. We conducted two types of PSM analyses. Both included all control variables (from Model 1 in Table 2) and industry fixed effects as the predictor variables of *Fit* in the first stage and as covariates of *Fit* in the second stage. In the first scenario, we added as a predictor the CEO-firm match value generated by the two-sided matching analysis (see definition [5] in Section 5.1). In the second scenario, we added the four complementarities identified in the two-sided matching analysis (as well as the *Generalist CEO* dummy because one of the four-complementarity interactions included that dummy).[19] The PSM analysis enabled us to create a matched sample in which the treatment and control observations were similar in terms of their observable characteristics, including the CEO-firm complementarities.

5.5 | Results of our hypotheses testing when accounting for two-sided matching

The results of our tests of H1 and H2 accounting for the complementarities identified in the two-sided matching are presented in Table 4. Models 1 and 2 indicate that, indeed, CEO generalists are more likely to pursue a higher number of acquisitions *only* if they work at firms with higher generalist boards. Further, the *Generalist board* variable (measured as a continuous score) is negative in the subsample where it takes values above the median and not significant in the subsample where it takes values below the median. Thus, while it is unlikely that the board type alone would drive the results in H1, the complementarity with the board appears to be important in prompting generalist CEOs to engage in acquisitions. This analysis suggests that our hypothesized effect in H1 is *potentially* confounded by the systematic sorting of CEOs into firms. Further, regarding H2, in Models 3–6, the *Generalist CEO* variable remains highly significant in all specifications across the *Generalist board* subsamples. The *Generalist board* variable (measured as a continuous score) is also insignificant in three out of four models. The results suggest that the *Generalist CEO* dummy is significant above and beyond the board effects—even in the subsample of generalist boards below the median. This lends support to the idea that generalist CEOs pursue unrelated acquisitions, irrespective of board type.

The results of our PSM analysis and our tests of H3 accounting for the complementarities identified in the two-sided matching are presented in Table 5. Panel A highlights that treatment

[19]For both PSM analyses, we used 1:1 matching with replacement and only retained observations on the common support.

TABLE 4 Subsample analysis to test H1 and H2 based on the identified complementarities from the two-sided matching models

	High generalist board	Low generalist board	High generalist board		Low generalist board	
	Model (1) H1	Model (2) H1	Model (3) H2	Model (4) H2	Model (5) H2	Model (6) H2
	Acquisitiveness	*Acquisitiveness*	*Num diversify*	*D(diversify)*	*Num diversify*	*D(diversify)*
Generalist CEO	0.171	0.039	0.677	0.505	0.757	0.424
	(.037)	(.697)	(.000)	(.015)	(.000)	(.031)
Generalist board (continuous measure)	−0.960	−0.654	0.534	1.030	1.348	0.628
	(.065)	(.448)	(.257)	(.176)	(.057)	(.602)
*Firm size*CEO prestige*	−0.129	−0.114	0.052	0.000	0.151	0.352
	(.036)	(.246)	(.399)	(.999)	(.120)	(.028)
*High tech*CEO old*	0.225	−0.553	0.490	0.294	0.444	0.156
	(.204)	(.014)	(.067)	(.543)	(.103)	(.720)
*Tobin's Q*CEO prestige*	0.180	0.325	0.267	−0.424	0.061	−0.150
	(.357)	(.197)	(.301)	(.325)	(.859)	(.749)
Constant	−5.281	−6.627	−6.930	4.506	−12.683	−11.958
	(.000)	(.000)	(.000)	(.084)	(.000)	(.000)
Observations	3,983	3,799	863	863	860	860
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year FEs	Yes	Yes	Yes	Yes	Yes	Yes

Note: p-values in parentheses; *SE* are clustered at the firm level. Models 1 and 2 include the same control variables as Model 1 in Table 1. Models 3–6 include the same control variables as Model 3 in Table 1. Across the models, we controlled for CEO age through a *CEO old* dummy instead of the *CEO age* variable (the results were consistent when controlling for the continuous *CEO age* variable).

and control observations are similar along all complementarities, alongside the propensity score, and alongside almost all other control variables. Panel B shows that H3 holds in the matched sample, even when controlling for the overall value of CEO-firm match and for CEO-firm complementarities. This analysis provides evidence that our results underlying H3 are unlikely to be driven by the systematic sorting of CEOs into firms.

As we have shown above, the tests based on the two-sided matching analysis provide evidence that alleviates some of the concerns that the sorting of CEOs into firms may bias our inferences. Another problem arises from the possibility that an *unobserved* firm characteristic may both attract generalists to the CEO positions in firms and cause (unrelated) acquisitions to happen and create greater value. The maximum score analysis relies on observable (to the researcher) matching attributes and cannot completely rule out this concern (but see Fox, Yang and Hsu (2018) for recent work on the identification of the distribution of unobservables in matching games).

TABLE 5 PSM results based on complementarities identified in the two-sided matching models

Panel A matching quality						
	Control	**Treated**	***p*-value**	**Control**	**Treated**	***p*-value**
Pscore	0.599	0.599	.990	0.611	0.611	.993
Cash deal	0.661	0.607	.014	0.627	0.607	.350
Tender offer	0.074	0.064	.371	0.067	0.065	.855
Target termination fee	0.243	0.229	.454	0.213	0.228	.443
Poison pill	0.578	0.565	.551	0.539	0.565	.253
Competing bidder	0.017	0.020	.609	0.014	0.021	.299
Public target	0.309	0.300	.657	0.271	0.300	.159
Board independence	0.683	0.687	.541	0.673	0.687	.049
Board size	10.198	10.381	.209	10.007	10.385	.011
Director ownership	0.086	0.082	.743	0.063	0.082	.114
Generalist board	0.410	0.408	.811	0.398	0.409	.186
CEO duality	0.683	0.670	.560	0.701	0.669	.129
CEO ownership	1.494	1.539	.809	1.738	1.531	.262
CEO old	55.131	55.120	.971	55.339	55.093	.456
CEO tenure	7.400	8.065	.025	8.139	8.014	.687
CEO prestige	0.341	0.331	.630	0.334	0.331	.885
Ethnicity diversity	0.292	0.305	.122	0.301	0.306	.570
Age diversity	0.587	0.585	.573	0.580	0.585	.371
Average age of board	59.259	59.283	.892	59.127	59.286	.383
Deal size last year	0.081	0.096	.478	0.057	0.085	.116
Number of deals last year	0.487	0.463	.647	0.479	0.467	.815
Firm size	8.410	8.394	.841	8.319	8.398	.346
Multiple segments	0.475	0.474	.964	0.471	0.473	.927
Tobin's Q	0.654	0.640	.550	0.642	0.640	.947
Free cash flow	0.058	0.056	.609	0.058	0.057	.612
ROA	−2.888	−2.933	.268	−2.918	−2.932	.740
Leverage ratio	0.189	0.198	.161	0.202	0.198	.594
Firm acq exp	5.756	5.602	.756	5.708	5.717	.985
High tech	0.338	0.331	.736	0.345	0.331	.532
CEO-firm match value from two-sided matching model	4.384	4.266	.620			
Generalist CEO				0.408	0.422	.518
*Firm size*CEO prestige*				3.113	3.090	.913
*High tech*CEO old*				0.236	0.231	.788
*Tobin 's Q*CEO prestige*				0.249	0.240	.660
*Generalist CEO*generalist board*				0.202	0.211	.448

TABLE 5 (Continued)

Panel B. Test of H3 based on a matched sample		
	Model 1: CAR[−1,1]	***Model 2: CAR[−1,1]***
Fit	0.008	0.013
	(.000)	(.000)
Match value from two-sided matching model	−0.000	
	(.696)	
Generalist CEO		0.012
		(.086)
*Firm size*CEO prestige*		−0.001
		(.664)
*High tech*CEO old*		−0.005
		(.378)
*Tobin's Q*CEO prestige*		0.010
		(.086)
*Generalist CEO*generalist board*		−0.018
		(.165)
Constant	−0.026	0.013
	(.481)	(.736)
Observations	1,932	1,932
Other controls	Yes	Yes
Industry and year fixed effects	Yes	Yes

Note: p-values in parentheses; standard errors are clustered at the firm level. Models 1 and 2 include the same control variables as Model 3 in Table 1. In addition, Model 2 includes the *Generalist CEO* variable. In both Models 1 and 2, we control for CEO age through a *CEO old* dummy instead of the *CEO age* variable (the results were consistent when controlling for the continuous *CEO age* variable).

6 | ADDITIONAL ANALYSIS AND ROBUSTNESS CHECKS

We conducted several robustness checks. First, we ran a robustness check in which we used a continuous measure of *Generalist CEO* instead of a dichotomous variable. This analysis corroborated our results. Further, based on our dichotomous *Generalist CEO* variable, we also conducted a robustness check in which we dropped each one of the five components of the *Generalist CEO* index and were able to confirm our results. Similarly, we ran a robustness check in which we based the *Generalist CEO* dummy on each of the five components, and the analysis was largely consistent with our main findings.[20] To mitigate the concern that our estimates were affected by

[20]In tests where the *Generalist CEO* dummy is based on one of the five index components, the coefficient of *Generalist CEO* is always consistent with our prediction; in 5 of the 15 regressions, the coefficient is not significant at conventional significance levels.

extreme outliers in *Acquisitiveness* and *Num Diversify*, we winsorized these two measures at the top 2 percentile. Our inferences were not affected. Second, our main analysis used industry fixed effects and year fixed effects rather than firm fixed effects. While we observed mobility in the sample, using firm fixed effects could absorb some of the effect of the *Generalist CEO* variable. Thus, we adopted the approach of not using firm fixed effects in our main analysis; instead, we ran a robustness check with firm fixed effects. This analysis revealed that our results were fully supported for H1 and H2 and remained qualitatively similar for H3. Third, in relation to H3, we conducted a robustness check to examine whether one or both types of fit (generalist CEOs engaging in unrelated acquisitions and specialist CEOs engaging in related acquisitions) is associated with stronger performance. Our analysis (Table A2 in the Appendix) shows that both types of fit are associated with stronger acquisition performance than the absence of fit, with the difference being statistically significant in both cases. However, we find no statistically significant difference in acquisition performance *between* the two types of fit. Finally, we used CARs as a measure of acquisition performance in our tests of H3. Although CARs are widely used as a measure of acquisition performance, they largely reflect the market's assessment of an acquisition at the time of the acquisition announcement, and as such suffer from limitations in measuring acquisition performance. They could be seen as a short-term stock market signal regarding how the market perceives the acquisition, and may not accurately reflect the *long-term* acquisition performance or the actual value an acquirer creates in an acquisition in the *long term*. To further test whether *Fit* leads to better long-term acquisition performance for the firm (rather than merely leading to higher short-term announcement returns), we used an alternative measure of acquisition performance which is long-term oriented and accounting based, namely the change in ROA from the year an acquisition is announced to either two or three years after the acquisition announcement. The results of these tests (Table A2 in the Appendix) are consistent with our main analysis: for both windows, *Fit* has a positive and significant effect on the change in ROA.

7 | DISCUSSION AND CONCLUSION

This paper has examined how the nature of CEOs' human capital relates to firms' strategic behavior, and whether the fit between the nature of CEOs' human capital and the strategic actions they engage in is associated with stronger performance. We have explored these questions in the context of generalist and specialist CEOs and their acquisition behavior and performance. Our initial and preliminary results indicated that generalist CEOs are more acquisitive than specialist CEOs. Further, conditional on engaging in an acquisition, generalist CEOs are more likely to engage in diversifying (unrelated) acquisitions than specialist CEOs. These results are consistent with the idea that CEOs engage in strategic behavior that corresponds to the nature of their human capital. Our initial findings also suggest that the fit between CEOs' human capital and the type of acquisitions they engage in is on average associated with stronger acquisition performance. In this regard, as our main measure of acquisition performance is based on short-term abnormal announcement returns, our results suggests that, on average, the stock market reacts positively to an acquisition announcement when the CEO's human capital fits with the type of acquisition he or she engages in. However, our robustness checks based on long-term acquisition performance also suggest that acquirers indeed achieve stronger long-term acquisition performance when there is fit between the CEO's human capital and the acquisition type.

Using a two-sided matching model, we examined whether the sorting of CEOs into firms confounded our results. We found that CEO and firm matching was multidimensional, driven by several complementarities between their attributes. One complementarity that may affect our results is the complementarity between the CEO's human capital and that of the board. The results of the two-sided matching analysis suggest that generalist CEOs' engaging in more acquisitions is, to some extent, driven by the sorting of generalist CEOs into firms governed by boards whose members are also generalists. This finding is important as it highlights that complementarities in the matching of CEOs and firms may indeed bias the analysis of how CEO characteristics affect firm outcomes and possibly invalidate such findings, highlighting the need for future research in this area to account for these complementarities. Further, the results of the two-sided matching analysis also suggest that our evidence regarding the generalist CEOs' tendency to engage in diversifying acquisitions and the better performance achieved when there is a fit between the CEO's human capital and the acquisition type is robust to the sorting of CEOs into firms and the associated complementarities of the firm-CEO match.

Our paper makes several contributions. First, it contributes to strategic leadership research that tests hypotheses on how the characteristics of CEOs affect firm outcomes. In particular, this paper is among the first in the strategic leadership literature to use a two-sided matching model with the aim of identifying the complementarities of the firm-CEO match and subsequently accounting for these complementarities for a better understanding of how CEO characteristics shape firm outcomes. As CEO-firm complementarities may affect the relationship between other CEO characteristics and firm outcomes, future research examining how CEO characteristics shape firm outcomes could utilize this empirical approach to alleviate endogeneity concerns that stem from the matching of CEOs and firms, thus strengthening the validity of research findings. Second, our paper contributes to the literature on human capital and to research on microfoundations in strategy. Our paper highlights that the nature of the human capital of top managers (in our paper, CEOs) can shape firms' strategic behavior. We provide insights into how managers engage in strategic behavior that corresponds to the nature of their human capital, and how the fit between the nature of their human capital and the strategic actions they engage in is associated with stronger performance. Further, our paper suggests an interesting potential path dependency in executive human capital development, namely how executives with a particular human capital profile engage in strategic behavior that matches their human capital profile, thus further entrenching their human capital profile. Third, our paper also contributes to the literature on acquisitions by highlighting an important factor that can shape acquisition behavior and acquisition performance: the nature of the CEO's human capital, and the fit between the nature of the CEO's human capital and the type of acquisitions he or she undertakes.

Our study has some limitations. First, we have used a two-sided matching approach based on observable characteristics to alleviate endogeneity concerns. However, this approach does not eliminate the endogeneity bias deriving from potential selection on unobservable characteristics of the CEO and firm. While we used a substantial number of CEO- and firm-level control variables which are likely to be correlated with unobservable CEO and firm characteristics, we cannot rule out that selection on unobservables is biasing our analysis, and thus we need to interpret our results with caution. Second, there may be several reasons why CEOs engage in strategic behavior that corresponds to the nature of their human capital, including actively matching their human capital to opportunities to increase the returns from it (the "active view") and engaging in strategies in their "comfort zone" to minimize the additional effort and risk associated with unfamiliar strategies (the "passive view"). While the support for H3 suggests that it is unlikely that CEOs *only* pursue their own objectives at the firm's expense, we

cannot conclusively say which of the two mechanisms is the dominant one behind our findings. While it is not our paper's goal to differentiate between these two mechanisms, future research can explore this further.

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ORCID

Guoli Chen https://orcid.org/0000-0003-1116-8426

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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