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The Changing Landscape of Corporate Governance Disclosure: Impact on Shareholder Voting

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May 2023

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We thank seminar participants at Indiana University and conference participants at the 2022 FMA Annual Meetings. We acknowledge Daniel Kelly for outstanding research support.

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Keywords: shareholder voting, boards of directors, skills matrices, corporate governance disclosure

JEL Classifications: G30, G34, J24

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While mutual funds are required to vote on directors in every portfolio firm every year, many funds satisfy this requirement by following the recommendations of proxy advisory service companies such as ISS. However, companies complain that ISS employs one-size-fits-all policies, which do not consider firm-specific governance demands. A rational response to such frictions would be for firms to decrease investors' costs of evaluating directors' expertise. Consistent with this conjecture, we find that firms increasingly disclose directors' expertise in image-based formats. Moreover, these disclosures lead to less reliance on ISS, and to higher voting support, particularly in cases where ISS tends to employ blanket recommendations and in firms with high information asymmetry. Finally, we find that this transparent disclosure of directors' skills is informative regarding future firm outcomes.

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1. Introduction

The board of directors plays a critical role in a company: the directors are the representatives of firm owners. Consistent with directors' position as the liaison between shareholders and management, shareholders have significant input into the composition of the board via shareholder votes. Multiple pieces of evidence highlight the impact of directors and the salience of these votes. Burt, Harford, and Hrdlicka (2020) conclude that a director influences up to 1% of firm value, and Cai, Garner and Walking (2009) find that lower vote outcomes are associated with changes in governance provisions and with CEO turnover.

Several factors suggest that shareholder votes on directors are becoming more influential; for example, the increasing percentage of firms with majority voting provisions and the SEC's adoption of the universal proxy. However, there are also substantial challenges surrounding voting, many of which stem from the high costs to shareholders of evaluating directors. Mutual funds have a fiduciary duty to vote on each director up for election in every portfolio firm every year. However, many funds satisfy this requirement by relying, at least partially, on the recommendations of proxy advisory service firms, for example ISS or Glass Lewis. Critically, firms regularly complain that some of these recommendations are misguided. This may be because the proxy advisory service firms fail to understand firms' true governance demands or because they have incomplete information regarding directors' skillsets. In a related vein, firms complain that it can be difficult to effectively communicate their governance choices to investors.

A rational response to such frictions would be for firms to decrease investors' costs of evaluating the directors' expertise. Relatedly, a decrease in such costs should result in fewer investors relying on proxy advisory service company recommendations. We present evidence indicating that this is precisely what has occurred.

Firms increasingly present directors' qualifications and expertise in image-based formats, commonly referred to as director skills matrices. As shown by Hartzmark and Sussman (2019), image-based representations can significantly affect investors' evaluations, even if these images provide no incremental information relative to textual or quantitative metrics. Our empirical analyses are based on detailed data collected from the proxy statements of S&P1500 firms over the 2011 – 2021 period. For each firm-year, we determine whether the firm provides a director skills matrix, which is typically a tabular description where directors are listed in each row and the set of skills is listed across the columns. We group reported skills into 20 categories, to facilitate comparison across firms. The percent of firms presenting director skills matrices grew from less than 5% in 2011 to nearly 65% in 2021. The change is striking because unlike most disclosure changes, it was not precipitated by any regulatory requirement. The fact that these disclosures are voluntary suggests that firms perceive the benefits of such disclosures to outweigh the costs.

Our first prediction is that these image-based representations decrease investors' costs of evaluating directors up for vote, and as a result diminish investors' reliance on proxy advisory service companies such as ISS. Following the difference-in-difference approach of Baker, Larcker, and Wang (2022) with a matched sample to overcome endogeneity concerns, we find evidence consistent with this prediction. Moreover, effects are greater among investors for whom a decrease in information costs is most likely to be influential, specifically among investors who do not indiscriminately follow ISS across all agenda items up for vote. In economic terms, the presence of a skills matrix increases active voters' propensity to come to a different conclusion from ISS by five percentage points (within the subsample where management and ISS disagree).

We further predict that the effects of these image-based disclosures on investors' propensity to independently vote should be greatest in cases where ISS's recommendation is less precise, that is, when the recommendation is a noisier representation of director quality to the firm. Multiple pieces of evidence support this conjecture. First, effects are significantly larger among director types on which ISS tends to issue blanket against recommendations, for example affiliated directors and overboarded directors. While ISS has stated polices of recommending against such directors, Coles, Daniel and Naveen (2008) and Field, Lowry and Mkrtchyan (2013) conclude that the greater inside knowledge and unique expertise of these candidates can make them valuable in certain types of firms.[1] Second, we find some evidence that effects are significantly greater among firms with higher information asymmetry, as proxied for example by stock return volatility. Such firms are arguably more likely to have unique governance demands that are not readily transparent, thus suggesting that ISS's recommendation would be less precise. In sum, given proxy advisory service companies' tendencies to disregard firm specific governance demands, the finding that skills matrices lower investors' reliance on ISS highlights the value of these image-based disclosures.

Our second set of empirical tests focuses on the level of support for directors, as a function of skills matrices. If skills matrices enable investors to more accurately assess the incremental contribution of each director, then this disclosure format will contribute to greater voting support (under the premise that most firms strive to appoint high-quality directors). Relatedly, if skills matrices increase investors' propensity to independently evaluate directors in ways that lessen the extent of ISS blanket against recommendations, this will further contribute to higher support levels. Results are consistent with such dynamics: we find that adoption of a skills matrix significantly increases average voting support.

[1] For example, ISS's policy states that it will recommend against any non-independent director who sits on the compensation, nominating, or audit committee. See chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.issgovernance.com/file/policy/active/americas/US-Voting-Guidelines.pdf.

Heterogeneity analyses indicate that the effects of these matrices on voting support are concentrated among directors whose contribution to the firm is least clear and among firms whose governance demands are least transparent. First, we find that support is significantly greater among directors who previously received the lowest support, consistent with the contribution of these directors to the board's collective expertise being previously unclear to investors. Second, we find that the relation is strongest among high information asymmetry firms. The less transparent nature of such companies means that the skills and expertise of the directors best positioned to oversee such firms will tend to be less clear. In sum, by highlighting the contribution of each director to the board's collective expertise, skills matrices contribute to higher average support.

Our third set of empirical tests focuses on firms' decisions to adopt this imagery-based form of disclosure. If firms recognize the benefits of skills matrices, for example in terms of more informed investor voting, then firms should voluntarily adopt matrices even without explicit external pressure. Alternatively, if agency issues lead some firms to maintain suboptimal boards, then managers of these firms have incentives to be less transparent regarding board composition. In such cases, we would expect external forces to pressure firms to increase transparency. Our findings suggest that both channels play a role.

Consistent with better governed firms having the greatest incentives to be more transparent regarding board composition, we find that more independent boards and non-dual class boards are significantly more likely to adopt matrices. Consistent with external pressures playing a role in other firms, however, we find activist pressures regarding board composition have a significant effect: a one standard deviation increase is this measure is associated with a 10% increase in subsequent matrix adoption. We also find evidence of a learning channel that contributes to matrix adoption. When at least one of a firm's directors sits on the board of another firm that has a matrix, the focal firm is significantly more likely to adopt a matrix. In economic terms, a one standard deviation increase in such director linkages is associated with a 30% increase in matrix adoption. Relatedly, we find that matrix adoption is positively related to the percentage of industry peers with a matrix. Finally, firm size is also a significant determinant of matrix adoption, consistent with Hermalin and Weisbach's (2012) conclusion that larger firms tend to optimally adopt stricter disclosure policies.

In the final portion of the paper, we strive to independently evaluate the information content of firms' directors' skills matrices. If matrices are informative, then directors' reported skills should correspond to firms' governance demands, and the presence of certain skills should be informative regarding future firm outcomes. Alternatively, if firms employ skills matrices as a form of window dressing, then a reported skill is more likely exaggerated and as such will not be informative regarding future firm outcomes. The level of detail in our data enables us to test this quite precisely, as we can establish a very tight link between the skill and the associated outcome.

Our findings highlight the extent to which director skills matrices are informative. First, we find that directors' reported skills conform to reasonable proxies for firms' governance demands. For example, firms with international operations are significantly more likely to have a director who reports international expertise, and firms with more patents are significantly more likely to have a director who reports technology expertise. More generally, we find that a firm's industry is significantly related to associated skills, for example with firms in the finance industry being more likely to report directors with investment skills and firms in the health industry being more likely to report directors with scientific skills. Second, we find that among the subset of firms that report skills matrices, directors' skills are informative regarding the risks of various future firm outcomes. For example, firms with at least one director with risk management expertise are significantly less likely to face a class action lawsuit in the next one to three years. Drilling down even further, we find that cybersecurity expertise is significantly negatively related to future cybersecurity lawsuits. In addition, firms who have at least one director with strategy / M&A expertise are significantly less likely to make a value-decreasing acquisition, defined as an acquisition in which the announcement CAR falls within the bottom decile.

Collectively, our findings highlight the informativeness of director skills matrices for outside investors. As stated by the Council of Institutional Investors, "To vote thoughtfully, shareholders need relevant information about director nominees and an understanding of the board's perspective on how each individual serves the company's needs." Matrices facilitate investors' ability to evaluate whether firms have the necessary skillsets.

Our paper contributes to several streams of literature. First, we contribute to the literature on boards of directors. Boards are tasked with monitoring and advising management. However, it can be difficult for shareholders to assess directors' capacity to fulfill these roles. Adams, Akyol and Verwijmeren (2018) employ textual analysis of director descriptions provided in proxy statements to infer director skills. While this approach provides insights on the value of different skills, it would arguably be costly for an investor to employ this approach as they attempt to compare skills across broad sets of firms. Our evidence that matrices contribute to more independent voting builds upon the work of Ben-Rephael, Ronen, Ronen and Zhou (2021) and Hartzmark and Sussman (2019); images represent a more effective means of communication than text, in this case as a way for management to communicate board expertise to outside investors. Moreover, the finding that a lack of certain director skills predicts future negative firm outcomes highlights the information content of these skills matrices.

Second, our paper contributes to literature on disclosure. A broad body of literature has shown that more transparent financial disclosure contributes to better firm outcomes, including for example a lower cost of capital, higher liquidity, better investment allocation, and more accurate analyst recommendations, to name a few.[2] However, academic evidence on the value of corporate-governance related disclosure is more mixed. Hermalin and Weisbach (2012) document that more disclosure contributes to better quality decisions but can also lead to increased agency costs. Iliev (2010) shows that although the added disclosure mandated by SOX might be value-increasing for large firms, it was value-decreasing for small firms. Given these costs and benefits, our finding that so many firms have voluntarily adopted this enhanced form of disclosure via director skills matrices is informative. As discussed by Stigler (1964), firms have incentives to voluntarily provide information if the benefits exceed the costs; absent frictions, regulations requiring disclosure should be unnecessary.

2. Data

2.1 Sample Description

Our sample includes S&P 1500 companies from 2011 through 2021, 16,804 firm-years with 2,008 unique firms. For each firm-year, we manually search the company's annual proxy statement to determine whether the company provided a director skills matrix. These director skills matrix tables are distinct from the list of director biographies, which are provided separately in the proxy statement.

Companies report matrices in several different formats. The most common format is a table, which includes each director's name along one axis and the reported skills along the opposite axis. The table provides markings that indicate which directors have each of the reported skills

[2] See review papers by Roychowdhury, Shroff and Verdi (2019), Healy and Palepu (2001).

(see Figure 1 Panel A for an example).[3] Across our sample of 16,804 firm-years, 10.5% employ this tabular format.

A smaller portion of firms (8% of firm-years in our sample) similarly use check marks or icons to denote each director's skill, but instead of summarizing all skills within one table they instead include either a set of icons or a bulleted list of skills next to each director's biography (see Figure 1 Panel B for an example). Finally, across 3.3% of firm-years, the proxy simply includes a summary figure that lists each skill and the number (or percentage) of directors with that skill. To determine the individual skills held by each director, one must refer back to the director biographies (see Figure 1 Panel C for an example).[4]

We categorize all these cases as representing director skills matrices, a total of 3,672 firm-years (21.9% of firm-years in our sample) representing 960 unique firms (47.8% of firms in our sample). For this set of firms, we obtain detailed skills information, as reported in the matrices. To collect these skills, we first employ a combination of Python and manual collection across all matrix types. Once we have a complete listing of all directors and their reported skills, we standardize each reported skill into 20 main categories using Adams, Akyol, and Verwijmeren (2018) as a basis for the classification.[5] Appendix A provides the list of skill categories with examples of the sub-categories reported.

We merge our matrix disclosure data with Compustat to obtain firm-level accounting data, with the Center for Research of Stock Prices (CRSP) database for stock returns, and with the WRDS Thomson Reuters Stock Ownership database for institutional ownership. In addition, we

[3] In a small subset of these cases, the firm discloses the degree to which a director has a skill in a radial format.
[4] In a subset of cases, we are unable to link the summarized skillsets to the actual skills provided in the director biographies. In these cases, we code the firm as not having a matrix. In robustness tests, we exclude the 3.3% of firm-years in which each director is not explicitly matched to his / her skill and obtain qualitatively similar results.
[5] We retain the original skills categories provided in the proxy statements and, for robustness, alter the sub-categories or which skills are reported in which category. Across all alternate specifications, results are materially the same.

use data from Factset for activist involvement with firms, Institutional Shareholder Services (ISS) and BoardEx for firm and director governance measures, ISS Voting Analytics for director election measures, AuditAnalytics for corporate litigation information, and the Thompson/SDC U.S. Merger and Acquisitions database (SDC) for acquisition measures. For director-level matrix data, we match the director skills collected from the matrices to ISS/BoardEx director data.

2.2 Summary Statistics

In December 2009, the SEC amended Regulation S-K to require that all publicly traded companies disclose in the annual proxy statement the qualifications, attributes, skills, or experience that led the board to conclude that the person should serve as a director. The regulation, however, did not provide guidance on the format in which to disclose this information. Historically, most firms complied with this regulation by providing free-form paragraph descriptions about director qualifications under the directors' biographies. In more recent years, an increasing percent of firms has supplemented these textual descriptions with image-based representations, that is, with skills matrices.

To begin our investigation of director skills matrices, Figure 2 shows the time series trend in matrix disclosure. Less than five percent (66 firms) of companies in our sample voluntarily disclosed a skills matrix in 2011, compared to nearly 65% (837 firms) by 2021. The rate of increase is striking, given the absence of any changes in regulatory requirements over this period.

Matrix adoption also varies across both industry and firm size. Panel A of Figure 3 shows that, on average across the sample period, the healthcare industry has the lowest rate of skills matrices at 15%, compared to a high of 28% within the utility industry. Panel B shows that the relation between firm size decile and matrix adoption is nearly monotonic, increasing from an average 11% among the smallest firms to 40% among the largest firms. This nearly four-fold increase in matrix disclosure across firm size deciles is consistent with the findings from Hermalin and Weisbach (2012) that larger companies tend to optimally adopt stricter disclosure policies.

Table 1 details summary statistics of firm characteristics, for both our entire sample of firms and also conditional on whether a matrix is disclosed in a given firm-year. There is some evidence that skills matrices are more common among firms with stronger governance, as evidenced by the fact that these firms' boards tend to be more independent, they are less likely to be classified, and the share structures are less likely to be dual class. Looking at financial characteristics, matrix adoption is higher among larger firms, growth firms, and firms with lower stock returns over the past year. Consistent with learning, a firm's propensity to have a matrix is higher if a greater number of other firms in the same industry also have a matrix. Table 1 also shows that average director voting support is higher among firms with matrices.

2.3. Skills reported within skills matrices

Apart from understanding which firms voluntarily disclose director skills matrices, we also seek to understand which skills firms choose to report. In Figure 4, we detail the frequency with which individual director skills are disclosed, among companies that provide a matrix. Looking first at Panel A, *Finance* represents a base skill that nearly all firms reporting a matrix find valuable; among firm-years with a matrix, 92% list this skill. Approximately 70% list *leadership* or *corporate governance* skills. In contrast, some skills are quite specialized and are reported by relatively few firms (e.g., 11% report *real estate*).

Panel B of Figure 4 details the time series trends among the five individual skills that exhibit the largest changes across our sample period: *diversity*, *environmental & social (E&S), human resources*, *risk management*, and *technology. Human resources*, *diversity*, and *E&S* represent the skills with the largest increases, at 250%, 200%, and 175%, respectively. There is a

100% and 60% increase in both *risk managemen*t and *technology* skills, respectively. Other skills stay relatively stable over the sample period (among firm-years with a matrix).

Panels A and B of Figure 5 show the distributions of the number of skills per firm and per director, respectively, among firm-years with a matrix. Examining Panel A first, firms most commonly report seven to nine skills in their matrix. However, 5% of matrix firm-years report only 2 – 4 skills, and 12% list 12 or more different skills. Focusing on the director level in Panel B, the most common scenario is 3 – 6 skills per director. However, 1,129 director-firm-years (3.5%) report only one skill, and 10 director-firm-years detail 15 different skills.

The skillset of a firm's directors should reflect the firm's governance demands, and thus it should relate to the firm's operational environment. Table 2 shows that this is the case. We estimate linear probability models (OLS) of the likelihood of disclosing each various skill in a director skills matrix. The sample is limited to the subset of 3,202 firm-years that report a matrix and for which we have data on the individual director skills reported.

Panel A of Table 2 focuses on two skills that relate broadly to the operational structure of firms across multiple industries: *international* and *technology*. Looking first at column 1, we find that firms with more international operations, as proxied by an international segment reported within the Compustat segment data, are more likely to report a director with international expertise. Column 2 details that firms whose operations are more innovation-oriented, as proxied by number of patents, are more likely to report a director with technology expertise.

In Panel B, we provide broader evidence regarding the link between firm characteristics and directors' reported expertise. We examine six skills that generally relate to industry expertise: *Investments, Scientific*, *Consumer-oriented*, *Environmental and Social (E&S)*, and *Regulatory*. Findings provide further evidence that director skills relate to the operational characteristics of the firm. In particular, we find significant positive relations between the following director skills – firm types: *Investment* skills are greater in the financial industry; *Scientific* skills are greater in the healthcare industry; *Consumer-oriented* skills are greater in the consumer nondurables, consumer durables and retail industries; *E&S* skills are greater in the energy and utility industries, consistent with these industries facing greater environmental-related challenges; and, *Regulatory* skill is greater in the utility industry.

3. Influence of Director Skills Matrices on Investor Voting

3.1 Propensity of investors to independently vote

In this subsection, we focus on our first main question: do image-based representations of director skills decrease investors' costs of evaluating directors up for vote, in ways that diminish reliance on proxy advisory service companies? As discussed by Iliev and Lowry (2015), investors will only independently assess portfolio firms' directors when the benefits of doing so exceed the costs. Alternatively, when the net benefits of such evaluation are negative, they will fulfill their fiduciary duty to vote by relying on the recommendations of a proxy advisory service company such as ISS. If director skills matrices decrease investors' information processing costs, then reliance on ISS should fall.

The effects of matrix provision on voting behavior should be concentrated among investors whose net benefits of independently voting exceed some lower bound. Intuitively, this lower bound represents the point at which the decrease in information processing costs (as brought upon by provision of a matrix) is influential. There arguably exists a subsample of mutual funds whose net benefits of voting are sufficiently low that they would fall below such a level. Such funds tend to outsource all voting-related matters to a proxy-advisory service company such as ISS;[6] in many cases, such funds are likely not even aware of changes in voting-related disclosures. In contrast, other funds rely partially on ISS but also complement ISS's recommendations with their own research. We argue that the effect of image-based representations will be concentrated within the latter group.

To proxy for the set of investors for whom matrix provision is most likely to be influential, we define investors' net benefits of independently voting following Iliev and Lowry (2015). Specifically, we take the first principal component of four fund characteristics: fund assets under management, fund family assets under management, fund turnover, and location in an area of high fund concentration. Fund and family size capture economies of scale in research: when assets under management are greater the costs of research can be spread over a wider asset base. In a similar vein, funds with lower turnover can spread the costs of research over a longer period of time. Finally, the geographical-based proxy is based on the premise that a larger concentration of fund managers within a close proximity lowers the cost of information sharing, as posited by Hong, Kubik and Stein (2005). The net benefits of independently voting are positively related to fund size, family size, and fund geographical concentration, and they are negatively related to fund turnover. Consistent with this intuition, the first principal component is correlated with each underlying factor in these directions. We define funds with a positive value of the first principal component (which is approximately equal to above-median) to be active voters.

Results are reported in Table 3. Our empirical tests are based on a difference-in-difference framework, following the approach recommended by Baker, Larcker and Wang (2022) and similar to that employed by Gormley and Matsa (2011) to soak up potential sources of endogeneity. The

[6] For example, Iliev and Lowry (2015) find that during their 2006 – 2010 sample period, over 25% of mutual funds voted with ISS on over 99% of all proposals across all portfolio firms throughout the five-year period.

sample is at the firm × year × director × mutual fund vote level, and the dependent variable is a dummy variable equal to one if the fund voted for the director, zero otherwise. The treatment sample represents firms that disclose a matrix, where the first year of matrix disclosure is considered the event year (year 0). The control sample consists of a matched sample of firms that do not disclose a matrix, where matching is conducted with replacement based on event year, Fama-French 12 industry classification, and a 10% firm size bandwidth (expanded to 25% if the treatment firm is not matched initially). We require that both the treatment and control firms have at least one firm-year in the pre-period (before matrix disclosure) and one firm-year in the post-period (following matrix disclosure). We also limit the sample to the (-3,+3) firm-year window around matrix disclosure. *Treatment* equals one for firms in the treatment sample, and *Post* equals one for the (0, +3) window.

The independent variable of interest is *Skills Matrix* × *Active Voter*. *Skills Matrix* equals one for firm-years that disclose a matrix, which within our difference-in-difference setup equates to *Treatment* × *Post*. (*Treatment* and *Post* are soaked up by fixed effects, which are described below.) *Active Voter* equals one for mutual fund-years with positive net benefits of voting, as defined above.

To capture the tendency of a fund to independently vote, we split the sample into two subsets: the set of directors on which ISS recommended against (column 1) and the set of directors on which ISS recommended for (column 2). If these image-based disclosures increase active funds' propensity to independently vote, then these disclosures will lead these funds to come to a different conclusion than ISS with a greater frequency. That is, amongst directors that ISS recommends against, we predict that active voters exhibit a greater frequency of voting for among firm-years with a skills matrix. Thus, in column 1, we predict a positive coefficient on *Skills Matrix*

× *Active Voter*. In contrast, in column 2, disagreement with ISS manifests in a lower probability of voting for, that is, we predict a negative coefficient on this interaction term.

We include a wide array of control variables, which relate to voting: director characteristics, firm-level governance factors, and firm financial characteristics. We additionally include *cohort* × *firm* and *cohort* × *year* fixed effects. As Baker, Larcker and Wang (2022) discuss, when treatment is staggered in time (in our setting this equates to firms adopting matrices at different points) and treatment effects can be heterogeneous (in our setting, the influence on voting varies across firms), a potential "bad comparisons" problem can bias results. This bias arises from the fact that the control sample can include past treatment firms. *Cohort* × *firm* fixed effects control for this potential bias, where a cohort is defined as a matched treatment firm to control firm(s) group. *Cohort* × *year* fixed effects allow for time trends that vary by type of firm. The variation we isolate represents the causal effects of a skills matrix. We estimate OLS regressions, and standard errors are clustered by fund.

Results are broadly consistent with predictions. The coefficient on *Skills Matrix* × *Active Voter* is positive in column 1 and negative in column 2 – that is, active voters are more likely to vote for (against) directors among the subsample that ISS recommends against (for). These findings are consistent with active voters being more likely to independently vote and thus come to a different conclusion than ISS when firms decrease information processing costs by providing director skills matrices. Moreover, the coefficient on this interaction term is significant at the 1% level in Column 1, within the ISS against subsample. The finding of an insignificant effect within the ISS for sample (column 2) is arguably not surprising because so few of these director elections are controversial: when both ISS and management support a director, the probability that the director is low quality is quite small.

In Table 4, we examine heterogeneity in the impact of skills matrices on funds' voting, across different types of directors and different types of firms. Our overarching prediction is that skills matrices will be most influential among directors for which ISS's recommendations tend to be least precise. Less precise recommendations are noisier estimates of whether a director would contribute positively to firm value, for example through the monitoring and advising services she would reasonably be expected to provide.

We focus on two channels of recommendation precision. First, prior literature (see, e.g., Iliev and Lowry (2015) and Malenko and Shen (2016)) document that ISS tends to issue one-size-fits-all recommendations, commonly referred to as blanket recommendations. Evidence that one-size-fits-all approaches toward governance are frequently not optimal (see, e.g., Coles Daniel and Naveen (2008)) implies that such recommendations will be less precise.[7] We thus predict that the effect of skills matrices on disagreement with ISS will be significantly greater among directors where ISS is more likely to issue blanket recommendations. Based on ISS's policies, we use two measures of blanket recommendations: affiliated director and overboarded director. Our classification of affiliated director comes from the ISS US Directors database, and it is broadly defined as an outside director with a material relationship with the firm. Overboarded director is defined as a director with five or more public directorships. In our sample of directors, affiliated directors are four times more likely to receive an 'against' recommendation from ISS compared to independent directors (16% of affiliated versus 4% of independent directors). Further, overboarded directors are almost three times more likely to receive an 'against' recommendation from ISS compared to non-overboard directors (14% of overboarded versus 5% of non-overboarded directors).

[7] Consistent with this conclusion, Iliev and Lowry show that mutual fund votes, in particular the votes of actively voting funds, are more focused on shareholder value than ISS's recommendations.

The second dimension of ISS recommendation precision focuses on firm-level effects. We predict that precision will be lower among firms with higher information asymmetry. Such firms tend to have more unique corporate governance demands (see, e.g., Coles, Daniel, and Naveen 2008) and, as such, ISS's tendency to issue one-size-fits-all recommendations will be more likely to result in suboptimal recommendations. We use stock return volatility, bid-ask spread, and absolute abnormal returns around earnings announcements as measures of a firm's information asymmetry. Return volatility is defined as the annualized standard deviation of monthly stock returns, averaged over the past 12 months, and *High volatility* equals one if this measure is in the top quartile, zero otherwise. Bid-ask spread is defined as the average daily bid-ask spread over the prior year and *High bid-ask spread* equals one if this measure is in the top quartile, zero otherwise. Absolute abnormal return around earnings announcements is defined as the average absolute abnormal return surrounding a firm's earnings announcements in the prior year and *High absolute abnormal earnings return* equals one if this measure is in the top quartile, zero otherwise.

Results are detailed in Panels A through E of Table 4. The regressions in each panel are similar to those in Table 3, with the exception that we now add an interaction term, Skills Matrix × Precision proxy, where the precision proxy represents measures of blanket recommendations: *Affiliated director* (Panel A) and *Overboarded director* (Panel B), or measures of information asymmetry: *High volatility* (Panel C), *High bid-ask spread* (Panel D) or *High absolute abnormal earnings return* (Panel E).

Looking first at Panel A, columns 1 – 3 focus on the subset of directors on which ISS recommends against. We predict that skills matrices will increase investors' tendency to disagree with ISS, with magnitudes being significantly greater among directors for which recommendations tend to be less precise. Thus, we predict a positive coefficient on the main interaction term, *Skills* *matrix* × *Affiliated director*. Results are consistent with these predictions: relative to affiliated directors within non-matrix firms, a skills matrix increases investors' likelihood of disagreeing with ISS (and thus voting for the director) by 4.1 percentage points. Columns 2 and 3 show that this effect is concentrated within funds that do not indiscriminately follow ISS, i.e., among actively voting funds.

In column 4 of Panel A, we estimate a similar regression based on the subset of directors for which ISS recommends for. The coefficient on *Skills matrix* × *Affiliated director* is negative rather than positive (albeit not significant at conventional levels). This provides further evidence that the main effect of skills matrices is to increase the probability that funds independently assess directors up for vote. This leads funds to come to a different conclusion than ISS more often: they are significantly more likely to vote for directors when ISS recommends against, and they are (insignificantly) more likely to vote against directors when ISS recommends for.[8]

Conclusions are similar in Panel B, where the interaction term of interest is based on Overboarded director. In economic terms, relative to non-matrix firms, a skills matrix increases funds' likelihood of supporting an overboarded director by 4.7 percentage points. The effect is greater among funds that are less likely to indiscriminately follow ISS, where the magnitude is 6.2 percentage points. Finally, the coefficient in column 4 (the ISS for sample) is again negative, and in this case significant at the 5% level.

Panels C, D and E provide some evidence that firm-level information asymmetry also plays a role. Looking first at Panel C, we find that the skills matrix leads to significantly more independent voting among high volatility firms relative to low volatility firms. In a similar vein,

[8] The economically small and insignificant magnitude is consistent with the low likelihood that these directors are low quality, as reflected by the fact that ISS and management support the candidate

we find in Panel E that the skills matrix has a significantly greater effect among firms with high absolute abnormal returns around earnings announcements. However, we do not find a significant effect using the bid-ask spread as a proxy for firm information asymmetry, as shown in Panel D.

In sum, results throughout this section provide strong evidence that image-based disclosures decrease investors' information costs in ways that increase independent voting, that is, they decrease investors' propensity to indiscriminately follow ISS. These effects are concentrated within directors and firms for which ISS's recommendations are likely to be least precise.

3.2 Support for directors

Results in the prior section showed that skills matrices contribute to more independent voting, which equates to a higher probability of coming to a different conclusion than ISS: voting for when ISS recommends against, and vice versa. In this section, we focus on the level of director support, which can be thought of as the net effect of the two ISS subsample results.[9] In addition, we examine the types of directors on which support would most likely be elevated.

There are several reasons to believe skills matrices will contribute to higher director support (in addition to more independent voting). First, skills matrices should clarify the contribution of each individual director; clarity regarding what a director adds to the firm should lead to higher voting support. Second, in addition to facilitating evaluation of each individual director, skills matrices also increase investors' ability to evaluate the collective expertise of the aggregate board. Third, results in the prior section show that skills matrices decrease investors' propensity to rely on ISS blanket against recommendations.

We test the effects of skills matrices on the level of director voting support in a format

[9] Ex ante, it is not clear which effect will dominate. On the one hand, the magnitude of funds' tendency to vote for when ISS recommends against is greater (compared to funds' tendency to vote against when ISS recommends for). However, the sample size of the ISS against sample is substantially smaller than the ISS for sample.

similar to Table 3, using the difference-in-difference approach of Baker, Larcker, and Wang (2022). Results are shown in Table 5. Looking first at column 1, the coefficient on Skills Matrix is significantly positive, indicating that firms with a skills matrix receive significantly higher voting support than firms without a matrix. The average annual percent 'for' votes increases by 0.5 percentage points following disclosure, which in economic magnitude represents one-tenth of a standard deviation.

We predict that the greater support will be concentrated within subsamples where the contribution of directors was least apparent. We test this both at the director level and at the firm level. At the director level, we conjecture that effects should be concentrated among directors who previously received the lowest support, that is, among directors that investors had the most concerns regarding their contribution to firm value. At the firm level, we predict that effects should be concentrated among high information asymmetry firms, that is, among firms that investors have the least clarity regarding governance demands. The image-based representation of director skills both highlights the skills that the firm feels are most relevant and clearly depicts the directors with these relevant skills.

Column 2 of Table 5, Panel A shows evidence at the director level. For each firm-cohort-director, we calculate average support during the pre-period. Based on this support level, we then place the directors into terciles within each firm-cohort.[10] The independent variable of interest equals *Skills Matrix* × *Low vote director*, where Low vote director represents directors in the lowest tercile. We find that the higher average support is significantly greater among the Low vote directors; among this group, matrix disclosure is associated with a 0.9 percentage point increase

[10] As described in detail in the description of Table 3, We require that both the treatment and control firms have at least one firm-year in the pre-period (before matrix disclosure) and one firm-year in the post-period (following matrix disclosure).

in voting support. In sum, our results suggest that the disclosure of skills matrices enables investors to better discern the contribution of each director, particularly those directors whose contribution to the board was most in doubt prior to this disclosure.

Panel B of Table 5 provides evidence at the firm level. The governance demands of high information asymmetry firms tend to be more opaque, and analogously it is more difficult for investors to discern the contribution of each director. A director skills matrix would be particularly valuable in such cases, and thus we would expect the relation with average voting support to be stronger among such firms. We employ the same three proxies for firm information asymmetry: stock return volatility, bid-ask spread, and absolute abnormal return around earnings announcements.

We re-estimate the regression in column 1 of Table 5, but we interact the Skills matrix variable with each information asymmetry proxy. Consistent with predictions, the positive relation between the presence of a skills matrix and voting support is higher among high information asymmetry firms. The interaction terms between skills matrix and both high bid-ask spread and absolute abnormal earnings return are significantly positive, while the interaction term for high return volatility is positive but not statistically significant.

We also examine the relation between the skillsets reported within these matrices, and their relation with voting support. We begin by examining the relation between voting support and an arguably crude measure of board expertise: the total number of skills reported (across all directors, as listed in the matrix). We then investigate the influence of specific skills, which we conjecture relate to firms' governance demands. Results are provided in Table 6.

To capture the collective expertise of the entire board, we focus on the aggregate skills across all directors within a firm-year. The dependent variable is the average voting support across the board, and we limit the sample to the subset of firm-years with skills matrices. We examine the influence of: *Number of skills reported*, which is defined as the total number of skills listed in each firm's skills matrix; *Number of 'top industry' skills reported*, defined as the three most common skills within the industry-year; and *Number of non-'top industry skills' reported'*, which is defined analogously.

Results in column 1 show that the total number of skills reported by the board is not significant, which is perhaps not surprising given prior literature showing that different types of firms have different governance demands. In contrast, results in column 2 show that the presence of top industry skills is associated with significantly higher voting support. Investors look for firms to display certain types of expertise, where this expertise is related to the firm's operational environment, as proxied by the industry within which they fall. When firms demonstrate greater such expertise, average voting support across a firm's directors is higher. In contrast, the number of non-top industry skills is not significant at conventional levels. In column 3, we employ *Percent of board with a top industry skill* as an alternative measure of directors' collective expertise. We similarly find that this is significantly positive.

Our findings throughout this section highlight the benefits to firms of director skills matrices. Investors diminish their reliance on proxy advisory service companies, and voting support for firm directors increases. These findings highlight an additional benefit of more robust disclosure. Prior literature shows that more robust disclosure contributes to a lower cost of capital, higher liquidity, better investment allocation, and more accurate analyst recommendations. Our findings shed light on a channel underlying these outcomes. Disclosure that decreases investors' information processing costs contribute to improved monitoring, in ways that benefit the underlying firms.

4. Determinants of Director Skills Matrix Disclosure

Findings in the prior section suggest that firms should voluntarily adopt skills matrices, as a way to diminish investors' information costs and thereby facilitate more informed voting. However, there are always risks to voluntarily providing extra information. By transparently laying out the skills that its directors have, by definition the firm also highlights the skills that are only weakly represented on its board, or perhaps not represented at all. Moreover, by providing a skills matrix, the firm weakly commits to similarly providing such enhanced disclosure in the future. Within our sample, there is no case where a firm reverses this disclosure, that is, where it reports a matrix in one year and then omits it the following year.

We posit three non-mutually exclusive channels driving the disclosure of a director skills matrix: internal governance, learning, and investor pressure. Internal governance refers to the possibility that better governed firms are more likely to nominate a set of directors with the most relevant skills, and as such they would perceive more benefits in sharing this information with their investors in the most transparent form.

The learning channel allows for the possibility that managers and directors obtain information regarding the benefits of director skills matrices from other individuals in their network. Learning effects tend to be greatest when existing knowledge is low. Given the relatively recent emergence of director skills disclosure in company proxy statements (descriptions of directors' experience were first mandated in 2009), firms arguably lack a good understanding of the costs and benefits of alternative means of disclosure.

Finally, investor pressure will also play a role if investors perceive benefits to this more transparent form of disclosure, but firms decline to voluntarily provide it. As discussed previously, fund managers have a fiduciary duty to vote on all portfolio firms' directors. This is an enormous monitoring task, yet most fund families have a relatively small number of individuals within the stewardship department. Bebchuk and Hirst's (2019) findings suggest that investors devote a fraction of a person-hour towards evaluation of each director. They show that the average employee in the stewardship department of the Big Three mutual funds (Blackrock, State Street, and Vanguard) is responsible for 250 – 2,016 portfolio companies. In a similar vein, activists evaluate many companies to identify undervalued targets in which they can effect change. Boyson and Mooradian (2011) find that board representation improves performance more than other changes.

Table 7 reports the results of linear probability models (OLS) estimating the likelihood of providing a director skills matrix as a function of firm governance, learning, and investor pressure, as well as firm financial characteristics, and year fixed effects. In certain specifications we also include industry or firm fixed effects. Firms are included in the specification until they report a matrix or if they do not report one until the earlier of delisting or the end of the sample The dependent variable in each model is equal to one if the firm provides a director skills matrix in that year, zero otherwise.

Looking first at column 1 of Table 7, regressors include firm-level governance factors and financial characteristics, as well as year and industry fixed effects. Consistent with predictions, results suggest that matrix adoption is more common among better governed firms, as indicated by the significantly positive coefficient on board independence and the significantly negative coefficient on dual class.[11] Matrix adoption is significantly greater among larger firms, consistent with patterns shown in Figure 3.

Column 2 adds several proxies for learning and investor pressure. Our most direct measure

[11] However, we also find a positive weakly significant coefficient on CEO-Chair duality.

of learning is the percentage of directors with board seats at other firms that disclose matrices, which follows the extant literature on the ways in which information diffuses across firms (see, e.g., Davis (1991), Davis and Greve (1997), Bouwman (2011)). We also include the percentage of industry peers with a matrix. This captures the learning that stems from a given disclosure practice becoming more common among peer firms. Given the upper bound on this percentage and the associated non-linear effect, we additionally include the squared term of this variable. We note that the practices of industry peers can also contribute to pressure to adopt what becomes perceived as an 'industry best practice'.

Our most direct proxies for external pressure represent two measures of activism from Factset: *Board-related activism* and *Non-board-related activism*. Board-related activism is defined as an activist campaign with one of the following main campaign objectives: activism board control, board representation, support dissent group in proxy fight, or vote against a director election management proposal.[12] Non-board-related activism is defined as all other activist campaigns provided by Factset.

Given that several of the variables of interest in column 2 are measured at the industry level, we necessarily omit industry fixed effects. Results provide significant support for both investor pressure and learning effects contributing to matrix adoption. A one-standard deviation increase in board-related activism is associated with a 10% increase in matrix adoption the subsequent year, and a one standard deviation increase in percentage of directors with other board seats at matrix firms is associated with a 30% increase. Finally, the percent of industry peers reporting a matrix is also significantly positively related, potentially capturing both investor

[12] We also include institutional ownership, but we note that this variable is highly correlated with firm characteristics such as firm size, meaning the coefficient is likely to capture dynamics other than just external pressure.

pressure and learning effects.

Model 3 replicates this regression adding firm fixed effects. By isolating within firm changes in disclosure practices, this specification controls for many sources of endogeneity, for example, as would stem from cross-sectional differences between firms. Inferences are similar in this specification. Firms with greater investor pressure and with greater opportunities for learning are significantly more likely to adopt a matrix. We find less support for internal governance in this specification, though we note that this is potentially driven by the fact that many governance proxies exhibit little within-firm time-series variation.

5. Informativeness of Director Skills Matrix Disclosure

The purported advantage of providing a skills matrix is that it more effectively represents the expertise of the board. As such, these disclosures provide an opportunity to assess the value of certain skills more robustly among various firm types. While there is increasing consensus among academics that the board plays a critical role in monitoring and advising the firm, the precise channels of influence have been difficult to identify, in part because much of the board's work is unobserved by outsiders.

We posit that if the skills reported in these matrices are informative, then the presence of certain skills should decrease the probability of a corresponding negative event. To test this prediction, we investigate three distinct negative firm outcomes: litigation, value-destroying acquisitions, and negative say-on-pay votes. We limit our sample in the following analyses to the subset of firm-years that report a matrix in which we have data on the individual director skills reported.

We begin by examining whether firms with specific director skills are less likely to be subject to litigation. We use the AuditAnalytics database as our source of corporate litigation.

AuditAnalytics includes case data on civil litigation filed in federal district courts on matters disclosed to the SEC as material pending litigation. We extract the date the litigation was filed and the litigation type. Across our sample of 2,017 firm-years that report a skills matrix, the unconditional rate of litigation over the following fiscal year 10.6%, and the rate over the subsequent three fiscal years is 18.1%.

Table 8 reports linear probability models (OLS) estimating the likelihood of litigation as a function of whether the company reports a particular skill in its matrix. All models include year and industry fixed effects. Looking first at Panel A, we examine the relation between the *Risk Management* skill and subsequent litigation. We focus on two measures of this skill: (1) an indicator variable equal to one if the firm reports *risk management* in its skills matrix and (2) a continuous measure of the percentage of directors with reported *risk management* skill. In models 1 and 2, the dependent variable is a dummy equal to one if the firm faced a lawsuit over the next fiscal year. Models 3 and 4 are similar, with the exception that we focus on the incidence of a lawsuit over the next three years.

Results in Table 8 are consistent with predictions. The deficit of a key skill is informative regarding the probability of future negative outcomes. Firms that report *risk management* as a director matrix skill are significantly less likely to be subject to a lawsuit over the following one- and three- year periods. Moreover, this conclusion is robust to using either the indicator measure or the continuous measure of the *risk management* skill. The effect is economically meaningful: firms that report this skill are roughly 30% less likely to be subject to litigation in the following year. If firms were, on average, employing skills matrices to exaggerate the skills of their directors as a form of window dressing, we would not expect to find this result.

One potential factor underlying these specifications is endogeneity. However, in this setting endogeneity arguably biases us against finding the predicted effect. The predominant source of endogeneity is that both the presence of *risk management* skills on the board and the likelihood of facing lawsuits are related to underlying firm risk. To the extent that we are unable to completely control for firm risk, this represents a correlated omitted variable. Importantly, this would upwardly bias the relation between the *risk management* skill and subsequent litigation risk: Firms with higher risk would both have the *risk management* skill and be more likely to face lawsuits. In this sense, our finding of a significant negative relation between these two factors is a conservative estimate of the true magnitude of the effect.

In Panel B of Table 8, we examine in more depth the relation between disclosed director skills and subsequent lawsuits, by focusing on two specific types of litigation and the specific corresponding skills. Models 1 and 2 examine whether the presence of the *cybersecurity* skill relates to the subsequent likelihood of a cybersecurity-related lawsuit, and Models 3 and 4 focus on the relation between the *environment* skill and the subsequent likelihood of an environmental-related lawsuit. In our classification of 20 skills (as reported in Panel A of Figure 4), the *cybersecurity* skill is a subset of the *technology* skill category, and the *environment* skill is a subset of the *Scientific* category. Across our sample of firm-years with a matrix, 4.8% report the *cybersecurity* skill and 14.3% report the *environment* skill.

Results suggest a strong relation between cybersecurity-related skills and litigation risk. Firms reporting the *cybersecurity* skill are significantly less likely to be subject to cybersecurity-related litigation in the following year. In economic terms, the presence of this skill is associated with a 0.6% lower probability of facing a cybersecurity lawsuit. Relative to the unconditional probability of such a lawsuit, this represents a 100% decrease. In contrast, we fail to find similar evidence for environmental lawsuits and skill. We note that this is potentially due to underlying endogeneity detailed above.

Our second set of tests regarding the relation between director skills and subsequent firm outcomes focuses on the *strategy / M&A* skill. We examine whether firms with deficits in this skill are more likely to engage in value-destroying acquisitions. We collect information on acquisitions announced by firms from SDC, and we calculate the acquirer's three-day cumulative abnormal return (CAR) surrounding the announcement date. For the sub-sample used in this analysis (2,017 firm-years with a skills matrix), 228 (446) firm-years announce at least one acquisition in the following fiscal year (three years).

We estimate linear probability models (OLS) in which the dependent variable is an indicator variable equal to one if the announcement CAR is in the bottom decile, that is, whether the acquisition is a value-destroying deal. Similar to specifications in Table 8, we focus on two measures of the *strategy / M&A* skill: (1) an indicator variable equal to one if the firm reports *strategy / M&A* in its skills matrix and (2) a continuous measure of the percentage of directors with reported *strategy / M&A* skill. All models include year and industry fixed effects. Results are reported in Table 9.

Consistent with predictions, across all four specifications the coefficient on *strategy / M&A* skill is negative as predicted. Moreover, we find statistically significant results in Models 3 and 4, where we focus on the three-year horizon. In economic terms, the presence of the *strategy / M&A* skill decreases the probability of a value-destroying acquisition by 10.2%. This finding relates to Field and Mkrtchyan (2017) who find that board acquisition experience is positively related to subsequent acquisition performance.

Finally, our third set of tests on firm outcomes examines whether firms with deficits in the *compensation* skill are more likely to be subject to negative say-on-pay (SOP) votes. The *compensation* skill represents a sub-category of the *corporate governance* skill (which is shown in Panel A of Figure 4). Across our sample of firm-years with a matrix, 8.5% report having at least one director with the *compensation* skill. We collect information on SOP votes at annual meetings from ISS Voting Analytics, and we tabulate the percent of outstanding shares that voted 'against' the advisory vote on the executive compensation plan. Our sample of SOP votes consists of 1,119 firm-years from the sub-sample of 2,017 firm-years with skills matrices (and for which we have detail on the skills reported within this matrices). The SOP vote sample is somewhat smaller because not all firms hold an advisory vote on compensation each year.

Table 10 reports OLS regressions estimating the percent of 'against' SOP votes (Models 1 and 2) and whether the percent of 'against' SOP votes is in the highest tercile of the sample (Models 3 and 4). Following previous specifications, we again focus on two measures of *compensation* skill: (1) an indicator variable equal to one if the firm reports *compensation* in its skills matrix and (2) a continuous measure of the percentage of directors with reported *compensation* skill. All models include year and industry fixed effects.

Results from Table 10 again provide support for our predictions. The coefficient on *compensation* skill is negative across all four specifications. The magnitude of the coefficient suggests that the percent of directors with the *compensation* skill is more important than merely the presence of at least one director with this skill. Using this measure, the relation is significant at the 5% level when we focus on the three-year horizon. The economic effect is analogous to effects documented in Tables 8 and 9. A one standard deviation increase in the percent of directors with this skill results in roughly a 10% decrease in the likelihood of a SOP 'against' vote in the top tercile.

In sum, results throughout this section provide evidence that self-reported skills are informative. Firms that appear to lack key skills face a higher likelihood of a negative subsequent outcome, for example a lawsuit, a value-destroying merger, or a negative say-on-pay vote. These findings provide further evidence regarding the value of skills matrices.

6. Conclusion

The portion of firms voluntarily providing director skills matrices has increased markedly over the past decade. The fact that this has occurred in the absence of any changes in regulatory requirements suggests that firms and their investors perceive it to be beneficial. Results throughout the paper provide evidence consistent with this conjecture.

First, we find that director skills matrices lead to decreased reliance on ISS, which is consistent with these image-based disclosures decreasing investors' costs of evaluating directors. These effects are concentrated in cases where ISS tends to issue blanket recommendations, for example affiliated directors and overboarded directors. In addition, the impact of skills matrices is significantly greater among higher information asymmetry firms, consistent with such firms being more likely to have unique governance demands that are not recognized by ISS.

Second, we find that director skills matrices lead to higher voting support, which is consistent with these more transparent disclosures clarifying the incremental contribution of each director to the board. These effects are concentrated within directors whose contribution was previously least clear, as measured by low support prior to the introduction of the matrix, and among firms with high information asymmetry.

Finally, skills matrices are informative regarding directors' expertise. We find that the director skills reported in this transparent disclosure format are informative regarding future firm outcomes; including, for example, the risks of lawsuits as well as the risks of value-decreasing mergers.

By facilitating the comparison of expertise across firm boards, matrices enable investors to more readily identify weaknesses in firms' governances. To the extent that the presence of director skills matrices lowers the costs to investors of evaluating firms' governance structures, we would expect the efficacy of engagement to increase. This paints an optimistic future going forward, as firms and investors alike continue to work towards more effective governance.

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Appendix A: Matrix Skills Categories

The appendix reports the main and sub (bullet point) categories that skills disclosed in board skills matrices are categorized into.

Academia
- Education

Accounting
- Audit
- Compliance

CEO

Consumer Oriented
- Marketing
- Brand Management
- PR
- Communications
- Sales/Retail

Corporate Governance
- Board Service
- Investor Relations
- Compensation
- Succession
- Independence

Environmental & Social (E&S)
- Community
- Environment
- Non-profit
- Sustainability

Diversity
- Ethnicity

Finance
- Banking
- Wall Street Experience

HR
- Talent Management
- Human Capital

Industry
- Multi-industry
- Labor

International
- Global
- Emerging Markets
- Trade

Investments
- Capital Markets
- Capital Allocation
- Private Equity
- Capital Management

Leadership
- Executive
- C-level
- Management

Operations
- Manufacturing
- Distribution
- Supply chain
- Logistics
- Product development

Real Estate

Regulatory
- Government
- Public Policy
- Legal

Risk Management
- Crisis Management

Scientific
- Science
- Engineering
- Health

Strategy / M&A
- Business Development
- M&A
- Corporate Affairs
- Consulting

Technology
- IT
- Digital
- Cybersecurity
- Ecommerce
- Software
- Data Analytics

Appendix B: Variable Definitions

	Source	Variable Definition
Panel A: Governance Characteristics		
Board independence	IRRC	Percentage of the board that is independent
Board size	IRRC	Number of directors
Classified board	IRRC	Indicator equal to one if directors are assembled into distinct classes with successive annual elections for a single class of directors
Dual class	IRRC	Indicator equal to one if the firm a dual class shareholder structure
CEO-Chair duality	IRRC	Indicator equal to one if the CEO is also chair of the board
Institutional ownership	Thomson	Percentage of outstanding shares held by institutional shareholders
Panel B: Firm Characteristics		
Firm size	Compustat	Natural logarithm of market capitalization
Market-to-book	Compustat	Natural logarithm of market-to-book ratio
ROA	Compustat	Operating income scaled by total book value of assets
Stock return	CRSP	Annual buy-and-hold return
Stock return volatility	CRSP	Annualized standard deviation of monthly stock returns
R&D	Compustat	R&D expenses scaled by total book value of assets
International operations	Compustat	An indicator variable equal to one if the firm has operations outside of the U.S. as reported in the firm's Compustat segment data
Log(1+# of patents)	USPTO	The natural log of one plus the number of patents filed in the prior fiscal year.
Bid-ask spread	CRSP	The average daily bid-ask spread over prior year
Absolute abnormal earnings return	IBES	The average absolute abnormal returns surrounding firms' earnings announcement in the prior year
Intangible Assets	Compustat	Intangible assets scaled by total book value of assets.
Acquisition CAR	CRSP	Acquirer three-day cumulative abnormal return (CAR) surrounding announcement date of acquisition
Panel C: Board Matrix External Factors		
Board-related activism	FactSet	Indicator equal to one if activism event(s) with the following campaign objectives defined by Factset occurs: board control, boardrepresentation, support dissent group in proxy fight, or vote against a director election management proposal
Non-board-related activism	FactSet	Indicator equal to one if activism event(s) with non-board-related campaign objectives defined by Factset occurs
Percentage of industry peers with matrix		Percentage of firms in the same 2-digit SIC industry classification that disclosure a skills matrix in the prior year
Percentage of directors with other board seats at matrix firm		Percentage of directors that hold a directorship at a different S&P 1500 firm that reports a skills matrix in the prior year
Panel D: Director Voting Characteristics		
Percent 'for' votes	IRRC	Percent 'for' votes cast for an individual director at annual meeting
Average percent 'for' votes	IRRC	Average percent 'for' votes cast for directors up for election at annual meeting

Appendix B: Variable Definitions (continued)

	Source	Variable Definition
Panel D: Director Voting Characteristics		
Residual of ISS 'for' recommendation	IRRC	Residual estimate from a regression model of the ISS 'for' recommendation based on director, firm and governance characteristics
Residual of percent of board with ISS 'for' recommendation	IRRC	Residual estimate from a regression model of the average ISS 'for' recommendation based on firm and governance characteristics
Independent director	IRRC	Indicator equal to one if the director is defined as independent
Log(Age)	IRRC	Natural log of director age
Log(Tenure)	IRRC	Natural log of director tenure
Female	IRRC	Indicator equal to one if the director if female
Number of other directorships	IRRC	Number of board seats held at other publicly traded firms
Director ownership	IRRC	Shares held by director scaled by total shares outstanding
Audit committee	IRRC	Indicator equal to one if director is on audit committee
Audit committee chair	IRRC	Indicator equal to one if director is audit committee chair
Compensation committee	IRRC	Indicator equal to one if director is on compensation committee
Compensation committee chair	IRRC	Indicator equal to one if director is compensation committee chair
Nominating committee	IRRC	Indicator equal to one if director is on nominating committee
Nominating committee chair	IRRC	Indicator equal to one if director is nominating committee chair
Attendance problem	IRRC	Indicator equal to one if director's board meeting attendance is less than 75%
Affiliated director	IRRC	Indicator equal to one if director is defined by ISS to be an outside director with a material relationship to the firm
Overboarded director	IRRC	Indicator equal to one if director holds five or more public directorships
Panel E: Fund Voting Characteristics		
Active voter		Indicator equal to one if the fund's predicted active voter score calculated following Iliev and Lowry (2015) is greater than zero. The fund's predicted active voter score is the principal factor extracted from four fund-level proxies for net benefits of voting: fund size, membership in top-five family, location in top fund MSA and fund turnover.
Fund size		Fund total net assets
Family size		Fund family total net assets
Fund turnover		Minimum of aggregate purchases or aggregate sales of securities over the calendar year, divided by the average total net assets of the fund
Top 5 MSA		Indicator equal to one if the fund management company is located in one of the top-five MSAs based on number of mutual funds

Appendix B: Variable Definitions (continued)

Panel F: Director Skills Variables	
# skills reported	Total number of skills reported in a firm's skills matrix
# 'top industry' skills reported	Total number of top 3 most reported skills in a given Fama-French 12 industry-year (excluding Corporate Governance, Finance, and Leadership skills) included in a firm's skills matrix
# 'non-top industry' skills reported	Total number of non-top 3 most reported skills in a given Fama-French 12 industry-year (excluding Corporate Governance, Finance, and Leadership skills) included in a firm's skills matrix
Percent of board with 'top industry' skill	Percentage of board that is reported to have a top 3 industry skill
Risk Management skill (0/1)	Indicator equal to one if the firm discloses risk management as a matrix skill, zero otherwise
Risk Management skill (%)	Percentage of the board with risk management as a matrix skill
Cybersecurity skill (0/1)	An indicator equal to one if the firm discloses cybersecurity as a matrix skill, zero otherwise.
Cybersecurity skill (%)	Percentage of the board with cybersecurity as a matrix skill
Environment skill (0/1)	An indicator equal to one if the firm discloses environment as a matrix skill, zero otherwise.
Environment skill (%)	Percentage of the board with environment as a matrix skill
Strategy / M&A skill (0/1)	Indicator equal to one if the firm discloses strategy / M&A as a matrix skill, zero otherwise
Strategy / M&A skill (%)	Percentage of the board with strategy as a matrix skill
Compensation skill (0/1)	Indicator equal to one if the firm discloses compensation as a matrix skill, zero otherwise
Compensation skill (%)	Percentage of the board with compensation as a matrix skill

Figure 1: Examples of Director Skills Matrix Disclosure

The figure depicts examples of the three types of director skills matrix disclosure. Panel A provides the skills matrix disclosure for Microsoft Corporation from its 2019 proxy statement. Panel B provides the skills matrix disclosure for General Mills, Inc. from its 2019 proxy statement. Panel C provides the skills matrix disclosure for Marriott International Inc. from its 2019 proxy statement. Panel D provides an example of director biographies provided by Stryker Corporation without a board matrix disclosure from its 2019 proxy statement.

Panel A: Example #1 of Skills Matrix Disclosure (Microsoft Proxy Statement, 2019)

Experience, expertise, or attributes

	Gates	Hoffman	Johnston	List-Stoll	Nadella	Noski	Panke	Peterson	Pritzker	Scharf	Sorenson	Stanton	Thompson	Warrior
Financial	■		■	■		■	■			■	■	■	■	
Gender, ethnic, or national diversity				■	■		■	■	■				■	■
Global business	■		■	■	■	■	■	■	■	■	■	■	■	■
Leadership	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Mergers and acquisitions		■	■	■	■	■			■	■	■	■	■	■
Sales and marketing				■			■	■		■			■	
Technology	■	■			■	■		■		■		■	■	■

Panel B: Example #2 of Skills Matrix Disclosure (General Mills Proxy Statement, 2019)

R. Kerry Clark, Independent Lead Director

Age: 67

Independent Director Since: 2009

Committees: Corporate Governance; Finance

Other Public Directorships: Anthem, Inc. (formerly Wellpoint, Inc.)
Avnet, Inc.
Textron, Inc.

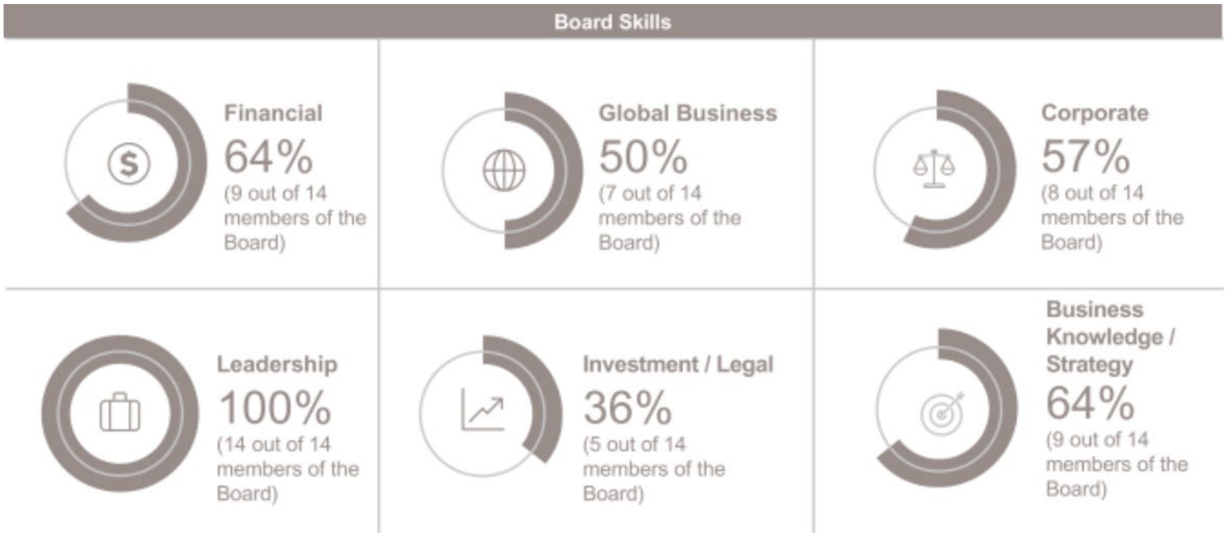
Senior Executive Leadership | Industry Focus | Global Experience | Governance Expertise | Health and Wellness

R. Kerry Clark served as Chairman and Chief Executive Officer of Cardinal Health, Inc., a provider of health care products and services, until his retirement in 2009. Mr. Clark joined Cardinal Health in 2006 as President and Chief Executive Officer and became Chairman in 2007. Prior to that, Mr. Clark had been with The Procter & Gamble Company, a consumer products company, since 1974. There, he held various positions including President of P&G Asia; President, Global Market Development and Business Operations; and from 2004 to 2006, Vice Chairman of the Board.

Contributions to the Board:

- As our Independent Lead Director, Mr. Clark draws on his business leadership, corporate strategy and governance expertise to provide strong, independent board leadership and to ensure board effectiveness by fostering active discussion and collaboration among the independent directors and serving as an effective liaison with management.
- With a strong background in consumer packaged goods and health care products, he brings to the board extensive experience in launching new products, brand-building, marketing and partnering with customers across sales channels.
- Mr. Clark also lends a global business perspective, developed through his leadership of global business operations at Procter & Gamble.

Panel C: Example #3 of Skills Matrix Disclosure (Marriott Proxy Statement, 2019)



Panel D: Example of Director Biographies without a Board Matrix (Stryker Proxy Statement, 2019)

MARY K. BRAINERD, Age 65, Director since 2017

Former President and Chief Executive Officer of HealthPartners, the largest, consumer-governed, nonprofit health care organization in the United States, which she led from 2002 to May 2017. Prior to joining HealthPartners in 1992, she held various executive roles with Blue Cross and Blue Shield of Minnesota from 1984 to 1992. She also serves as a director of Bremer Bank and Securian Financial, a financial services company headquartered in Minneapolis.

Ms. Brainerd's extensive experience surrounding both health care delivery and insurance enable her to provide unique and invaluable insight to our Board discussions, particularly in light of the evolving landscape in the health care delivery and payer markets.

ROCH DOLIVEUX, DVM, Age 62, Director since 2010

Chairman of the Board, Pierre Fabre SA, a global dermocosmetics and healthcare company. Chairman of GLG Institute, a community of senior executives for experience sharing and learning. Director of UCB, a global biopharmaceutical company, where he was Chief Executive Officer for 10 years. He is also Chairman of the Board of the Vlerick Business School, a top-100 business school in the world based in Belgium and of the Caring Entrepreneurship Fund, a philanthropic organization to help entrepreneurs start their own businesses in healthcare.

Dr. Doliveux has extensive experience in life science and healthcare companies, including research, development, regulatory, medical, marketing, market access, sales and M&A, as well as strategic and organizational change management. His exposure to business in many geographies and cultures is very valuable as Stryker seeks to expand its global presence.

Figure 2: Percentage and Number of Firms with Skills Matrix, by Year

The figure reports the time series trend in director skills matrix disclosure for the percentage of firm-years and number of firms in our sample from 2011 through 2021.

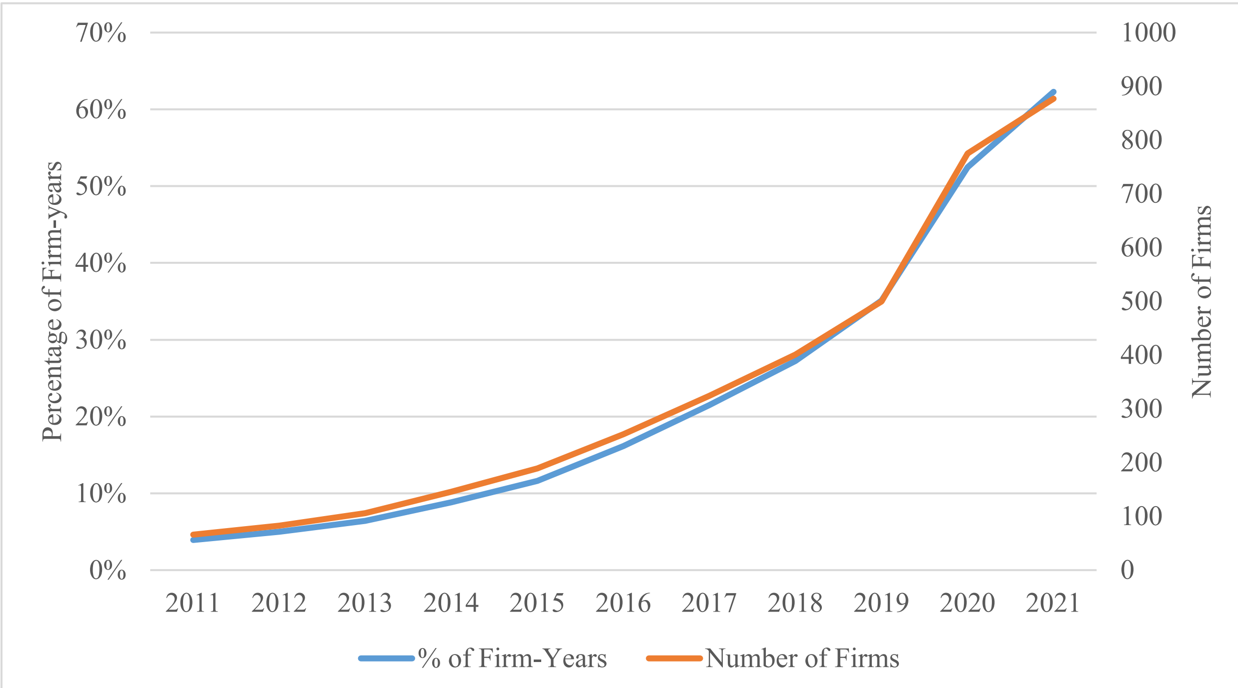
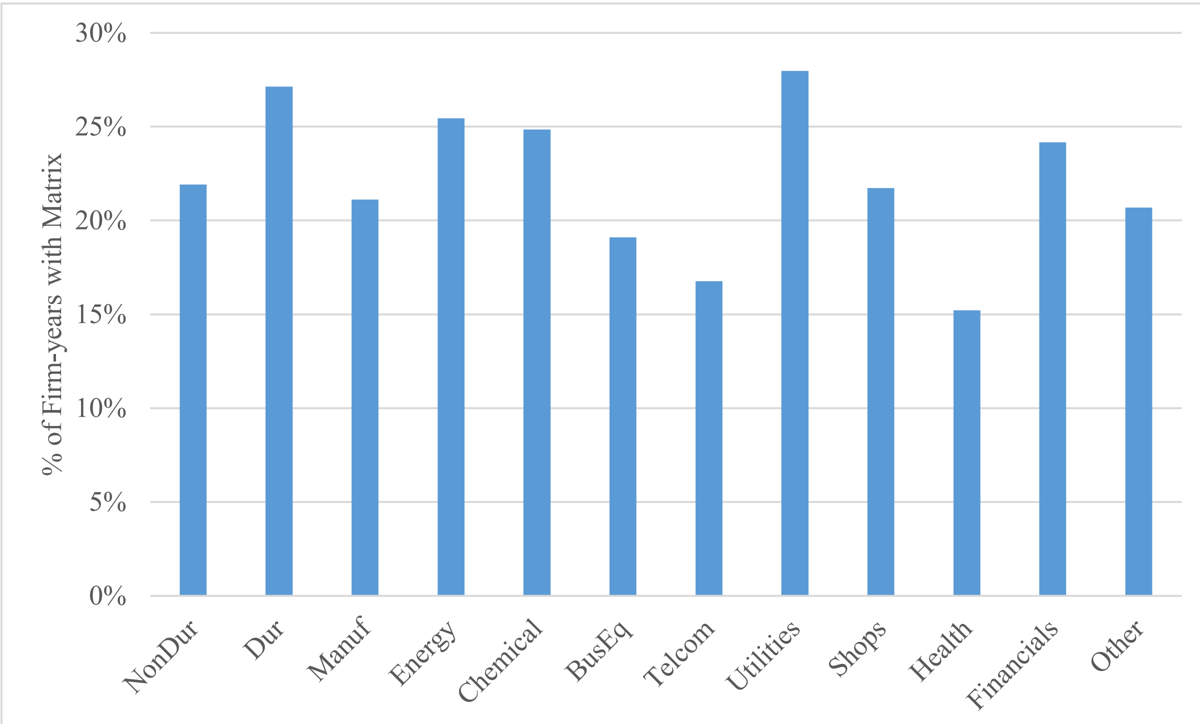


Figure 3: Percentage of Firms with Skills Matrix, by Industry and Size

This figure reports the distribution based on Fama-French 12 industry classifications (Panel A) and the market capitalization distribution based on deciles (Panel B) of director skills matrix disclosure.

Panel A



Panel B

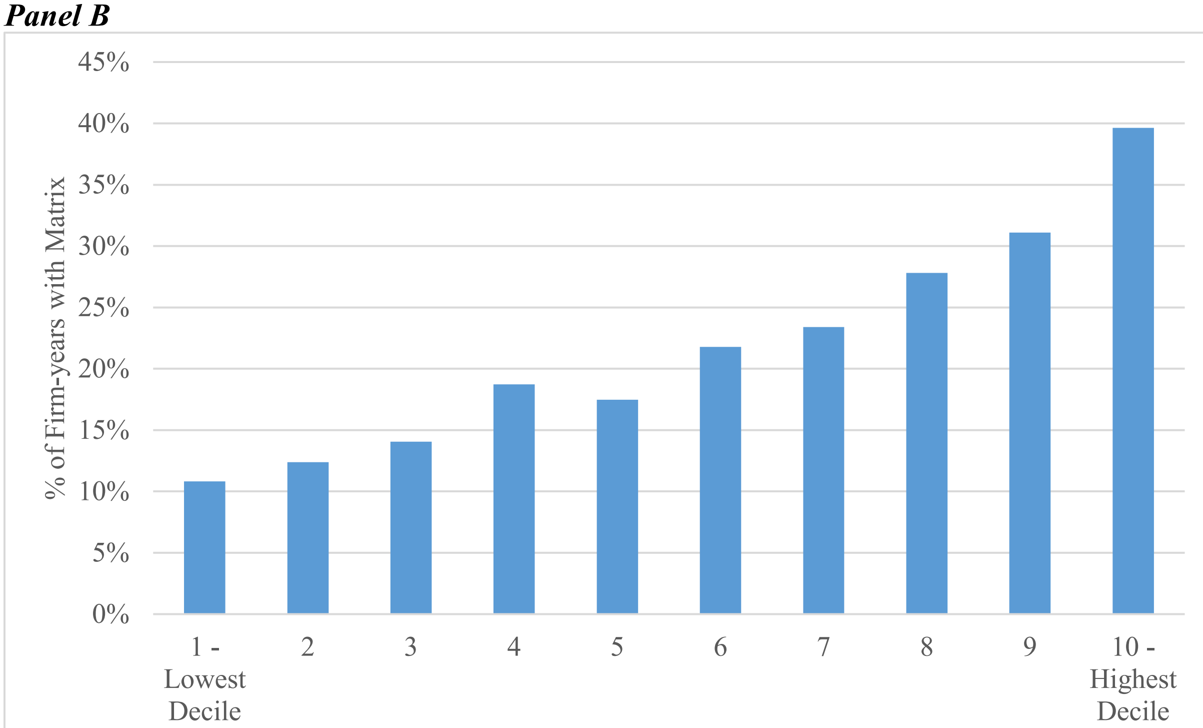
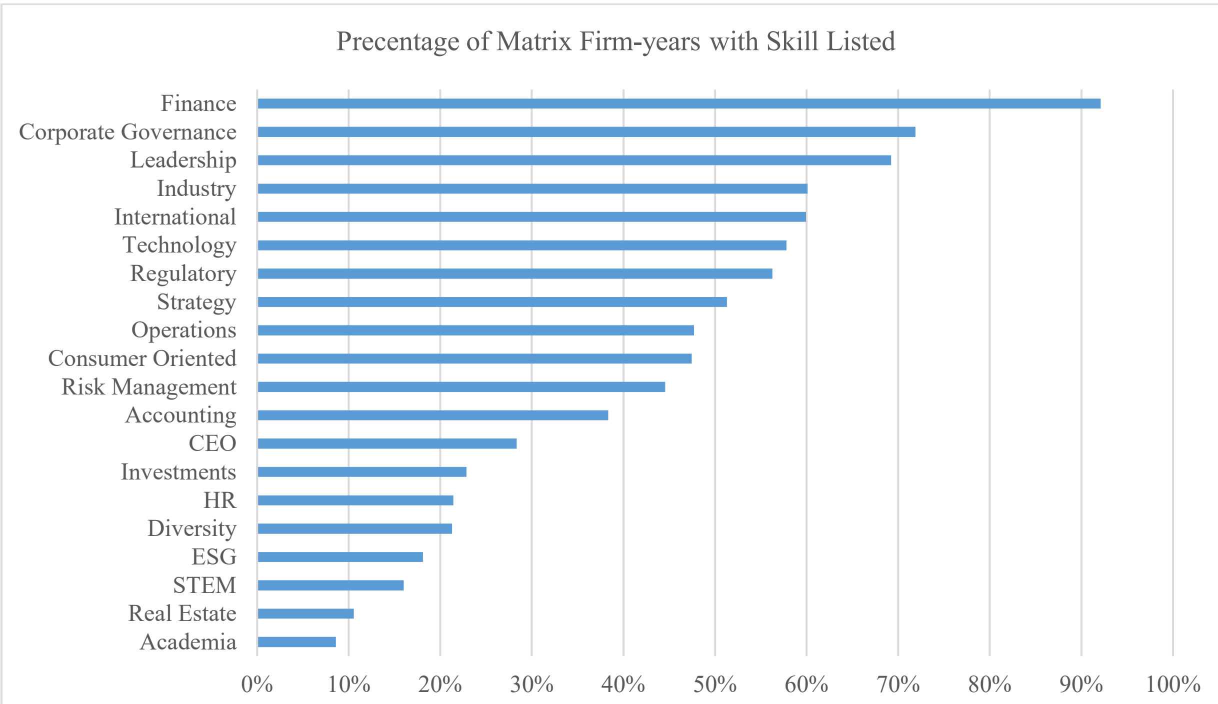


Figure 4: Frequency of Individual Director Skills Disclosed

These figure reports skills listed in a director skills matrix for companies that disclose a matrix from 2011 through 2021. Panel A details the percentage of firm-years in which a particular director skill is listed. For example, 92% of firm-years that disclose a matrix in their proxy statement list 'Finance' as a skill. Panel B reports the time series trend for these percentages of firm-years in which a particular director skill is listed. For example, 41% of firm-years that 3disclose a matrix in their proxy statement list 'Technology' as a skill in 2011 compared to 67% in 2021. The disclosed director skills are limited to those that increase in frequency over the sample period. The frequency of all other disclosed director skills from Panel A remain relatively stable throughout the sample period.

Panel A



Panel B

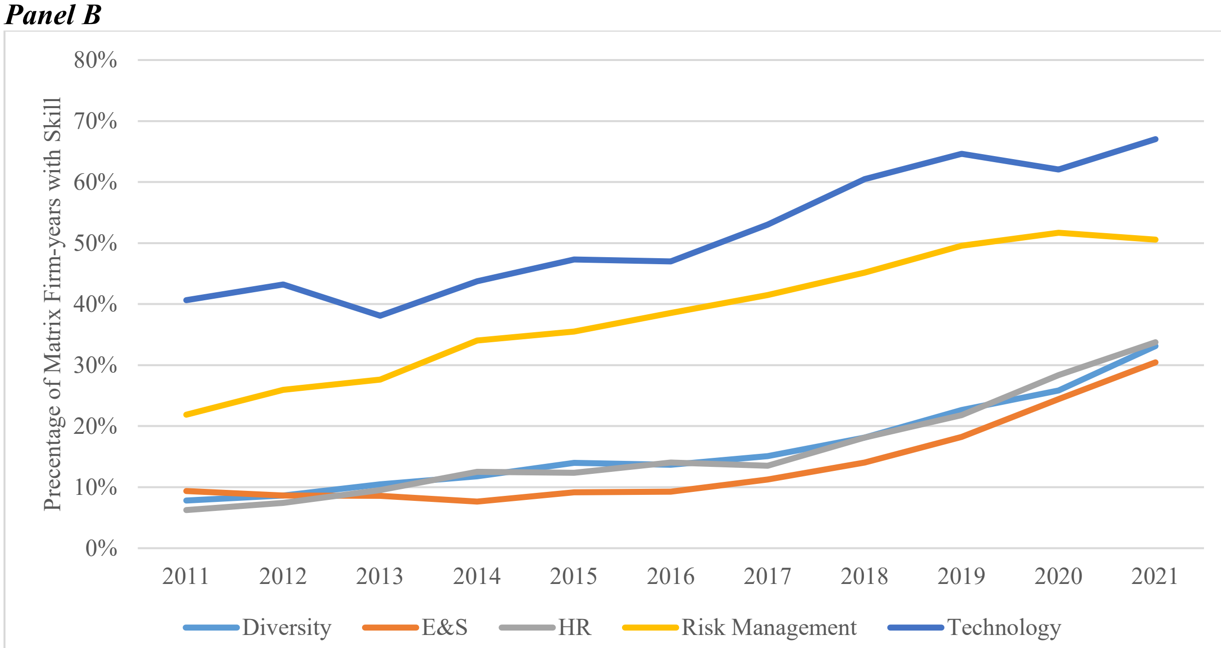
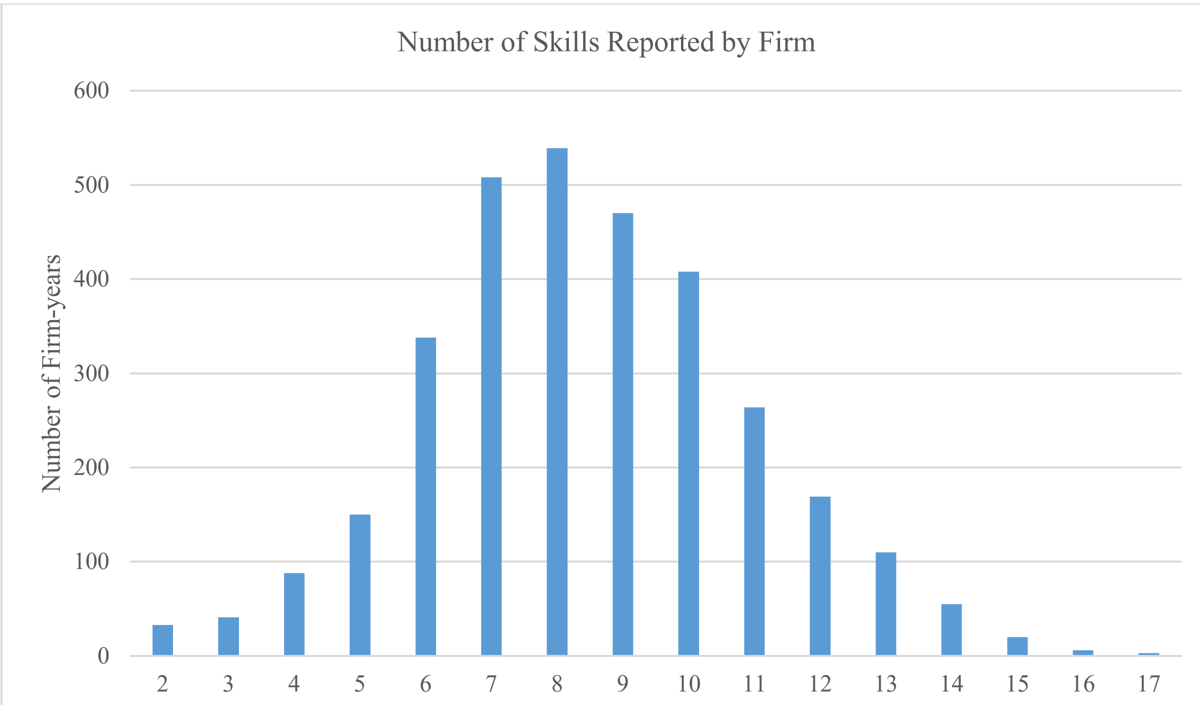


Figure 5: Average Number of Skills Reported by Firms and for Directors

The figure reports the distributions of the number of skills listed by a firm in a skills matrix (Panel A) and of the number of skills held by an individual director (Panel B) for companies that disclose a matrix from 2011-2021. For example, 539 board matrix firm-years list eight skills in their matrix and 5,353 director-firm-years have four matrix skills.

Panel A



Panel B

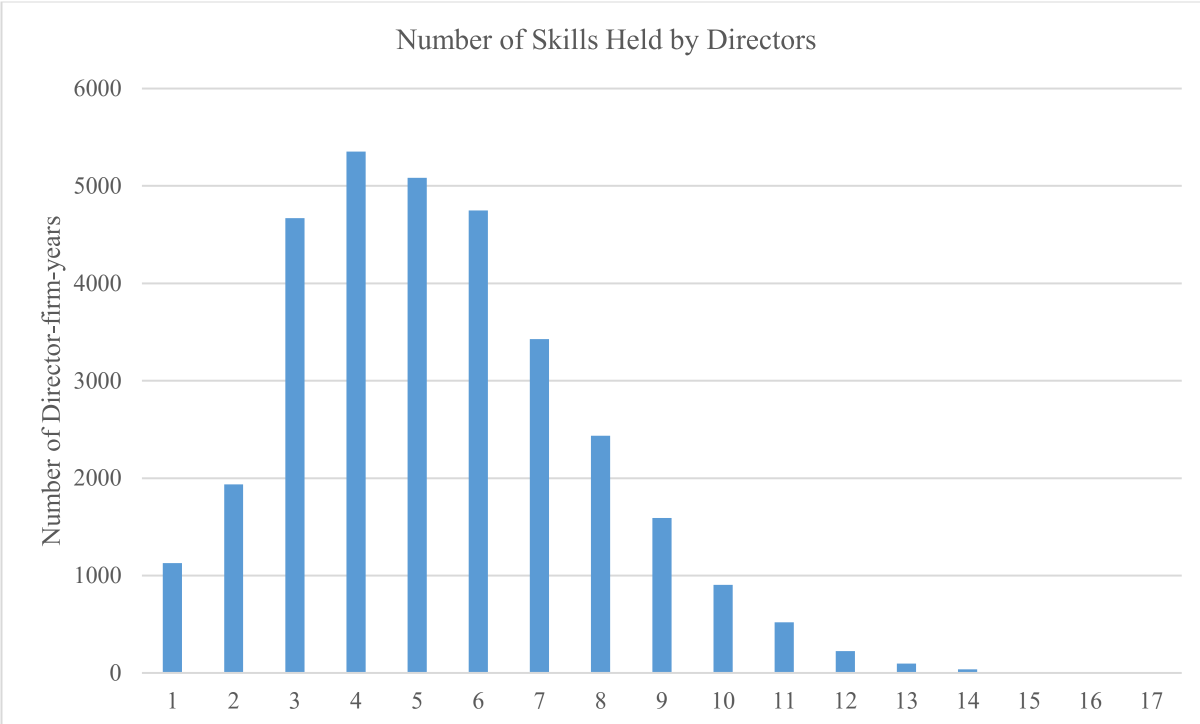

Number of Skills Held by Directors
6000
5000
4000
3000
2000
1000
0
Number of Director-firm-years
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

Table 1: Summary Statistics

The table reports sample means of firm-level variables for all firm-years and those firm-years with and without a director skills matrix from 2011 to 2021. All variable definitions are included in Appendix B. ***, **, and * indicate statistical differences between the matrix and non-matrix firm-years at the 1%, 5%, and 10% levels, respectively.

	All firm-years (N = 16,804)	Matrix firm-years (N = 3,672)	Non-matrix firm-years (N = 13,132)
Governance Characteristics			
Board independence	73%	81%	70%***
Board size	9.3	10.0	9.1***
Classified board (0/1)	36%	25%	39%***
Dual class (0/1)	6%	4%	6%***
CEO-Chair duality (0/1)	41%	40%	42%**
Institutional ownership	77%	77%	77%
Firm Characteristics			
Firm size	$11,969	$24,230	$8,541***
Market-to-book	3.67	4.57	3.42***
ROA	0.11	0.11	0.11***
Stock return	1.5%	-1.8%	2.4%***
Stock return volatility	9.2%	9.7%	9.1%***
R&D	0.022	0.018	0.024***
Matrix External Effects			
Board-related activism	4%	7%	3%***
Non-board-related activism	8%	14%	6%***
Percentage of industry peers with matrix	18%	30%	14%***
Percentage of directors with other board seat at matrix firm	7%	15%	5%***
Director Voting Characteristics			
Average percent 'for' votes	95%	96%	95%***
Average percent ISS 'for' rec.	94%	96%	93%***

Table 2: Relation between Matrix Skills and Firm Characteristics

The table reports OLS models estimating the likelihood of disclosing a particular skill in a director skills matrix. The sample is limited to firms that disclose a matrix from 2011 through 2021. Panel A includes skills with strong firm-specific components to disclosure. Panel B includes skills with a strong industry component to disclosure. These specifications include indicator variables equal to one for each of the Fama-French 12 industry classifications. All independent variables are measured as of the fiscal year end prior to the board matrix disclosure in the firm's annual proxy statement, and they are defined in Appendix B. t-statistics based on standard errors cluster at the firm-level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: International and Technology expertise

	Dependent Variable:	
	International	Technology
	Model 1	Model 2
International operations	0.382***	
	(9.064)	
Log (1+ # of patents)		0.023**
		(2.277)
Board independence	0.001	0.002**
	(1.520)	(1.979)
Board size	0.002	0.021*
	(0.237)	(1.821)
Classified board	0.014	0.070*
	(0.403)	(1.815)
Dual class	-0.084	-0.207**
	(-0.976)	(-2.417)
CEO-chair duality	0.021	0.045
	(0.792)	(1.491)
Institutional ownership	0.086	0.061
	(1.508)	(0.950)
Firm size	0.056***	0.031*
	(4.600)	(1.882)
Market-to-book	-0.013	0.006
	(-0.735)	(0.321)
ROA	0.155	0.239
	(0.836)	(1.214)
Stock return	-0.041	-0.005
	(-1.565)	(-0.154)
Stock return volatility	0.316	0.329
	(1.298)	(1.124)
R&D	-0.938**	-0.035
	(-2.272)	(-0.077)
Observations	3,202	3,202
Year & Industry Fixed Effects	Yes	Yes
Adjusted R-squared	0.371	0.171

Panel B: Industry-related forms of expertise

	Dependent Variable:				
	Investments	Scientific	Consumer Oriented	E&S	Regulatory
	Model 1	Model 2	Model 3	Model 4	Model 5
Financials	0.172***	-0.004	-0.063	0.014	0.021
	(2.918)	(-0.108)	(-0.908)	(0.288)	(0.352)
Health	0.054	0.656***	-0.202**	-0.089*	-0.110
	(0.538)	(8.167)	(-2.071)	(-1.828)	(-1.127)
Business Equipment	-0.035	-0.034	-0.006	-0.041	-0.195***
	(-0.552)	(-0.771)	(-0.071)	(-0.825)	(-2.601)
Telecom	0.005	-0.015	-0.132	0.038	-0.133
	(0.041)	(-0.209)	(-1.066)	(0.300)	(-0.896)
Consumer Nondurables	-0.080	0.028	0.195**	0.002	-0.241***
	(-1.038)	(0.415)	(2.154)	(0.040)	(-2.659)
Consumer Durables	-0.059	0.155*	0.202*	-0.111**	-0.105
	(-0.623)	(1.687)	(1.943)	(-2.513)	(-0.928)
Retail	-0.066	0.029	0.234***	-0.036	-0.185**
	(-1.041)	(0.590)	(3.020)	(-0.802)	(-2.510)
Energy	-0.131**	0.178**	-0.381***	0.237***	-0.047
	(-1.967)	(2.507)	(-4.741)	(2.886)	(-0.545)
Utilities	0.007	0.142*	0.023	0.310***	0.283***
	(0.091)	(1.940)	(0.238)	(4.083)	(5.265)
Manufacturing	-0.109*	0.078	-0.090	0.041	-0.131*
	(-1.895)	(1.523)	(-1.180)	(0.651)	(-1.785)
Chemicals	-0.130*	-0.016	-0.059	0.068	0.039
	(-1.880)	(-0.274)	(-0.473)	(0.836)	(0.355)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	3,202	3,202	3,202	3,202	3,202
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.068	0.187	0.117	0.138	0.118

Table 3: Effects of Director Skills Matrix Disclosure on Shareholder Disagreement with ISS

The table reports OLS regressions estimating the effects of skills matrix disclosure on an investor's likelihood to disagree with ISS. The first year a firm discloses a matrix (treatment firm) is considered the event year. Firms that do not disclose a matrix (control firms) are matched with replacement to treatment firms in a given event year based on Fama-French 12 industry classification and a 10% firm size bandwidth (expanded to 25% if no initial match). We require both treatment and control firms to have at least one firm-year before matrix disclosure and one following matrix disclosure. We also limit the sample to the (-3,+3) firm-year window around disclosure. The dependent variable in both models is an indicator equal to one if the fund votes 'for' an individual director. Model 1 (2) includes observations where ISS recommends 'against' ('for') an individual director. Disclosure is an indicator equal to one for treatment firms in the post-disclosure period. Active voter is an indicator equal to one if the fund's predicted active voter score calculated following Iliev and Lowry (2015) is greater than zero. Each regression includes cohort by firm and cohort by year fixed effects. A cohort is defined as a matched treatment firm to control firm(s) group. t-statistics based on standard error clustered by fund are reported in parentheses. All observations are at the fund by director by meeting level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable = Fund 'for'	
	ISS 'against' subsample	ISS 'for' subsample
	Model 1	Model 2
Skills matrix	-0.058	0.003***
(Treatment x Post)	(-1.357)	(2.833)
Skills matrix x Active voter	0.050***	-0.001
	(3.265)	(-0.661)
Active voter	0.115***	0.001
	(3.676)	(0.362)
Treatment x Active voter	-0.010	0.001
	(-0.926)	(0.987)
Post x Active voter	-0.025*	-0.001
	(-1.828)	(-0.764)
Independent director	0.018***	0.001**
	(3.084)	(2.025)
Ln(Age)	-0.052***	0.007***
	(-5.900)	(7.352)
Ln(Tenure)	-0.010***	-0.004***
	(-4.541)	(-17.395)
Female	-0.018***	0.002***
	(-7.877)	(12.847)
Number of other directorships	-0.024***	-0.007***
	(-13.915)	(-18.184)
Director ownership	0.178	0.104***
	(1.477)	(7.947)
Audit committee	-0.018***	0.001***
	(-5.897)	(3.356)
Audit committee chair	-0.015***	0.000
	(-4.512)	(1.433)
Compensation committee	-0.074***	-0.003***
	(-16.880)	(-9.797)

Compensation committee chair	-0.029***	0.001**
	(-9.050)	(2.208)
Nominating committee	-0.031***	-0.005***
	(-5.814)	(-9.219)
Nominating committee chair	-0.020***	-0.010***
	(-4.827)	(-13.815)
Attendance problems	-0.208***	-0.020***
	(-11.207)	(-8.153)
Board independence	0.022	0.004**
	(0.404)	(2.444)
Board size	0.102*	-0.001
	(1.659)	(-0.863)
CEO-Chair duality	1.357***	-0.008
	(5.718)	(-1.454)
Institutional ownership	0.015	-0.000
	(0.341)	(-0.055)
Firm size	-0.159	-0.029***
	(-0.496)	(-2.800)
Market-to-book	0.778	0.000
	(0.865)	(0.010)
ROA	-0.049	-0.004**
	(-0.815)	(-2.036)
Stock return	-0.038***	-0.000*
	(-3.530)	(-1.845)
Stock return volatility	0.002	0.000***
	(1.254)	(5.779)
R&D	0.086**	-0.001
	(2.297)	(-0.913)
Fund size	0.025***	-0.000
	(5.211)	(-0.467)
Family size	0.011*	0.004***
	(1.814)	(3.257)
Fund turnover	-0.009	0.003***
	(-1.453)	(4.224)
Top 5 MSA	0.181***	-0.010**
	(6.373)	(-2.424)
Director-Fund-Year Obs.	218,546	7,175,703
Cohort-firm Fixed Effects	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes
Adjusted R-squared	0.216	0.031

Table 4: Disagreement with ISS, heterogeneity analysis

The table reports OLS regressions estimating the effects of skills matrix disclosure on an investor's likelihood to disagree with ISS. The first year a firm discloses a matrix (treatment firm) is considered the event year. Firms that do not disclose a matrix (control firms) are matched with replacement to treatment firms in a given event year based on Fama-French 12 industry classification and a 10% firm size bandwidth (expanded to 25% if no initial match). We require both treatment and control firms to have at least one firm-year before matrix disclosure and one following matrix disclosure. We also limit the sample to the (-3,+3) firm-year window around disclosure. The dependent variable in both models is an indicator equal to one if the fund votes 'for' an individual director. In each panel, the first three (last) models include observations where ISS recommends 'against' ('for') an individual director. In each panel, the second and third model include observations if a fund is an 'active' voter fund and a non-'active' voter fund, respectively. Disclosure is an indicator equal to one for treatment firms in the post-disclosure period. All models suppress the output of director, firm and fund control variables for brevity. An affiliated director is defined by the ISS US Directors database as an outside director with a material relationship with the firm. An overboarded director is defined as a director that holds five or more public directorships. High return volatility, high bid-ask spread and high absolute abnormal return are indicators equal to one if the firm-year observation falls in the top quartile of the respective measure for a given sample year. Each regression includes cohort by firm and cohort by year fixed effects. A cohort is defined as a matched treatment firm to control firm(s) group. t-statistics based on standard error clustered by fund are reported in parentheses. All observations are at the fund by director by meeting level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A	Dependent Variable = Fund 'for'			
	ISS 'against' subsample			ISS 'for' subsample
	All funds	Active funds	Non-active funds	All funds
Skills matrix	-0.028	-0.038	-0.103	0.002***
(Treatment x Post)	(-0.672)	(-0.807)	(-1.510)	(3.591)
Skills matrix x Affiliated	0.041**	0.054***	0.037	-0.002
director	(2.560)	(2.645)	(1.323)	(-1.456)
Affiliated director	-0.006	0.010	-0.021***	-0.008***
	(-0.806)	(0.760)	(-2.803)	(-6.815)
Treatment x Affiliated director	0.016*	0.018	0.009	-0.004***
	(1.654)	(1.211)	(0.739)	(-3.806)
Post x Affiliated director	-0.029***	-0.027**	-0.047***	0.003***
	(-3.061)	(-2.064)	(-3.780)	(4.399)
Director-Fund-Year Obs.	218,546	105,492	113,052	7,175,703
Director, firm & fund controls	Yes	Yes	Yes	Yes
Cohort-firm Fixed Effects	Yes	Yes	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.212	0.228	0.114	0.031

Panel B	Dependent Variable = Fund 'for'			
	ISS 'against' subsample			ISS 'for' subsample
	All funds	Active funds	Non-active funds	All funds
Skills matrix	-0.032	-0.071	-0.103	0.002***
(Treatment x Post)	(-0.764)	(-1.621)	(-1.591)	(3.793)
Skills matrix x Overboarded	0.047***	0.062**	0.034**	-0.002**
Director	(3.030)	(2.398)	(2.082)	(-2.112)
Overboarded director	-0.001	0.005	-0.011	-0.009***
	(-0.120)	(0.393)	(-1.229)	(-8.593)
Treatment x Overboarded director	-0.005	-0.034**	0.023**	0.006***
	(-0.555)	(-2.127)	(2.141)	(7.300)
Post x Overboarded director	0.001	0.015	-0.008	0.001
	(0.177)	(1.514)	(-1.162)	(1.644)
Director-Fund-Year Obs.	218,546	105,492	113,052	7,175,703
Director, firm & fund controls	Yes	Yes	Yes	Yes
Cohort-firm Fixed Effects	Yes	Yes	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.212	0.228	0.114	0.031

Panel C	Dependent Variable = Fund 'for'			
	ISS 'against' subsample			ISS 'for' subsample
	All funds	Active funds	Non-active funds	All funds
Skills matrix	-0.160***	-0.215***	-0.232**	0.001**
(Treatment x Post)	(-3.058)	(-4.578)	(-2.424)	(2.137)
Skills matrix x High return volatility	0.332***	0.364***	0.302**	0.006***
	(3.719)	(4.144)	(2.092)	(3.178)
High return volatility	-0.038	0.047	0.028	-0.002*
	(-1.014)	(1.116)	(0.511)	(-1.893)
Treatment x High return volatility	-0.140**	-0.185**	-0.170*	-0.002
	(-2.420)	(-2.417)	(-1.801)	(-1.355)
Post x High return volatility	-0.332***	-0.545***	-0.215**	-0.002
	(-5.080)	(-7.620)	(-2.253)	(-1.474)
Director-Fund-Year Obs.	218,546	105,492	113,052	7,175,703
Director, firm & fund controls	Yes	Yes	Yes	Yes
Cohort-firm Fixed Effects	Yes	Yes	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.212	0.228	0.114	0.031

Panel D	Dependent Variable = Fund 'for'			
	ISS 'against' subsample			ISS 'for' subsample
	All funds	Active funds	Non-active funds	All funds
Skills matrix	-0.012	-0.091	0.078	0.002**
(Treatment x Post)	(-0.155)	(-0.956)	(0.710)	(2.211)
Skills matrix x High bid-ask spread	-0.066	0.007	-0.321**	0.003*
	(-0.685)	(0.071)	(-2.108)	(1.847)
High bid-ask spread	0.049*	0.140***	-0.023	0.002
	(1.721)	(5.661)	(-0.504)	(1.409)
Treatment x High bid-ask spread	-0.004	-0.179*	0.155	0.000
	(-0.044)	(-1.740)	(0.950)	(0.160)
Post x High bid-ask spread	0.072	-0.007	0.025	-0.000
	(1.627)	(-0.148)	(0.410)	(-0.242)
Director-Fund-Year Obs.	218,546	105,492	113,052	7,175,703
Director, firm & fund controls	Yes	Yes	Yes	Yes
Cohort-firm Fixed Effects	Yes	Yes	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.212	0.228	0.114	0.031

Panel E	Dependent Variable = Fund 'for'			
	ISS 'against' subsample			ISS 'for' subsample
	All funds	Active funds	Non-active funds	All funds
Skills matrix	-0.210***	-0.208***	-0.192*	0.003***
(Treatment x Post)	(-3.545)	(-2.873)	(-1.949)	(4.189)
Skills matrix x High absolute	0.450***	0.488***	0.225	-0.002*
abnormal earnings return	(4.054)	(3.607)	(1.217)	(-1.720)
High absolute abnormal earnings	-0.017	-0.054	-0.076	-0.002***
return	(-0.543)	(-1.435)	(-1.641)	(-3.021)
Treatment x High absolute abnormal	-0.301***	-0.342***	-0.274*	0.005***
earnings return	(-3.224)	(-3.122)	(-1.846)	(4.722)
Post x High absolute abnormal	-0.047	0.114*	0.076	0.004***
earnings return	(-0.792)	(1.719)	(0.986)	(4.858)
Director-Fund-Year Obs.	218,546	105,492	113,052	7,175,703
Director, firm & fund controls	Yes	Yes	Yes	Yes
Cohort-firm Fixed Effects	Yes	Yes	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.212	0.228	0.114	0.031

Table 5: Effects of Director Skills Matrix Disclosure on Shareholder Voting

The table reports OLS regressions estimating the effects of skills matrix disclosure on director support. The first year a firm discloses a matrix (treatment firm) is considered the event year. Firms that do not disclose a matrix (control firms) are matched with replacement to treatment firms in a given event year based on Fama-French 12 industry classification and a 10% firm size bandwidth (expanded to 25% if no initial match). We require both treatment and control firms to have at least one firm-year before matrix disclosure and one following matrix disclosure. We also limit the sample to the (-3,+3) firm-year window around disclosure. Panel A reports regressions based on director by meeting date observations where the dependent variable is the percent 'for' votes for an individual director in a given firm-year. A 'low' vote director is an indicator variable equal to one if the director falls in the bottom tercile of average percent 'for' votes in the pre-disclosure period for a given firm. Panel B reports regressions based on firm by meeting date observations where the dependent variable is the average percent 'for' votes for all directors in given firm-year. In Panel B, we interact disclosure with three proxies for firm-level information asymmetry: high return volatility, high bid-ask spread, and high absolute abnormal return which are indicators equal to one if the firm-year observation falls in the top quartile of the respective measure for a given sample year. Disclosure is an indicator equal to one for treatment firms in the post-disclosure period. Each regression includes cohort by firm and cohort by year fixed effects. A cohort is defined as a matched treatment firm to control firm(s) group. T-statistics based on standard error clustered by firm are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A	Dependent Variable = Percent 'for'	
	Model 1	Model 2
Skills Matrix	0.004***	0.003**
(Treatment x Post)	(3.741)	(2.388)
Skills Matrix x 'Low' vote director		0.006**
		(2.533)
'Low' vote director		-0.025***
		(-24.299)
Treatment x 'Low' vote director		-0.002
		(-0.790)
Post x 'Low' vote director		0.006***
		(5.068)
Residual of ISS 'for' recommendation	0.202***	0.193***
	(29.685)	(28.274)
Independent director	0.004***	0.002
	(3.311)	(1.326)
Ln(Age)	-0.006**	-0.004
	(-2.291)	(-1.631)
Ln(Tenure)	-0.008***	-0.005***
	(-18.991)	(-10.800)
Female	0.006***	0.005***
	(11.905)	(11.025)
Number of other directorships	-0.007***	-0.006***
	(-18.793)	(-16.055)
Director ownership	0.173***	0.130***
	(5.907)	(4.619)
Audit committee	0.002***	0.001**
	(3.380)	(2.476)
Audit committee chair	0.002***	0.001*
	(2.679)	(1.805)

Compensation committee	-0.004***	-0.003***
	(-6.222)	(-4.493)
Compensation committee chair	0.000	0.001
	(0.576)	(1.539)
Nominating committee	-0.011***	-0.009***
	(-15.860)	(-13.763)
Nominating committee chair	-0.014***	-0.010***
	(-16.016)	(-12.174)
Attendance problems	-0.140***	-0.137***
	(-13.108)	(-12.858)
Board independence	0.001***	0.001***
	(7.791)	(7.633)
Board size	0.000	0.000
	(0.962)	(1.036)
Classified board	-0.020***	-0.020***
	(-6.631)	(-6.319)
Dual class	-0.008	-0.008
	(-0.822)	(-0.807)
CEO-Chair duality	-0.004**	-0.004**
	(-2.245)	(-2.116)
Institutional ownership	-0.002	-0.002
	(-0.655)	(-0.757)
Firm size	0.001	0.001
	(0.465)	(0.339)
Market-to-book	0.008***	0.008***
	(4.670)	(4.555)
ROA	-0.034***	-0.032**
	(-2.644)	(-2.537)
Stock return	0.002	0.002
	(1.201)	(1.591)
Stock return volatility	0.036**	0.037***
	(2.512)	(2.582)
R&D	-0.166***	-0.157***
	(-4.304)	(-4.072)
Director-Year Obs.	56,701	56,701
Cohort-firm Fixed Effects	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes
Adjusted R-squared	0.645	0.669

Panel B	Dependent Variable = Avg Percent 'for' Votes:			
	Model 1	Model 2	Model 3	Model 4
		Return volatility	Bid-ask spread	Absolute abnormal earnings return
Skills Matrix (Treatment x Post)	0.005*** (3.097)	0.004* (1.900)	0.003* (1.752)	0.003 (1.273)
Skills Matrix x High information asymmetry		0.008 (1.576)	0.011** (2.044)	0.009** (2.022)
High information asymmetry		-0.000 (-0.079)	0.009*** (3.050)	0.003 (1.244)
Treatment x High information asymmetry		-0.002 (-0.529)	-0.009* (-1.942)	-0.008** (-2.304)
Post x High information asymmetry		-0.001 (-0.365)	-0.004 (-0.986)	-0.001 (-0.519)
Residual of percent of board with ISS 'for' recommendation	0.230*** (18.257)	0.230*** (26.598)	0.230*** (26.640)	0.229*** (26.627)
Board independence	-0.000 (-0.411)	-0.000 (-0.626)	-0.000 (-0.619)	-0.000 (-0.607)
Board size	0.001 (1.286)	0.001 (1.551)	0.001 (1.616)	0.001 (1.580)
Classified board	-0.024*** (-3.475)	-0.024*** (-4.542)	-0.023*** (-4.583)	-0.023*** (-4.508)
Dual class	-0.004 (-0.182)	-0.005 (-0.214)	-0.003 (-0.139)	-0.005 (-0.205)
CEO-Chair duality	-0.004* (-1.695)	-0.004** (-2.017)	-0.004** (-2.104)	-0.004** (-2.005)
Institutional ownership	-0.003 (-0.572)	-0.003 (-0.721)	-0.002 (-0.582)	-0.003 (-0.788)
Firm size	-0.004 (-1.066)	-0.004 (-1.611)	-0.003 (-1.040)	-0.004* (-1.652)
Market-to-book	0.009*** (3.636)	0.009*** (4.743)	0.009*** (4.709)	0.009*** (4.716)
ROA	-0.011 (-0.453)	-0.011 (-0.660)	-0.007 (-0.450)	-0.010 (-0.628)
Stock return	0.002 (0.823)	0.002 (1.169)	0.002 (0.828)	0.002 (1.187)
Stock return volatility	-0.004 (-0.186)	-0.002 (-0.076)	-0.006 (-0.331)	-0.005 (-0.249)
R&D	-0.134** (-1.966)	-0.133** (-2.498)	-0.132** (-2.500)	-0.132** (-2.508)
Firm-Year Obs.	9,909	9,909	9,909	9,909
Cohort-firm Fixed Effects	Yes	Yes	Yes	Yes
Cohort-year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.710	0.674	0.675	0.674

Table 6: Skills Matrix and Shareholder Voting, effects of skills disclosed

The table reports OLS regressions estimating the relation between skills reported within matrices and director voting. The sample includes firm-years with skills matrices. The dependent variable is the average percent 'for' votes in a given firm-year observation. Independent variables of interest include measures of directors' skillsets. All independent variables are measured as of the fiscal year end prior to the board matrix disclosure in the firm's annual proxy statement; they are defined in Appendix B. Industry by year fixed effects are included in each specification. T-statistics based on standard errors clustered at the industry-year level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dept Var = Avg Percent 'for' Votes		
	Model 1	Model 2	Model 3
Number of skills reported	0.000		
	(0.101)		
Number of 'top industry' skills reported		0.002***	
		(2.889)	
Number of non-' top industry' skills reported		-0.000	
		(-1.445)	
Percent of board with 'top industry' skill			0.005**
			(2.062)
Residual of percent of board with ISS 'for'	0.219***	0.219***	0.219***
recommendation	(27.146)	(27.076)	(27.138)
Board independence	0.000***	0.000***	0.000***
	(5.970)	(5.953)	(5.965)
Board size	0.002***	0.002***	0.002***
	(4.805)	(4.702)	(4.798)
Classified board	-0.015***	-0.015***	-0.015***
	(-9.682)	(-9.684)	(-9.701)
Dual class	0.004	0.004	0.004
	(0.908)	(0.942)	(0.911)
CEO-Chair duality	-0.006***	-0.006***	-0.006***
	(-6.252)	(-6.284)	(-6.184)
Institutional ownership	0.001	0.001	0.001
	(0.547)	(0.384)	(0.419)
Firm size	-0.004***	-0.004***	-0.004***
	(-7.690)	(-7.903)	(-7.937)
Market-to-book	0.004***	0.004***	0.004***
	(5.576)	(5.773)	(5.661)
ROA	0.012	0.011	0.011
	(1.183)	(1.172)	(1.173)
Stock return	0.008***	0.008***	0.008***
	(4.362)	(4.475)	(4.456)
Stock return volatility	-0.064***	-0.066***	-0.065***
	(-3.488)	(-3.582)	(-3.599)
R&D	0.042*	0.042**	0.042*
	(1.950)	(1.984)	(1.967)
Firm-Year Obs.	3,063	3,063	3,063
Industry by Year Fixed Effects	Yes	Yes	Yes
Adjusted R-squared	0.578	0.579	0.579

Table 7: Determinants of Director Skills Matrix Disclosure

The table reports OLS models estimating the likelihood of disclosing a director skills matrix in a given firm year. All independent variables are as of the fiscal year end prior to the board matrix disclosure in the annual proxy. Definitions are in Appendix B. Firms are included until they report a matrix or if they do not report one until the earlier of delisting or the end of the sample. t-statistics based on standard errors clustered by industry (Models 1 and 2) and by firm (Model 3) are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Var = Disclose Skills Matrix (0/1)		
	Model 1	Model 2	Model 3
Governance Factors:			
Board independence	0.021**	0.013	0.017
	(2.569)	(1.537)	(1.268)
Board size	0.004***	0.002**	0.003
	(2.946)	(2.223)	(0.990)
Classified board	-0.001	-0.000	-0.039**
	(-0.318)	(-0.097)	(-2.383)
Dual class	-0.025***	-0.029***	0.046
	(-2.912)	(-3.846)	(0.975)
CEO-Chair duality	0.008*	0.006	0.012
	(1.866)	(1.377)	(1.392)
Institutional ownership	-0.004	0.001	-0.053***
	(-0.498)	(0.120)	(-2.824)
External Factors:			
Board-related activism		0.031*	0.037**
		(1.791)	(2.279)
Non-board-related activism		-0.008	-0.001
		(-0.842)	(-0.041)
Percentage of industry peers with matrix		0.130**	0.276***
		(2.351)	(2.646)
Percentage of industry peers with matrix^2		-0.194**	-0.233
		(-2.003)	(-1.645)
Percentage of directors with other board seat at matrix firm		0.209***	0.271***
		(5.722)	(5.468)
Firm Financials:			
Firm size	0.020***	0.017***	0.003
	(7.167)	(7.450)	(0.412)
Market-to-book	-0.005	-0.006	0.003
	(-1.436)	(-1.667)	(0.349)
ROA	-0.015	-0.018	0.075
	(-0.571)	(-0.610)	(1.439)
Stock return	-0.004	-0.003	-0.003
	(-0.657)	(-0.563)	(-0.393)
Stock return volatility	0.119	0.101	0.023
	(1.340)	(1.505)	(0.267)
R&D	-0.049	-0.049	0.012
	(-0.720)	(-0.839)	(0.061)
Firm-Year Observations	12,434	12,434	12,434
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	No	No
Firm Fixed Effects	No	No	Yes
Adjusted R-squared	0.104	0.111	0.169

Table 8: Does Disclosure of Matrix Skills Predict Lawsuits?

The table reports linear probability models (OLS) estimating the likelihood of a civil litigation filing in a federal district court as disclosed to the SEC as material pending litigation. Panel A estimates the likelihood of a non-securities-related lawsuit filed in the following (three) fiscal year(s). Panel B estimates the likelihood of a cybersecurity-related lawsuit filed in the following (three) fiscal year(s) and the likelihood of an environmental-related lawsuit filed in the following (three) fiscal year(s). The sample is limited to firms that disclose a director skills matrix from 2011 through 2019. All models include year and industry fixed effects. t-statistics based on robust standard errors are reported in parentheses for Models 1 and 2 of Panel A as well as Models 1-4 of Panel B. t-statistics based on standard errors clustered at the firm-level are reported in parentheses for Models 3 and 4 of Panel A. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Risk management skill and subsequent litigation

	Dependent variable:			
	Lawsuit in next fiscal year (0/1)		Lawsuit in next three fiscal years (0/1)	
	Model 1	Model 2	Model 3	Model 4
Risk Management skill (0/1)	-0.030**		-0.044*	
	(-2.190)		(-1.841)	
Risk Management skill (%)		-0.038**		-0.054*
		(-2.112)		(-1.742)
Firm Size	0.062***	0.062***	0.092***	0.092***
	(11.343)	(11.285)	(9.775)	(9.750)
Market-to-Book	-0.033***	-0.033***	-0.039**	-0.039**
	(-4.104)	(-4.111)	(-2.444)	(-2.438)
ROA	0.130	0.128	0.076	0.072
	(1.505)	(1.471)	(0.455)	(0.433)
Stock Return	0.000	0.000	-0.022	-0.021
	(0.007)	(0.009)	(-0.694)	(-0.688)
Return Volatility	0.559**	0.553**	0.717**	0.708**
	(2.355)	(2.330)	(2.037)	(2.006)
Intangible Assets	0.107***	0.109***	0.160**	0.164**
	(2.792)	(2.864)	(1.969)	(2.016)
Institutional Ownership	-0.102***	-0.102***	-0.147**	-0.147**
	(-2.804)	(-2.796)	(-2.497)	(-2.472)
Constant	-0.401***	-0.405***	-0.520***	-0.526***
	(-5.245)	(-5.272)	(-4.093)	(-4.121)
Firm-Year Obs.	2,017	2,017	2,017	2,017
Adjusted R-squared	0.144	0.144	0.210	0.209

Panel B: Cybersecurity skill and subsequent cybersecurity lawsuit

	Dependent variable:			
	Cybersecurity lawsuit in next fiscal year (0/1)		Environmental lawsuit in next fiscal year (0/1)	
	Model 1	Model 2	Model 3	Model 4
Cybersecurity skill (0/1)	-0.006** (-2.053)			
Cybersecurity skill (%)		-0.013* (-1.873)		
Environment skill (0/1)			0.021 (1.575)	
Environment skill (%)				0.027 (1.624)
Firm Size	0.003** (2.084)	0.003** (2.080)	0.010*** (3.889)	0.010*** (3.863)
Market-to-Book	-0.004 (-1.387)	-0.004 (-1.376)	-0.002 (-0.610)	-0.002 (-0.508)
ROA	0.033 (1.636)	0.033 (1.615)	-0.085** (-2.444)	-0.086** (-2.467)
Stock Return	0.003 (0.569)	0.003 (0.576)	0.012 (0.936)	0.011 (0.914)
Return Volatility	-0.037 (-1.203)	-0.037 (-1.219)	-0.065 (-0.475)	-0.066 (-0.480)
Intangible Assets	0.027* (1.654)	0.027* (1.659)	-0.007 (-0.542)	-0.008 (-0.603)
Institutional Ownership	-0.007 (-0.601)	-0.007 (-0.601)	-0.007 (-0.555)	-0.008 (-0.651)
Constant	-0.030* (-1.938)	-0.030* (-1.932)	-0.046 (-1.409)	-0.044 (-1.346)
Firm-Year Obs.	2,017	2,017	2,017	2,017
Adjusted R-squared	0.016	0.016	0.048	0.048

Table 9: Does Disclosure of Matrix Skills Predict Bad Deals?

The table reports linear probability models (OLS) estimating the likelihood of a negative acquisition outcome. The dependent variables in the regressions include an indicator equal to one if the firm announces an acquisition accompanied by a three-day announcement return (CAR) that is in the bottom decile of sample merger CARs in the following fiscal year or following three fiscal years. The sample is limited to firm-years in which an acquisition is announced the following (three) fiscal year(s). All models include year and industry fixed effects. t-statistics based on robust standard errors are reported in parentheses for Models 1 and 2 and clustered standard errors at the firm-level are reported for Models 3 and 4. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable:			
	Deal with a CAR (-1,+1) in bottom decile in the following fiscal year (0/1)		Deal with a CAR (-1,+1) in bottom decile in the following three fiscal years (0/1)	
	Model 1	Model 2	Model 3	Model 4
Strategy / M&A skill (0/1)	-0.064		-0.102**	
	(-1.446)		(-2.236)	
Strategy / M&A skill (%)		-0.079		-0.089*
		(-1.531)		(-1.661)
Firm Size	0.001	-0.000	-0.009	-0.008
	(0.058)	(-0.000)	(-0.539)	(-0.493)
Market-to-Book	0.021	0.023	0.035	0.037
	(0.547)	(0.617)	(0.807)	(0.840)
ROA	-0.607	-0.665	-0.269	-0.312
	(-1.464)	(-1.560)	(-0.705)	(-0.785)
Stock Return	-0.105	-0.106	-0.136**	-0.137**
	(-1.010)	(-1.039)	(-2.367)	(-2.376)
Return Volatility	1.119	1.130	0.833	0.792
	(1.389)	(1.386)	(1.233)	(1.149)
R&D	1.512**	1.478**	1.088	1.022
	(2.014)	(1.983)	(1.617)	(1.562)
Institutional Ownership	0.080	0.082	0.095	0.102
	(1.095)	(1.116)	(1.074)	(1.137)
Constant	-0.015	-0.010	-0.035	-0.054
	(-0.064)	(-0.044)	(-0.174)	(-0.268)
Firm-Year Obs.	228	228	446	446
Adjusted R-squared	0.001	0.001	0.046	0.035

Table 10: Does Disclosure of Matrix Skills Predict Negative Say-on-Pay Votes?

The table reports linear probability models (OLS) estimating the likelihood of a negative say-on-pay vote. The dependent variables in the regressions include the percent of outstanding shares voted against the proposed executive compensation plan at the annual meeting and an indicator equal to one if the percent of outstanding shares voted against is in the highest tercile of sample observations. The sample is limited to firms that disclose a director skills matrix from 2011 through 2019 and with data on a Say-on-Pay vote. Firm Size is the natural logarithm of market capitalization. Market-to-Book is the natural logarithm of the market-to-book ratio. ROA is operating income scaled by the total book value of assets. Stock Return is the annual buy-and-hold return. Stock Volatility is the annualized standard deviation of monthly stock returns. R&D is research and development expenses scaled by total book value of assets. Institutional Ownership is the percentage of outstanding shares held by the institutional shareholders. All models include year and industry fixed effects. t-statistics based on robust standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable:			
	Percent Votes Against (%)		Percent Votes Against in Highest Tercile (0/1)	
	Model 1	Model 2	Model 3	Model 4
Compensation skill (0/1)	-0.000		-0.047	
	(-0.050)		(-0.928)	
Compensation skill (%)		-0.018		-0.157**
		(-1.453)		(-2.016)
Firm Size	0.002	0.002	0.019*	0.018*
	(1.091)	(1.017)	(1.855)	(1.811)
Market-to-Book	-0.010***	-0.010***	-0.055***	-0.055***
	(-3.020)	(-2.997)	(-2.895)	(-2.883)
ROA	0.012	0.011	-0.054	-0.058
	(0.337)	(0.311)	(-0.294)	(-0.314)
Stock Return	-0.034***	-0.034***	-0.150***	-0.148***
	(-3.539)	(-3.514)	(-2.994)	(-2.951)
Return Volatility	0.295***	0.293***	0.790*	0.774*
	(3.369)	(3.354)	(1.759)	(1.729)
R&D	0.077	0.073	-0.453	-0.472
	(0.641)	(0.608)	(-0.908)	(-0.950)
Institutional Ownership	0.030**	0.030**	0.119*	0.120*
	(2.068)	(2.068)	(1.707)	(1.718)
Constant	0.019	0.023	0.102	0.114
	(0.689)	(0.807)	(0.674)	(0.759)
Firm-Year Obs.	1,119	1,119	1,119	1,119
Adjusted R-squared	0.058	0.059	0.045	0.047

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