

Social Media Use and the Director Labor Market: Evidence from Twitter*

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JEL classification: G30, G34, G39, J23, J44, L86

Key words: social media, Twitter, labor market.

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Abstract

Social media networks allow information to spread faster and more broadly than traditional networks, thereby reducing information frictions in the labor market. However, social media networks are not as personable as traditional networks and can thus introduce frictions to the labor market. To explore the labor market consequences of social media use, we study the labor market outcomes of directors who use Twitter. Specifically, we identify directors in S&P 1500 firms who are active on Twitter and based on their account creation date, examine the relation between being on Twitter and director labor market outcomes. We find directors on Twitter are more likely to gain an additional directorship, a larger directorship and a directorship in a new industry in a given year than those who are not on Twitter. These results hold when controlling for time invariant unobserved director characteristics and are strongest for female or minority directors. Shareholders show more support for these directors through a greater (lesser) percentage of votes casts “For” (“Against”) their election and through a greater stock price reaction to the announcement of first time director appointments. These results suggest that social media can play an important role in reducing traditional labor market frictions.

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“The labor market increasingly awards social skills,”

– Deming (2017) (Abstract) *The Quarterly Journal of Economics*

1. Introduction

As social skills are becoming increasingly important in labor markets, the way we think about social capital today is expanding due to the explosive growth of social media platforms. Membership in traditional social networks is a long-standing measure of social capital with favorable labor market implications (e.g. Simon, and Warner (1992) and Agarwal, Qian, Reeb and Sing (2016)) because they help reduce information frictions (Stigler (1962)). However, with the arrival of social media based networks it is not clear how these new ways for people to establish and maintain social networks (Kane, Alavi, Labianca and Borgatti (2014)) will affect labor markets. Prior studies find that social media networks provide a platform for aggregating information (Battaglini (2017)), reducing the cost of connecting individuals and sharing information (Allcott, Braghieri, Eichmeyer and Gentzkow (2020)) and lowering coordination costs (Enikolopov Makarin and Petrova (2020)), all of which can reduce frictions in labor markets and suggest favorable outcomes. Conversely, social media networks can also have negative societal consequences, such as contributing to the polarization of ideas (Levy (2021)), or personal consequences by creating self-control problems (Allcott, Gentzkow and Song (2022)). Directors on these platforms may therefore experience reputational damage resulting in unfavorable labor market consequences. In this study, we seek to understand whether presence in a social media network is associated with enhanced or diminished labor market opportunities by focusing on Twitter use by corporate directors.

Social media platforms represent an important source of meaningful and relevant information for investors and markets. As various social media platforms came on the scene they allowed investors access to impactful information from other investors (e.g. Chen, Hu and Hwang (2014), Heimer (2016)), directly from the firm (e.g. Blankespoor, Miller and White (2014), Lee,

Hutton, and Shu (2015), Jung, Naughton, Tahoun and Wang (2018), and from the firm's executives (e.g. Kelton and Pennington (2020), Chen, Hwang and Liu (2022) and Crowley, Huang and Lu (2022)). Despite this literature on the meaningful information revealed through social media platforms, there are no studies exploring the association between executive or director social media use and their labor market outcomes.

Prior literature has established that the market for corporate directors is built on ones' reputation or visibility, experience and connections (e.g. Fama (1980), Masulis and Mobbs (2013), Harford and Schonlau (2013), Field and Mkrtychyan (2017), Hwang and Kim (2009), and Fracassi and Tate (2012)). Social media platforms afford directors the opportunity to enhance each of these aspects. An important and novel aspect of the information conveyed on social media platforms is their informal and personal nature. Such information provides investors with a new insight into the personality and way of thinking of the individual sharing the information (Bui, Chou, Lin and Lu (2023)). Furthermore, because social media platforms create a sense of dialogue between the recipients and the sender, it creates sense of social interaction or personal connection (Elliott and Grant (2018)), all of which can affect reputational capital.

As evidence of the reach, or visibility, and potential impact of being on Twitter, at the end of 2022, Twitter had 450 million monthly active users, with about 259.4 million daily active users.¹ For comparison, LinkedIn, at the end of 2022, had 134.5 million daily active users.² While LinkedIn has more members than Twitter, only 16.2% of the registered users on the platform are active, which limits the impact and reach of individual posts. While there is a large degree of overlap (the mean social media user is on 7.2 platforms) only about 39% of Twitter users are on

¹ For statistics on Twitter see <https://thesocialshepherd.com/blog/twitter-statistics>. For comparison, a platform similar to Twitter in China, Sina Weibo has 252 million daily active users. Numbers reported are as of March 2023.

² <https://thesocialshepherd.com/blog/linkedin-statistics> Numbers reported are as of March 2023.

LinkedIn, while over 65% of LinkedIn users are also on Twitter. Facebook is by far the social media platform with the most users (more than 2.9 billion), however and perhaps most importantly for our research, across all social media platforms, including LinkedIn and Facebook, Twitter has the highest percentage of active users who indicate they use the platform to keep up to date with news and current events.³ Thus, given the greater activity on Twitter and its reputation as a source of up to date news and current events, most prior studies of the corporate impact of social media engagement is conducted using Twitter. Likewise, for our study of labor market implications arising from self-directed media attention on a social media platform, we also focus on Twitter.

We begin by identify directors who are on Twitter by first searching for director names through Twitter's API and then manually verifying them. We use the director database from ISS, which consists of directors in the S&P 1500 firms, matched with Compustat to obtain firm information. We find that of the 186,801 director-years from this sample 3,195, or 1.7%, are on Twitter. In the last year of our sample, fiscal year end 2021, of the 13,866 directors in that year, 540 (3.9%) are on Twitter. Also in the last year of our sample, in larger S&P 500 firms over 6% of the directors are on Twitter. In the same year, at the board level, 1 in 4 firms have at least one director on their board who is on Twitter.

Our first research question is what type of directors are more likely to be on Twitter. In a multivariate setting, across multiple specifications, we find that younger directors and those who are female or minority directors are more likely to be on Twitter, which is consistent with Crowley, Huang and Lu (2022). In addition, we find that being a CEO, in a larger firm or serving alongside other directors on Twitter are additional characteristics associated with a greater likelihood of being on Twitter. Conversely, longer-tenured directors or those with financial expertise are less

³ <https://datareportal.com/social-media-users>

likely to be on Twitter. Several of these characteristics, (i.e. age, gender, CEO) are also associated with labor market demand for their services. Therefore, in a subsequent analysis we control for these characteristics to see if being on Twitter has a marginal effect beyond these attributes.

Next, we examine how Twitter use by directors affects their performance on the director labor market. We construct a director-year panel data from the ISS database for the fiscal years from 2007 to 2021 and use the Twitter account creation date for each director to code an indicator variable for being on Twitter in a given year. Because Twitter can be used to generate self-directed attention from a broad audience, the use of the platform can potentially increase a director's visibility and marketability. Furthermore, due to the social connective nature of this communication platform it can strengthen a director's reputation by increasing his/her social capital with a network of followers. Thus, with greater market reach and enhanced human capital, we hypothesize that Twitter use by directors is associated with more demand for their human capital. Alternatively, if Twitter use distracts directors from their work or their tweets reduce their reputational capital, directors on Twitter may suffer adverse labor market consequences. We test these competing hypotheses by examining a variety of labor market outcomes and shareholder assessments.

First, we explore the likelihood of a director gaining an additional directorship. After controlling for other characteristics associated with their labor market value, we find evidence that being on Twitter doubles a director's chance of gaining an additional directorship, particularly female directors. Relative to being directors not on Twitter, a director on Twitter has a 64% greater likelihood of gaining a new directorship. Meanwhile, they are no more likely to lose a directorship in a given year than those who are not on Twitter. In related analysis, we also find that directors on Twitter are also more likely to gain a directorship in a firm that is larger than their current firm

or is in a different industry. These results are especially salient for minority and female directors. Thus, Twitter use is associated with expanded labor market opportunities for directors, consistent with Twitter use broadening a director's visibility or social network in the market.

Since Twitter use is an endogenous decision of a director, an alternative explanation is that our results simply capture unobserved differences across directors that are correlated with Twitter use rather than a causal Twitter effect. Twitter use may simply allow us to observe directors who would have better labor market outcomes than other directors even if Twitter did not exist. To mitigate this concern, we incorporate director fixed effects to account for time-invariant innate director characteristics. We continue to find that Twitter use is associated better labor market outcomes. Thus, both cross-sectional and within-director analysis indicate that Twitter use is associate with positive labor market outcomes.

Second, because shareholders' perspective toward directors is the foundation of the labor market, we study two measures of shareholder assessment of directors. The first measure is the percentage of shareholder votes a director receives during an election. We find that directors who are on Twitter receive a significantly higher (lower) percentage of "For" ("Against") votes than directors who are not on Twitter serving on the same board. While directors supported by the management usually receive a vast majority of "For" votes and thus rarely fail to be elected, our results suggest that not only are directors on Twitter more likely to gain additional boards seats but they also receive greater support and less opposition by shareholders. Interestingly, we also find some evidence that directors on Twitter are significantly less likely to receive an "Abstain" vote. If shareholders are more likely to vote "abstain" for director they are less familiar with, this results further supports the hypothesis that Twitter can serve as a channel to convey more positive information about the director to shareholders.

The second measure of shareholder assessment of directors is the stock market reaction to the announcement of first time director appointments. We hand collected the appointment dates of directors appointed in 2019 and then exclude those dates with confounding events (e.g. acquisition). We find that the 3-day cumulative abnormal return around the announcement is significantly greater if the director is on Twitter at the time of the appointment. Again, this result is consistent with the hypothesis that shareholders likely have (1) more information about and (2) a more favorable disposition towards directors who are on Twitter.

Overall, the results we find are consistent with Twitter use facilitating greater labor market visibility, reputation and outcomes. However, it is possible directors' favorable labor market experiences create incentives to join Twitter. While our evidence is suggestive of the former causal explanation, in either case director Twitter use serves to identify directors with greater labor market visibility and mobility. Therefore, social media use is an important characteristic associated with reduced labor market frictions.

Our paper contributes to the new and growing literature on the role of social media in financial markets. Some earlier papers study its effects on retail investor decisions (e.g. Chen, Hu and Hwant (2014) Heimer (2016) and Grenna and Michaely (2021)). Our paper is closest to those studying the role of social median in corporate financial decision making. Papers in this latter group initially focused on how firms used Twitter, or similar social media platforms, to control information flow to the market (e.g. Lee, Hutton and Shu (2015), Jung, Naughton, Tahoun and Wang (2018) and Blankespoor, Miller and White (2014)). More recently, studies have started to examine social media use by CEOs and CFOs (e.g. Feng and Johansson (2019) and Chen, Hwang and Liu (2022)). These studies focus on the content of the Tweets by these executives to distinguish personal from firm related tweets or to identify personality traits (Bui, Choi, Lin and Lu (2023)).

While these studies do document that executive Twitter use affects investors, their focus is on firm outcomes (e.g. Elliott and Grant (2018), Crowley, Huang and Lu (2022) and Kelton and Pennington (2020)). None of these studies examines how executive social media use affects executive labor market outcomes. Furthermore, to our knowledge, there are no studies examining Twitter use by corporate directors. Given the growing use and impact of social media platforms, especially among younger up-and-coming directors and the important governance role directors' play, understanding how social media use influences the director selection process and shareholders' disposition towards directors is an important research agenda.

Secondly, by focusing on directors, these findings contribute to the vast literature on corporate directors by uncovering another potential mechanism that can facilitate learning about director characteristics, such as personality and influence. In a recent working paper, Bhattarai, Serfling and Woidtke (2023) document that director fixed effects, or unique characteristics, are important in firm outcomes. Thus, it is important for shareholders to know as much as possible about directors. While prior literature on directors has focused on easily observable traits or experiences, Bhattarai, Serfling and Woidtke (2023) highlight the importance of obtaining even more information about directors and their unique skills, insights or personality. Our findings reveal that using social media to convey such information is one important way for directors to convey information to both current and potential shareholders whom they serve as directors. Relatedly, given the role of social media in affecting individual reputation in the broader market, our findings contribute to the literature on director reputation incentives (e.g. Fama and Jensen (1983) and Masulis and Mobbs (2014)).

Third, more broadly these findings contribute to our understanding of the role of social networks in labor markets. Stigler (1962) highlights the important role of information in labor

markets in reducing search costs. An often studied channel is social networks (e.g. Simon and Warner (1992) and Lin, Cook and Burt (2001)). Because social-media-based networks differ from traditional social networks (Kane et al. (2014)), our findings provide the first insights into their effects on executive labor markets.

Finally, the findings in this study have implications for other labor markets. Social media platform use may vary across professions, industries or geographic regions, but invariably these platforms are changing the way we communicate and the way information is received by interested parties. Our results suggests, that the faster, tailored, broader and more personable reach of communication through social media has the potential to significantly impact labor markets. Thus, a greater understanding of these tools is imperative for labor market participants and policy makers alike.

2. Literature Review

2.1 Traditional Media

Traditional media sources play an important information intermediary role in markets, with significant reputation implications. For example, Dyck, Volchkova and Zingales (2008) find that coverage of firm governance violations by the press is associated with improved governance that is, at least in part, due to the reputation impact of such coverage. Similarly, Lui and McConnell (2013) document the reputational impact of media coverage influences managerial decision making. Specifically, the tone of the media attention given to value-reducing acquisition attempts effects managers' decisions to abandon such attempts. Because the media provider determines the tone, they are essentially gatekeepers as to how the information revealed is perceived by the market. The power of the media coverage lies with the media outlet and its ability to affect the managers' reputational capital that, in this case, is at risk. Dai, Parwada and Zhang (2015) also

document evidence of the governing effect of media attention on managerial decision making in the context of insider trading. These studies reveal that the powerful governing effect arising from media coverage comes stems from (1) the reduction of information asymmetry between either the firm or the executives and external stakeholders and (2) the enhanced human capital reputation impact, which is controlled by the media agent.

2.2 Social Media

With the advent of technology and social media platforms like Twitter, communication and media attention have evolved significantly since these earlier studies focused on traditional media. Market participants now seek (Da, Engelberg and Gao (2011)) and aggregate information from non-traditional sources of information such as various social media platforms ((Grenna and Michaely (2021))). Recent literature has discovered that these new sources of information have significant impact on investor decisions. Chen, Hu and Hwant (2014) find that investors' opinions on stocks shared on the social media platform Seeking Alpha predict future stock returns and earnings surprises. Relatedly, Heimer (2016) finds that investors on the social network platform ForexBook are twice as susceptible to the disposition effect on traders' market orders. Given the impact on investors of information conveyed through social media platforms, it is not surprising that firms and their managers recognize this impact and employ this new type of media as a medium for proactively relaying information to the market.

While traditional media is mostly reactive, social media platforms, like Twitter, allow firms to proactively disseminate information to the market in an effort to protect or enhance their reputation. Lee, Hutton and Shu (2015) analyze firm Twitter usage around product recall announcements and find that such social media use can limit the reputation loss from a recall by affording firms the opportunity to quickly and directly communicate with a large network of

stakeholders and thereby minimize any negative reputational effects from the recall news. Relatedly, Jung, Naughton, Tahoun and Wang (2018) find that firms use Twitter to strategically disseminate quarterly earnings announcements. Specially, they find that firms tweet good earnings announcements, but are less likely to do so when the earnings are bad. Furthermore, they also document that tweeting bad news is associated with more negative news articles, which suggests that social media news is more immediate and impactful than traditional news media.

As more investors turn to social media for information ((Grenna and Michaely (2021))), this provides firms with a new way to communicate with investors beyond traditional media coverage or traditional firm communications such as press conferences or regulatory filings. Blankespoor, Miller and White (2014) find that firms' disclosures on Twitter reach more investors and thus, are associated with significantly improved information environment as evident in greater market liquidity, especially in firms that are not highly visible. However, firm communications on social media are not limited to the firm itself. Rather, firm executives can also convey information on their personal social media accounts. While firms' Twitter accounts are used to provide information about the firm and not to facilitate a conversation (Zhang, Gosselt, and de Jong (2020)), executive accounts can also convey information about the firm at a more personal level.

Chen, Hwang and Liu (2022) examine CEO and CFO adoption of Twitter and find evidence of an improved information environment. However, the improvement stems from firm related content, rather than personal content, shared on Twitter. Similarly, Feng and Johansson (2019) find that when executives in Chinese firms post personal content on the social media platform Sina Weibo (similar to Twitter), it does not have a lasting effect. However, it does have an immediate, even if transitory, effect on firm stock returns. These findings suggest that social media content contains incremental information to other sources and markets react to such

information. While these studies reveal that personal tweets do not significantly affect firm outcomes, other studies reveal that they can reveal important information about the executives.

An important aspect of using social media platforms, like Twitter, to convey information is the information revealed about the sender and the perception of personal interaction. Microblogging (i.e. posting on a social medial platform like Twitter) can be a valuable indicator of executive sentiment (Tyagi and Tripathi (2019)) more so than traditional means of communication (e.g. conference calls or SEC filings) because they provide more insight into the personality of the sender. For this reason, Bui, Choi, Lin and Lu (2023) use the contents of CEO tweets to identify important personality traits (e.g. neuroticism). Perhaps because tweets are more personal, they can also serve to establish more of a perceived social bond between the sender and the receivers. Consistent with this view, Elliott and Grant (2018) find that investors are more willing to invest in firms following negative earnings surprises when the CEO tweets firm news from his/her personal account rather than the firm's account. Crowley, Huang and Lu (2022) also find that investors respond to CEO and CFO tweets more than firm tweets even when the information content is similar. The difference, they argue is driven by the perceived trust from the individual executive. Kelton and Pennington (2020) model this connectedness between executives and investors. They also find empirical evidence that CEO Twitter use can encourage feelings of connectedness, or social capital, among investors towards the CEO. Moreover, this social capital is favorable for the CEO. Namely, it leads to positive feelings toward the CEO from investors and thus more investor support for CEO compensation packages. Thus, information shared via an executive's personal account reveals something about that executive to the receivers of that information that facilitates a degree of social connection or bond.

Communications on social media, in summary, reveal information about executive

personal characteristics and it can positively influence market participants by establishing a sense of connectedness. Following this reasoning, recent papers have used executive Twitter activity as a measure of executive reputation. For example, Bui, Chen, Hasan and Lin (2023) use the diversity of language among CEO Twitter followers as a measure of international reputation. Because this new source of information from executives evidently improves the information environment surrounding those executives, it is reasonable to expect it to have important market and governance consequences (Zhu (2019)). The labor market for corporate directors is one such important governance mechanism.

2.3 Director Labor Market

Directors are motivated to develop a reputation as strong monitors and advisors (Fama and Jensen (1983) and Masulis and Mobbs (2014)). Prior literature has documented that evidence of such characteristics, namely through prior experience, is often rewarded with additional directorships. For example, experience with mergers and acquisitions (Harford and Schonlau (2013) and Field and Mkrtchyan (2017)), financial experience (Guner, Malmendier and Tate (2008)) or foreign experience (Giannetti, Liao and Yu (2015)) are associated with favorable director labor market outcomes. In addition, connections are important. Specifically, social connections with current board members, namely the CEO, also influence director selection (e.g. Hwang and Kim (2009), Fracassi and Tate (2012)). Thus, director appointment is influenced by the information the market has about a potential director as well as the degree of social capital the potential director has with influential market participants.

2.4 Hypothesis Development

Recent economic literature finds that social media platforms serve to aggregate information (Battaglini (2017)), reduce the cost of sharing information and making connections (Allcott et al.

(2020)) and reduce the cost of coordination (Enikolopov et al. (2020)). Each of these aspects can reduce labor market frictions and foster better labor market outcomes. Indeed, Wheeler, Garlick Johson, Shaw and Gargano (2022) find that social media removes search or information frictions in the rank-in file labor market. Given the increasing prevalence of individual executive's on social media, it noteworthy that no recent studies, to our knowledge, have examined the role of social in the executive labor markets. Given the important information intermediary role and reputational impact from traditional media coverage, social media, which is essentially self-directed media coverage is likely to have similar implications.

The recent findings that executive tweets serve to establish a social connection between themselves and their followers (e.g. Elliott and Grant (2018), Kelton and Pennington (2020) and Crowley, Huang and Lu (2022)) along with the existing literature on the director labor market and the importance of networks or connectedness (e.g. Fracassi and Tate (2012)) suggests that Twitter usage can have important direct labor market implications. Furthermore, Toubia and Stephen (2013) find that users post on Twitter to boost their reputation or visibility. While similar to the effects of traditional media coverage, social media differs in that it is self-directed and intended to be generally positive. Given the importance of reputation and visibility, in the director labor market (e.g. Fama and Jensen (1983)), the reputational enhancing aspects that Twitter affords further implies its usage can be associated with favorable labor market outcomes. Thus, our first hypothesis follows:

H1: Directors on Twitter will experience enhanced labor market outcomes relative to those not on Twitter.

While Twitter use can come with rewards, it can also increase the reputational risk of directors. Conti-Brown and Feinstein (2020), argue that the Federal Reserve's use of Twitter to

convey information induced greater criticism of their policy actions and thus suggested that their use of Twitter was detrimental. They noted that the complex nature of the information they attempted to convey was not conducive to the limited characters allotted to tweets. While their finding relates to tweets from organizations, individuals also face similar risk-reward tradeoffs when using Twitter. Directors may not be able to sufficiently convey information on Twitter in a way that shareholders will accurately assess, which could lead to greater criticism of their thoughts or actions.

Furthermore, the economic literature has noted several concerns with social media use that could have adverse labor market consequences. First, Levy (2021) finds that social media use contributes to the polarization of ideas. While Levy (2021) focuses on Facebook, the findings suggest that directors using Twitter risk alienating some members of their network, and potentially shareholders, if they develop a reputation for being polarizing. Braghieri et al. (2022) find that social media use through Facebook is associated with increased mental health concerns in students arising from unfavorable social connections. Such concerns could detract from a director's focus on monitoring and advising management. Furthermore, Allcott et al. (2022) find that social media is habit forming and can become a distraction and create self-control problems. Relatedly, Hall (2014), with a focus on scientist, argues that Twitter can be a distraction from one's primary tasks. Thus, these negative aspects of social media use can serve to reduce directors' reputation in the labor market and detrimentally affect their labor market opportunities. Our alternative hypothesis follows:

H2: Directors on Twitter will experience poorer labor market outcomes relative to those not on Twitter.

3. Sample and Descriptive Statistics

We obtain the directors in the S&P 1500 firms from the ISS director database. Our sample runs from 2007 to 2021. Using Twitter's API we search for each S&P 1500 firm director listed until May 2022 (most recent fiscal year 2021) by matching the director name with the Twitter Name and by searching for each director's primary employer in the Twitter users' bio.

We use the Levenshtein distance to calculate the similarity between a director's name in the ISS database and the names of all Twitter users. We consider a director name and a Twitter user name are initially matched if the Levenshtein similarity score between them is greater than 80, the Twitter user is a verified user or the name or ticker of director's primary employer is listed in the Twitter user's bio. We also limit our search to those with at least 750 followers (top tercile of initially identified matches). This gives us an initial list of possible matches. From this list, we manually verify each match, removing false positives and manually searching for and replacing any correct Twitter user names. This processes yielded Twitter information for 3,195 director-firm-years through May 2022. For each director, we record his or her Twitter username, following count, followers count, and the account creation date. Using the account creation date, we identify the years within our panel dataset when these directors are on Twitter. We assume that directors who do not have a Twitter account in May 2022 as never being on Twitter. If a director deleted their Twitter account before May 2022, our methodology would mistakenly classify the director as never being on Twitter. Hence, we are likely to underestimate the number of directors who had been on Twitter before May, 2022.

Table 1 reports the distribution of our sample observations at the director-firm-year level for the last fiscal year of our sample (calendar year 2022) and by director classification. In 3.9% of the observations, the director is on Twitter. This fraction is the same when we restrict our sample to only independent directors. Only 2.2% of observations of non-CEO executive or affiliated

directors are on Twitter. In an unreported t-test, we find there are significantly more CEOs on Twitter than there are independent directors (p -value=0.09). In Panel B, we report the fraction of observations where the director is on Twitter in the S&P Large, Mid and Small Cap size groups, respectively. We also find that there are proportionally more directors and CEOs of S&P 500 firms on Twitter relative to either small or mid-cap firms. In the S&P 500 firms, over 6% of the observations have directors on Twitter and 9% of the observations have the CEO on Twitter.

We report in Table 2, additional descriptive statistics for all director-firm-years in our sample who are on Twitter as of May 2022. Thirty-eight percent of the Twitter users are female and 29% are minorities. The average age is 57.67 years. Twitter directors have been on Twitter for an average of 6.1 years.

Table 2 Panel B compares the characteristics of directors who are on Twitter with those who are not. Females and minorities account for a greater proportion of the directors on Twitter relative to those not on Twitter. Likewise, in the bottom rows of the panel, the fraction of female (minority) independent directors on Twitter is significantly higher than the fraction of male (non-minority) independent directors on Twitter (6% vs. 3% (2.3% vs. 1.5%)). Directors on Twitter are significantly younger (57 versus 63) and have shorter tenure.

Finally, Table 2 Panels C and D report the distribution of observations with Twitter directors across the Fama-French 10-Industry groups in the last year of our sample and the full sample, respectively. Each industry has Twitter directors. The industry with the largest (smallest) portion of directors on Twitter is the High Tech Business Equipment (Utilities) industry.

While our focus is at the director level, we also aggregate Twitter usage to the board level. Specifically, we create board or firm level variables to capture Twitter use by directors and the CEO. Table 3 reports descriptive statistics at the firm and board level. In Panel A, the last year of

our sample, we find that 25 percent of the firm-years have at least one Twitter director. The CEO is on Twitter in 41 percent of the firm-years. The distribution across industries in the last year of our sample of firms with at least one director on the board who is on Twitter is similar to the director level distribution. In Panel B, for the full sample, we find 11% of the firm-years have at least one independent director who is on Twitter and 2% of the firms have a CEO who is on Twitter. Social media use is a growing trend among corporate directors and executives.

4. Determinants of Directors Being on Twitter

The univariate results revealed that directors on Twitter are younger, more likely to be female and in larger firms. Next, we explore determinants of being on Twitter in a multivariate setting. In addition to director gender, age, ethnicity and firm size, we also control for how long they have served as a director. Given that prior studies on the tweet contents of CEOs and CFOs (e.g. Chen, Hwang and Liu (2022), Choi, Lin and Lu (2023), Elliott and Grant (2018) and Crowley, Huang and Lu (2022)), we also control for whether the director is a CEO in his/her primary role and whether or not they are identified as a financial expert. Next, to account for the social influence of peers, we control for the presence of other independent directors on the board who are on Twitter.

We report results in Table 4. We start with linear probability models that incorporate industry fixed effects (Fama-French 10 or 48 industry definitions). We also report results from a probit specification without industry fixed effects and also a conditional logit specification, grouped by industry. We find similar results across all specifications that are consistent with the univariate analysis. Namely, directors in larger firms are more likely to be on Twitter. Directors who are female, who are minority, who are younger and whose first directorship occurred more recently are more likely to be on Twitter. We also find that independent directors whose primary

role is a CEO are more likely to be on Twitter.

Interestingly, we find that independent directors recognized as financial experts are significantly less likely to be on Twitter. Conversely, if at least one other independent director on the board is on Twitter, then other directors are also more likely to be on Twitter.

One interesting result is that those directors who have shorter tenure are more likely to be on Twitter. If the shorter tenure is driven by directors on Twitter getting new directorships more recently, this suggests that Twitter use may have important implications for obtaining directorships. Twitter use can increase visibility and access to broader networks, which can increase the likelihood of gaining a new directorship. However, firm size, which is another measure of visibility is also associated with a greater likelihood of being on Twitter. It is possible that directors in larger firms or who are CEOs in their primary role join Twitter because they already have a large audience or followers given their heightened visibility in the market. Alternatively, being on Twitter may have enhanced their visibility affording them opportunities to gain more directorships and directorships in larger firms.

Because we know when each director who is on Twitter in 2022 created their Twitter account, we can identify each year they have been on Twitter throughout our sample period, which is from 2007 to 2021. Figure 1, Panels A and B, report the years that each director joined Twitter and the number and fraction of directors on Twitter in each year of our sample, respectively. In Panel A, we see a large spike in directors joining Twitter in 2009, shortly after Twitter became public. In most of these cases, when the director joined Twitter, they were not a director in one of our sample firms when they joined. In Panel B, we see a steady increase in director-years who are on Twitter throughout our sample period. Because it can take time to build up a significant following on Twitter and because the size of the following reflects the visibility and potential

impact from being on social media, for our subsequent analysis we focus on directors who have been on Twitter for at least one year.

5. Labor Market Outcomes

In this section, we explore several measures of labor market activity. Based on our hypothesis one, we expect directors who are on Twitter to exhibit greater mobility in the director labor stemming from the greater positive reputation and visibility attributed to being on the social media platform. We measure mobility by the likelihood of gaining new directorships, broadening their reach and/or visibility through new directorships, and finally we consider a measure of efficiency or speed of mobility to new directorships. Conversely, if being on Twitter is viewed as a distraction (Hall (2014)) is more likely to have a negative impact on directors' reputations, we expect to find evidence of diminished labor market activity among directors who are on Twitter.

5.1 Labor Market Mobility: Directorship additions and losses

We begin by examining the likelihood of an existing director gaining a new directorship in a given year. The dependent variable in these models equals one if the director-firm-year represents a new directorship for the director and is zero otherwise. We use linear probability models that allow for the incorporation of year and industry or director fixed effects. We restrict the sample to directorship-years classified as independent. We also exclude the first directorship year observations within our sample. Thus, we are examining the likelihood of gaining an additional directorship.

To account for other factors likely associated with gaining additional directorships we control for director talent with the lagged number of existing directorships held by the director in a given year (e.g. Fama (1980), Fama and Jensen (1983), Shivdasani and Yermack (1999), and Fich and Shivdasani (2007)). We also control for director age. Masulis, Wang, Xie and Zhang

(2022) find that older directors, while beneficial for advising, tend to provide weaker monitoring. Gender is another important characteristics. The growing focus on board diversity through regulation and media attention, along with the increased insight into their unique skills of female or minority directors has increased the demand for their services (e.g. Ahern and Dittmar (2012), Adams and Funk (2012), Kim and Starks (2016), Greene, Intintoli and Kahle (2020), and Hwang, Shivdasani and Simintzi (2021)). Finally, given the importance of executive experience in the director role (Masulis and Mobbs (2011)), we control for whether the director is a CEO, CFO or COO in their primary firm using indicator variables for these respective roles.

Table 5 reports the results. In model 1, we find a positive and significant coefficient estimate for the Twitter indicator. Across our sample period, the likelihood of an independent director gaining a new directorship in a year is 0.028. The coefficient estimate in model 1 suggests that being on Twitter increases this likelihood by 0.018 or 64%, which is economically meaningful. We also see that more talented directors, as measured by lagged number of existing directorships, and female or minority directors are also more likely to receive an additional directorship in a given year. Conversely, older directors are less likely to receive an additional directorship. We find no evidence that current CEOs or CFOs are more likely to receive another directorship, while there is some evidence that COOs on Twitter are more likely to gain another directorship.

It is possible that directors who are on Twitter are on Twitter because they have an outgoing personality or already have a strong reputation with lots of visibility in the market. Thus, even without Twitter, they may be more likely to gain additional directorships simply due to their innate personal characteristics. In an initial step to address this concern, in model 2 we incorporate director fixed effects to control for time invariant director characteristics that can affect labor market visibility and reputation. After incorporating director fixed effects, we continue to find a

positive and significant coefficient estimate for directors on Twitter. Thus, the variation within directors suggests that a director on Twitter is more likely to acquire an additional directorship relative to when that same director is not on Twitter. The coefficient estimate for being on Twitter is associated with a likelihood of gaining another directorship that is about twice as great as before the director joined Twitter.

Next, we interact the Twitter indicator with the Female and Minority indicators. Here we find that the results are strongest for female directors, which suggests that Twitter may open up access to networks that previously difficult to access by female directors.

Next, we consider the likelihood of losing a directorship. Following our alternative hypothesis, if Twitter use is a distraction or actually results in reputational damage, we expect to see a positive association with being on Twitter and the likelihood of losing a directorship. These results are reported in Table 5 models 5 and 6, with industry and director fixed effects, respectively. In both models, we do not find a significant association between directors who are on Twitter and the likelihood of losing a directorship. We find evidence in model 5 that female directors are less likely to lose directorships, whereas older directors are more likely to do so. Interestingly, we also find evidence that more talented directors are more likely to lose directorships. The finding that talented directors, those with more directorships, are both more likely to gain and to lose directorships likely captures the conflicting information revealed by directors with multiple directorships. They are both an indication of talent, but they can also reflect greater director distraction (Fich and Shivdasani (2007)), which makes them less attractive for additional directorship positions. Finally, we find that directors who are the CEO or CFO, are likely to reduce their directorship load, perhaps due to the greater requirements of their time in their executive role. We find similar results in model 6 when including director fixed effects, with age being the

exception. Although older directors are more likely to lose or relinquish a directorship relative to younger directors, when we consider within director variation, we find that as a director ages or increase their tenure on a board, he/she is less likely to lose or relinquish directorship.

In summary, these initial findings for directors on Twitter is inconsistent with our alternative hypothesis and suggest that, while some Twitter users may be distracted or damage their reputation with their posts, on average Twitter use appears to have positive labor market consequences.

5.2 Labor Market Expansion: Size and Industry

In this section, we explore whether Twitter use facilitates broadening the reach of the director's labor market outcomes by increasing their reputation. Prior literature has documented that firm size is an important measure of director reputation (e.g. Adams and Ferreira (2008) and Shivdasani (1993)). Therefore, we first consider the likelihood of directors gaining a new directorship in a larger firm. We again use linear probability model specifications and the same controls as in Table 5. However, because we are considering the relative size of the new directorships, we also control for the lagged natural log of market capitalization for the largest directorship for each director-year.

We create an indicator for a new directorship being in a larger firm, but first each year ranking all firms by market capitalization and then sorting them into equally distributed bins. In Table 6 Panel A, models 1 and 2, we sort the firms into 100 bins or percentiles. The dependent variable in these models equals one if the director-firm-year is a new directorship and that new directorship is in a bin that is higher than the bin of the director's existing directorships. To examine larger jumps in size, in models 3 and 4 we sort firms into 25 bins. As in Table 5, models 1 and 3 incorporate industry fixed effects and models 3 and 4 incorporate director fixed effects.

We find in models 1-3 a positive and significant coefficient estimate for the Twitter indicator variable. In model 4, although the coefficient for the Twitter indicator is positive, it is not significant. Nonetheless, the evidence in models 1-3 is consistent with directors on Twitter gaining access to bigger and more visible directorships.

The coefficient for the lagged maximum size the director's current directorships is negative and significant, consistent with the logic that the larger the director's current directorships are the less likely that director will obtain an even larger one. The coefficients on the other control variables are generally similar to those in models 1 and 2 of Table 5. One interesting exception is the coefficient for the lagged number of directorships. It is not significant in models 1 and 3, the models with industry fixed effects. While talent, for which the number of directorships serves as a proxy, may increase the likelihood of a director gaining another directorships (Table 5 model 1), it does not increase the likelihood of that directorship being in a larger firm (Table 6 Panel A models 1 and 3). Whereas, perhaps the greater visibility and reputation building effects of being on Twitter may actually increase the likelihood a director is recognized by shareholders and directors of larger firms, making it more likely these directors can expand their labor market reach.

In models 5 and 6, we include interaction terms for the Twitter indicator and either the female or minority indicator variables. Here we find that minority directors seem to benefit the most from being on Twitter when it comes to gaining additional directorships in larger firms. This again suggests that social media can open up access to networks traditionally more difficult to access by minorities.

Next, we consider another dimension of expanding the reach of the director by examining the likelihood of a director gaining a directorship in another industry. Such a move would provide greater breadth of experience and further build the director's reputation in the labor market. We

define a new directorship to be in a different industry if the new directorship is in a Fama-French 48 defined industry that differs from the industry of all the directors' current directorships. The controls are again the same as those used in Table 5. The results are reported in Table 6 Panel B. In model 7, with industry fixed effects, we do not find a significant association with the Twitter indicator. However, in model 8, when we incorporate director fixed effects, we find a positive and significant coefficient for the Twitter indicator, which is further evidence that director who join Twitter are more likely to gain directorships in an industry different from their current director experience after joining. Finally, in models 9 and 10 we incorporate the interaction terms between the Twitter indicator and indicators for female or minority directors. Here we find that Twitter is beneficial for both female and minority directors in gaining access to directorships in different industries.

In summary the results in Table 6 indicate that directors who are on Twitter experience greater labor market expansion relative to their current directorships than do those directors who are not on Twitter, particularly for female or minority directors. Namely, being on Twitter is associated with greater opportunities in larger firms and in different industries. This evidence is supportive of hypothesis 1, that self-directed media attention through active involvement on social media platforms can facilitate greater attention and have positive reputational effects that can lead to positive director labor market outcomes. Thus, far, we have considered the effects of Twitter on a director's reach in the labor market. Next, we study direct measures of shareholder assessment of directors.

6. Shareholder Assessment

Shareholders represent an important component of the director labor market, as they are responsible for approving appointments of directors to monitor and advise management in their

interests (Fama and Jensen (1983)). Thus, if engaging on a social media platform, like Twitter, can positively influence shareholders disposition towards a director this can be one channel through which such use can facilitate improved labor market outcomes. In this section, we examine two measures of shareholder assessment of directors.

6.1 Voting Results

One measure of shareholders' view towards directors is their voting results. While shareholder support or lack of support for specific directors in election voting may not be effective at removing directors viewed as weaker monitors (Ertimur, Ferri and Oesch (2015)), they do represent meaningful assessment of director approval or disapproval. For example, Cai, Garner and Walkling (2009) find lower approval rates seems to instigate better monitoring as evident in lower "abnormal" CEO compensation, higher threat of CEO removal and governance improvements. Thus, in this section we examine shareholder voting behavior.

We obtain shareholder voting data on director elections from ISS and match each director election vote outcome with the directors in our sample. For each voting outcome, we create variables for the fraction of total votes casts that are "against", "abstain" or "for" the director election and are winsorized at the top and bottom five percent. Base on hypothesis 1, if engagement on Twitter facilitates connects with a broader audience, particularly shareholders, and promotes positive reputational capital, then we expect directors who are on Twitter to receive more "for" votes and few "against" votes. Conversely, our alternative hypothesis implies that directors on Twitter are more distracted and thus weaker monitors, which will lead to fewer "for" votes and more "against" votes.

We control for similar director characteristics, such as female and whether they are the CEO in their primary firm. Instead of controlling for the number of directors, which can be a

measure of talent or a measure of distraction if the director holds too many, which is not valued by shareholders, we use an indicator variable that equals one if the director holds three or more directorships (busy) (e.g. Fich and Shivdasani (2006)). Similarly, director age can have non-linear effects, as older directors, while more experienced can also be less effective monitors (Masulis, Wang, Xie and Zhang (2022)). We control for older directors using an indicator variable that equals one if director age is 75 or older and is zero otherwise. Since meeting attendance is another measure of director monitoring effort, we also control for director meeting attendance with an indicator if the director attended fewer than 75% of the meetings in the year. We also control for whether the director is identified as a financial expert and has high voting power. Finally, we control for whether the board elections follow majority voting with an indicator (Ertimur, Ferri and Oesch (2015)). Each model incorporates year and firm fixed effects. We find similar results when incorporate firm x year fixed effects. Standard errors are clustered by year and we restrict the analysis to independent directors.

In Table 7 model 1, we report results for the fraction of votes “against” election of the director to the board. The Twitter indicator variable is negative and significant. For the mean director receives 3.056% of the total votes casts are “against” election. However, if a director is on Twitter, this fraction is reduced by 9.61% ($0.00342/0.0356 = 0.0961$). In model 2, the dependent variable is the fraction of votes “abstained” for the director. Here we find evidence that a significantly smaller fraction of votes are recorded as abstain. If shareholders are less inclined to vote for director whom they do not know or have little knowledge of, this results suggest that being on Twitter can increase shareholder awareness of the director and thus decrease the likelihood they will abstain from voting on the director’s election. Finally, in model 3 we examine the fraction of votes received “for” the election of the director. Here we find a positive and significant coefficient

estimate on the Twitter coefficient estimate. Consistent with prior studies (e.g. Cai, Garner and Walkling (2009)) the average independent director does receive a vast majority of votes “for”, 96.21%. Based on the coefficient estimate in model 3, a director on Twitter receives 0.42% (0.004/0.9621) more “for” votes.

In models 4 and 5, we repeat the specification of model 3, but include the interaction terms of the Twitter indicator with either the indicator for female or minority director. We find no evidence that shareholders assess female or minority directors different conditioned on whether or not they are on Twitter.

The control variables also load as expected. For example, busy directors, those with poor attendance, high voting power, or are older directors receive significantly more “against” votes and significantly fewer “for” votes. Female directors and financial experts receive significantly fewer “against” votes and more “for” votes.

In summary, the voting results in Table 7 reveal that shareholders are more likely to recognize and thus cast votes for directors on Twitter. Perhaps more importantly, the votes they cast are significantly more likely to be “for” election and less likely to be “against” election. These results are consistent with hypothesis 1 and not with our alternative hypothesis 2. Namely, being on Twitter appears to be associated with greater shareholder recognition and more favorable assessment of the director’s human capital.

6.2 Director Appointments Announcements: Event study

Another means of assessing shareholders’ disposition toward a director is examining the shareholder reaction to the announcement of their being appointed or nominated to serve as a director (e.g. Rosenstein and Wyatt (1990) and Ellis, Guo and Mobbs (2021)). If directors nominees who are on Twitter are more likely to be known by shareholders and are also more likely

to be viewed more favorably by shareholders, our hypothesis 1 predicts shareholders will react positively to this news. Conversely, if being on Twitter has no effect on shareholder's information about a nominated director, or if the effect is associated with a negative effect on the director's human capital, the alternative hypothesis 2 predicts either no effect or a negative shareholder reaction to the announcement. To test these hypotheses, we hand collect announcement dates for all director appointments in our sample during the year 2019. We focus on this year because it falls after the 2018 law passed in California mandating greater female director representation on boards and before the Covid-19 pandemic. We also limit our director appointments to independent directors who are receiving their first directorship in our sample (S&P 1500 firm) and they have only the one directorship in that year. We exclude announcements that clearly include additional information such as mergers or that are only released as a part of a regular SEC filing. From this sample, we calculate the abnormal daily return as the appointment firm's daily stock return less the value weighted return for the market. Then we compute the cumulative abnormal return (CAR) for the three days surrounding the event day t , $[t-1, t+1]$. Lastly, we censor this sample at the top and bottom 5% to reduce the likelihood the announcement contains additional meaningful information about the firm. The final sample includes 228 director appointment events and 15 of these directors are on Twitter.

The mean shareholder reaction (3-day CAR) to this sample of director appointment announcements is -0.08% and is insignificant. However, the mean 3-day CAR for directors who are on Twitter is 1.2%, whereas those not on Twitter is -0.017. A simple t-test of the differences of the means of these 3-day CARs is significantly different from zero (p -value=0.03). Because we know proportionally more female directors are on Twitter and younger directors are also more likely to be on Twitter, shareholders may be reacting to either of these characteristics rather than

because they know the director from his/her Twitter engagement. To consider this possibility, in Table 8 we report multivariate regression analysis of the 3-day CARs controlling for director gender and age. Since investors may give more attention to more visible firms and thus be more attentive to announcements from those firms, we also control for the visibility of the firm with an indicator variable is the firm is in the S&P 500. In model 1, we find that director gender and age are not significantly related to shareholder reaction. The results do reveal that firm visibility matters to shareholders as director appointment announcements of firms in the S&P 500 exhibit a significantly larger shareholder reaction than those in smaller firms. After controlling for these characteristics, we continue to find evidence of a significantly greater shareholder reaction for announcement of director appointments who are on Twitter, consistent with the univariate result. In model 2, we incorporate Fama-French 10 industry fixed effects to account for varying levels of attention or Twitter following across industries and we find, slightly stronger, but similar results. In summary, the shareholder reaction to director appointment announcements is consistent with the shareholder voting analysis in revealing the directors on Twitter are associated with greater shareholder support, consistent with the social media platform creating value for directors in the labor market. Finally, in models 3 and 4, we consider the incremental effect of being on Twitter for female and minority directors and find no significant incremental effect.

7. Conclusion

Social media has revolutionized the way we transmit, receive and process information and is influencing many areas of our society, from entertainment to corporate communications. While researchers have begun to explore its effects on financial markets and corporate communications, there is much less research on the influence of social media on labor markets. An important aspect of social media is that it provides a new platform for individuals to selectively communicate

information that can potentially reach a much broader audience than previously possible with traditional media sources. As such, social media can be a tool for individuals to gain greater visibility and build a reputation. Such actions should have important labor market implications. We explore this possibility in the context of corporate directors and the market for their services.

We identify directors in S&P 1500 firms who are on Twitter in 2022 and use their account creation dates to build a panel data set at the director-firm-year level of director Twitter use between 2007 and 2021. We find that directors who are on Twitter exhibit greater labor market reach and breadth. These results hold when controlling for director level fixed effects to account for unobserved innate director characteristics. Thus, being on social media serves to enhance labor market outcomes for directors, especially for female or minority directors, which underscores the importance of social media in alleviating labor market frictions and broadening access beyond traditional networks.

We also find evidence of greater shareholder support for directors who are on Twitter. Twitter directors receive more “For” votes and less “Against” votes during elections and the stock market reacts more positively to the announcement of first-time appointment of Twitter directors. These results are consistent with shareholders having both more information about these directors and more favorable information about these directors, which presumably stems from the directors’ activity on Twitter.

In summary, the evidence in this study is consistent with the positive role social media can potentially have on directors in their labor market. These findings increase the importance of understanding how social media is changing our culture and society, specifically by its impact on labor markets and especially for females and minorities. Given the important role of information transfer in labor markets, how labor market participants convey information and whether through

traditional mediums or through new social media platforms will be an important consideration into the future. As such, understanding these connections is important for everyone, not just directors, but participants and policy makers across all labor markets.

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2061.

Table 1. Directors Identified on Twitter – May 2022

Directors are identified on Twitter using the following algorithm: We search for each director’s full name in Twitter. If multiple names are found in Twitter then we search each Twitter bio for any word in the collection of the company’s ticker, firm name or the director’s primary employer are listed in the Twitter bio to identify each director. We also compute a similarity score between each directors’ name and the twitter account name. We use the Levenhtein Distance to calculate how similar the director’s name is compared to the individual’s regular name on the Twitter Account, where 100 is a perfect match. Lastly, we utilize the “Verified” flag in Twitter. This is a Twitter created flag (shown as a blue checkmark on someone’s profile) that indicates that twitter has verified the person is who he or she claims to be and is well-known enough to be verified. For our initial screen, we consider a director to be potentially identified on Twitter if the director’s name is found on Twitter and (1) their followers count is > 750, (2) their name is Verified, (3) one of their firm’s is listed in the Twitter Bio or (3) the name match has a similarity score >70. We then manually search these 1,380 directors to identify 540 who are on Twitter in Fiscal year 2021 (identified May 2022).

Panel A.	N	Fraction on Twitter	Number on Twitter
All Directors	13866	0.039	540
CEOs	1418	0.049	69
Non-CEO Exec and Affiliated Directors	1010	0.022	22
Independent Directors	11438	0.039	449

Panel B.	N	Fraction on Twitter in S&P 500 - Large Cap	Number on Twitter
All Directors	5198	0.061	319
CEOs	476	0.090	43
Independent Directors	4414	0.060	263

	N	Fraction on Twitter in S&P 400 – Mid Cap	
All Directors	3598	0.031	113
CEOs	370	0.030	11
Independent Directors	2945	0.033	98

	N	Fraction on Twitter in S&P 600 – Small Cap	
All Directors	5070	0.021	108
CEOs	572	0.026	15
Independent Directors	4079	0.022	88

Table 2. Descriptive Statistics of Directors Identified on Twitter

This Table reports the means and medians for several director and Twitter characteristics for directors who are on Twitter. Followers Count is the number of followers directors have in 2022. Following Count is the number of other people or organizations that the director is following in 2022. Years Since Joining Twitter is the number of years the director has been on Twitter from their account creation date until May 2022.

Panel A.	All Directors		
	N	Mean	Median
Female	3195	0.38	0
African American	3195	0.12	0
Minority	3195	0.29	0
Age	3195	56.7	57
Year Became Director	3195	2010	2013
Years Since Joining Twitter	3195	6.1	6
Twitter Followers Count	3195	364049.81	5321
Twitter Following Count	3195	761.28	335
Number of Directorships	3195	1.38	1

Panel B.	Independent Directors		T-tests
	On Twitter	Not On Twitter	p-value
Female	2551 0.45	147324 0.20	0.00
African American	2551 0.1427	147324 0.0572	0.00
Minority	2551 0.3230	147324 0.2412	0.00
Age	2551 56.96	147140 63.34	0.00
Year Became Director	2551 2011.01	147324 2005.30	0.00
Number of Directorships	2551 1.40	147324 1.46	0.00

	Independent Directors		T-tests for differences
	Female	Male	p-value
On Twitter	3676	7762	
	0.06	0.03	0.00
	African-American	Non-African-American	p-value
On Twitter	8792	141083	
	0.041	0.016	0.00
	Minority	Non-Minority	p-value
On Twitter	36365	113510	
	0.023	0.015	0.00

Table 2. (continued)

Panel C.

Fam-French 10 Industries	N	Fraction of All Directors On Twitter in 2022	# of All Directors on Twitter
Consumer Non-Durables	644	0.042	27
Consumer Durables	329	0.033	11
Manufacturing	1925	0.024	46
Energy	417	0.034	14
High Tech Business Equipment	1978	0.065	129
Telecommunications	224	0.054	12
Wholesale, Retail and Some Services	1318	0.047	62
Healthcare, Med Equipment and Drugs	1190	0.040	48
Utilities	626	0.018	11
Other – Mines, Construction, Hotels, Bus. Services, Entertainment, Finance	5215	0.035	180
Total	13866	0.039	540

Panel D.

Fam-French 10 Industries	N	Fraction of All Directors On Twitter 2007-2022	# of All Directors on Twitter
Consumer Non-Durables	9657	0.016	150
Consumer Durables	4606	0.012	55
Manufacturing	26626	0.011	298
Energy	6993	0.012	83
High Tech Business Equipment	28102	0.028	800
Telecommunications	3110	0.034	106
Wholesale, Retail and Some Services	20084	0.019	387
Healthcare, Med Equipment and Drugs	14156	0.017	243
Utilities	9051	0.008	68
Other – Mines, Construction, Hotels, Bus. Services, Entertainment, Finance	64416	0.016	1005
Total	186801	0.017	3195

Table 3. Board Level Descriptive Statistics

Twitter Board equals 1 if at least on director on the board is identified on Twitter in 2022. # (%) Independent Twitter Directors is the number (percentage) of independent directors on the board who are on Twitter. Board Director Follower is the sum of the number of followers by all independent directors on the board identified on Twitter. Board Director Following is the sum of the number of people or organizations that the independent directors on the board who are identified on Twitter are following. Total Years Since Joining Twitter equals the total number of years since joining Twitter from May 2022 for all of the independent directors identified on Twitter. Avg. Years Since Joining Twitter is the average number of years since joining Twitter to May 2022 for all of the independent directors identified on Twitter. CEO on Twitter equals 1 if the CEO is identified on Twitter.

Panel A	All Firms in 2022					
	N	mean	p50	p75	p90	max
Twitter Board	1418	0.25	0	0	1	1
# Independent Twitter Directors	1418	0.32	0	0	1	4
% Independent Twitter Directors	1418	3.79	0	0	14.29	50
Board Director Followers	1418	36615.05	0	0	5447	26600000
Board Director Following	1418	281.18	0	0	701	35897
Total Years Since Joining Twitter	1418	3.22	0	0	13	47
Avg. Years Since Joining Twitter	1418	2.51	0	0	11	16
CEO on Twitter	1418	0.41	0	1	1	1

	N	Twitter Board
Fam-French 10 Industries		
Consumer Non-Durables	62	0.241935484
Consumer Durables	35	0.142857143
Manufacturing	201	0.179104478
Energy	45	0.2
High Tech Business Equipment	214	0.336448598
Telecommunications	20	0.2
Wholesale, Retail and Some Services	133	0.308270677
Healthcare, Med Equipment and Drugs	132	0.272727273
Utilities	57	0.157894737
Other – Mines, Construction, Hotels, Bus. Services, Entertainment, Finance	519	0.240847784
Total	1418	0.248236953

Panel B.	All Firms (2007-2022)					
	N	mean	p50	p75	p90	max
Twitter Board	19136	0.11	0	0	1	1
# Independent Twitter Directors	19136	0.13	0	0	1	4
% Independent Twitter Directors	19136	1.63	0	0	9.090909	50
Board Director Followers	19136	26614.86	0	0	983	26600000
Board Director Following	19136	112.07	0	0	48	35897
Total Years Since Joining Twitter	19136	1.40	0	0	7	47
Avg. Years Since Joining Twitter	19136	1.18	0	0	6	16
CEO on Twitter	19136	0.02	0	0	0	1

Fam-French 10 Industries	N	Twitter Board
Consumer Non-Durables	948	0.082278481
Consumer Durables	476	0.084033613
Manufacturing	2734	0.085588881
Energy	758	0.077836412
High Tech Business Equipment	3212	0.140099626
Telecommunications	287	0.205574913
Wholesale, Retail and Some Services	2067	0.122399613
Healthcare, Med Equipment and Drugs	1523	0.11687459
Utilities	811	0.067817509
Other – Mines, Construction, Hotels, Bus. Services, Entertainment, Finance	6320	0.105696203
Total	19136	0.108382107

Table 4. Determinants of Being on Twitter

This table reports results from determinant regression models for the likelihood of an independent director in an S&P 1500 firm being on Twitter. The dependent variable in all models is an indicator variable that equals one if the director is on Twitter in 2022 and zero otherwise. Models 1 - 3 are linear probability models. Model 4 is a probit model. Standard errors are clustered by firm and the corresponding *p*-values are in parentheses beneath each coefficient estimate. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Independent Director On Twitter	(2) Independent Director On Twitter	(3) Independent Director On Twitter	(4) Independent Director On Twitter Probit
Ln(Market Capitalization)	0.005*** (0.000)	0.005** (0.045)	0.002*** (0.001)	0.129*** (0.000)
Employment-CEO	0.011** (0.017)	0.011*** (0.007)	0.005** (0.029)	0.132*** (0.000)
Board Tenure	-0.000*** (0.003)	-0.000*** (0.000)	-0.001*** (0.000)	-0.018*** (0.000)
Age	-0.001*** (0.000)	-0.001*** (0.000)	-0.000 (0.709)	-0.031*** (0.000)
Female	0.014*** (0.000)	0.012*** (0.000)		0.309*** (0.000)
Minority	0.011*** (0.000)	0.010*** (0.000)		0.119*** (0.000)
Financial Expert	-0.012*** (0.000)	-0.013*** (0.000)	-0.001 (0.393)	-0.312*** (0.000)
# other Directors on Twitter	0.009*** (0.004)	-0.095*** (0.000)	0.003*** (0.004)	0.215*** (0.000)
Constant				-3.131*** (0.000)
Observations	149,555	149,603	146,607	149,604
Adjusted R-squared	0.035	0.134	0.875	
Pseudo R-squared			0.105	0.133
FF-48 Industry FE	Yes			No
Firm FE		Yes		
Director FE			Yes	
Year FE	Yes	Yes	Yes	Yes

Table 5. Likelihood of Gaining a Directorship

This table reports results from linear probability models for the sample of independent director-firm-year observations from 2007 to 2021. In models 1 and 2, the dependent variable is an indicator variable that equals one if the director-firm-year is a new directorship. The dependent variable in models 3 and 4 is an indicator variable that equals one if the director-firm-year is the last year for the director. Each director's first directorship in the sample is excluded. All models include year fixed effects. Models 1 and 3 (2 and 4) include Fama-French 48 Industry definition (director) fixed effects. Standard errors are clustered by director and the corresponding p -values are in parentheses beneath each coefficient estimate. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) New Directorship	(2) New Directorship	(3) New Directorshi p	(4) New Directorshi p	(5) Directorship Lost	(6) Directorship Lost
Twitter	0.018* (0.061)	0.057** (0.039)	-0.003 (0.668)	0.009 (0.435)	0.002 (0.607)	0.007 (0.566)
Number of Directorships _(t-1)	0.003*** (0.004)	-0.074*** (0.000)	0.003*** (0.004)	0.003*** (0.005)	0.086*** (0.000)	0.147*** (0.000)
Age	-0.001*** (0.000)	0.003 (0.191)	-0.001*** (0.000)	-0.001*** (0.000)	0.001*** (0.000)	-0.004** (0.022)
Female	0.020*** (0.000)		0.019*** (0.000)	0.020*** (0.000)	-0.004** (0.010)	
Minority	0.005*** (0.006)		0.005*** (0.007)	0.005** (0.015)	0.003** (0.015)	
Employment - CEO	0.001 (0.715)	-0.022*** (0.000)	0.002 (0.646)	0.001 (0.707)	0.015*** (0.000)	0.031*** (0.000)
Employment - CFO	-0.004 (0.584)	-0.017* (0.089)	-0.004 (0.598)	-0.004 (0.585)	0.009** (0.027)	0.027*** (0.003)
Employment - COO	0.027* (0.098)	0.013 (0.585)	0.027* (0.096)	0.027* (0.097)	0.012 (0.131)	0.023* (0.084)
Twitter X Female			0.047** (0.015)			
Twitter X Minority				0.027 (0.160)		
Observations	127,972	125,476	127,972	127,972	127,977	125,482
Adjusted R-squared	0.012	0.136	0.012	0.012	0.110	0.099
FF-48 Industry FE	Yes		Yes	Yes	Yes	
Director FE		Yes				Yes

Table 6 Likelihood of Gaining a New Directorships (Larger or Different FF-Industry)

This table reports results from linear probability models for the sample of independent director-firm-year observations from 2007 to 2021. In Panel A, models 1 and 2, the dependent variable is an indicator variable that equals one if the director-firm-year is a new directorship in a firm that is in a greater size percentile. The dependent variable in models 3 and 4 is an indicator variable that equals one if the director-firm-year is a new directorship in a firm that is in a greater size bucket where all firms are ranked by market capitalization and sorted equally into 25 buckets. All models include year fixed effects. Models 1 and 3 (2 and 4) include Fama-French 48 Industry definition (director) fixed effects. In Panel B, the dependent variable is an indicator variable equal to one if the director-firm-year is a new directorships and this directorships is in a different Fama-French 48 defined industry from the director's current directorships. Model 1 (2) includes year and industry (director) fixed effects. Standard errors are clustered by director and the corresponding p -values are in parentheses beneath each coefficient estimate. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	New Larger Directorship in a Firm in a Higher Size Percentile	New Larger Directorship in a Firm in a Higher Size Percentile	New Larger Directorship in a Firm in a Higher Size 25-Bucket	New Larger Directorship in a Firm in a Higher Size 25-Bucket	New Larger Directorship in a Firm in a Higher Size Percentile	New Larger Directorship in a Firm in a Higher Size Percentile
VARIABLES						
Twitter	0.012* (0.074)	0.046** (0.028)	0.009 (0.126)	0.034* (0.074)	0.002 (0.631)	0.001 (0.864)
Number of Directorships _(t-1)	0.001 (0.163)	-0.020*** (0.000)	0.001 (0.135)	-0.018*** (0.000)	0.001 (0.160)	0.001 (0.183)
Age	-0.000*** (0.000)	0.002* (0.091)	-0.000*** (0.000)	0.003** (0.012)	-0.000*** (0.000)	-0.000*** (0.000)
Female	0.009*** (0.000)		0.008*** (0.000)		0.008*** (0.000)	0.009*** (0.000)
Minority	0.002** (0.032)		0.002* (0.078)		0.002** (0.034)	0.002 (0.112)
Employment - CEO	0.001 (0.830)	-0.003 (0.305)	0.000 (0.845)	-0.002 (0.482)	0.001 (0.774)	0.001 (0.814)
Employment - CFO	0.003 (0.529)	-0.006 (0.276)	0.001 (0.749)	-0.009* (0.077)	0.003 (0.521)	0.003 (0.527)
Employment - COO	0.004 (0.672)	0.004 (0.721)	-0.001 (0.863)	-0.004 (0.687)	0.004 (0.667)	0.004 (0.663)
Max[Ln(Market Capitalization) _(t-1)]	-0.001*** (0.000)	-0.018*** (0.000)	-0.001*** (0.000)	-0.019*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Twitter X Female					0.021 (0.127)	
Twitter X Minority						0.033** (0.023)
Observations	125,501	128,672	125,501	123,086	125,501	125,501
Adjusted R-squared	0.005	0.127	0.005	0.132	0.005	0.005
FF-48 Industry FE	Yes		Yes		0.005	0.005
Director FE		Yes		Yes		

Table 6. (continued)

Panel B	(7)	(8)	(9)	(10)
		New	New	New
VARIABLES	New Independent Directorship in a Different Industry	Independent Directorship in a Different Industry	Independent Directorship in a Different Industry	Independent Directorship in a Different Industry
Twitter	0.014 (0.101)	0.051** (0.047)	-0.008 (0.104)	0.002 (0.812)
Number of Directorships _(t-1)	0.000 (0.711)	-0.058*** (0.000)	0.000 (0.719)	0.000 (0.753)
Age	-0.001*** (0.000)	0.002 (0.136)	-0.001*** (0.000)	-0.001*** (0.000)
Female	0.017*** (0.000)		0.016*** (0.000)	0.017*** (0.000)
Minority	0.006*** (0.000)		0.006*** (0.000)	0.005*** (0.002)
Employment - CEO	-0.005* (0.074)	-0.018*** (0.000)	-0.005* (0.096)	-0.005* (0.077)
Employment - CFO	-0.010* (0.076)	-0.023*** (0.004)	-0.010* (0.080)	-0.010* (0.076)
Employment - COO	-0.001 (0.901)	-0.015 (0.344)	-0.001 (0.911)	-0.001 (0.910)
Twitter X Female			0.050*** (0.005)	
Twitter X Minority				0.037** (0.045)
Observations	127,977	125,482	127,977	127,977
Adjusted R-squared	0.010	0.134	0.010	0.010
FF-48 Industry FE	Yes		Yes	Yes
Director FE		Yes		

Table 7. Shareholder Voting Results

This table reports results from regression analyses on the fraction of votes “Against” “Abstain” or “For” for director elections for the sample of independent director-firm-year observations from 2007 to 2021. The key dependent variable in models 1 - 3 is the number of votes cast “against”, “abstain” or “for”, respectively, divided by the total number of votes casts for each director year. The control variables are similar to those in previous tables. All models include firm and year fixed effects. Standard errors are clustered by year and the corresponding *p*-values are in parentheses beneath each coefficient estimate. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Fraction of Votes Against	(2) Fraction of Votes Abstain	(3) Fraction of Votes For	(4) Fraction of Votes For	(5) Fraction of Votes For
Twitter	-0.003*** (0.006)	-0.000* (0.066)	0.004*** (0.009)	0.005** (0.011)	0.005*** (0.001)
Busy	0.020*** (0.000)	0.000*** (0.000)	-0.020*** (0.000)	-0.020*** (0.000)	-0.020*** (0.000)
Old	0.010*** (0.000)	0.000 (0.115)	-0.010*** (0.000)	-0.010*** (0.000)	-0.010*** (0.000)
Female	-0.004*** (0.000)	-0.000*** (0.001)	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)
Minority	-0.001 (0.165)	-0.000 (0.871)	0.001 (0.157)	0.001 (0.156)	0.001 (0.137)
Employment - CEO	0.012*** (0.000)	-0.000* (0.064)	-0.012*** (0.000)	-0.012*** (0.000)	-0.012*** (0.000)
Financial Expert	-0.003*** (0.000)	0.000 (0.592)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
Attend <75%	0.078*** (0.000)	0.000 (0.129)	-0.080*** (0.000)	-0.080*** (0.000)	-0.080*** (0.000)
High Voting Power	0.006*** (0.000)	-0.000 (0.228)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
Majority Voting Requirement	-0.005*** (0.000)	0.002*** (0.000)	0.002** (0.024)	0.002** (0.024)	0.002** (0.024)
Twitter X Female				-0.004 (0.165)	
Twitter X Minority					-0.005 (0.113)
Observations	92,291	92,291	92,291	92,291	92,291
Adjusted R-squared	0.264	0.517	0.259	0.259	0.259
Firm and Year FE	Yes	Yes	Yes	Yes	Yes

Table 8. Shareholder Reaction to Director Appointments- Event Study

This table reports results from regression analyses of 228 director appointments/nominations to the board by firms in 2019. The dependent variable is the 3-day cumulative abnormal return around the announcement day [-1, 1]. The abnormal daily return is the daily return of the announcing firm's stock less the value-weighted daily return from CRSP. *p*-values are in parentheses beneath each coefficient estimate. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) 3-Day CAR	(2) 3-Day CAR	(3) 3-Day CAR	(4) 3-Day CAR
Twitter	0.011* (0.097)	0.012* (0.070)	0.011 (0.356)	0.017** (0.020)
Female	0.000 (0.956)	-0.001 (0.804)	-0.001 (0.801)	-0.001 (0.791)
Minority	-0.001 (0.871)	-0.002 (0.569)	-0.002 (0.570)	-0.001 (0.857)
Age	-0.000 (0.258)	-0.000 (0.185)	-0.000 (0.186)	-0.000 (0.178)
S&P 500 (1/0)	0.008*** (0.008)	0.007** (0.041)	0.007** (0.045)	0.007** (0.049)
Constant	0.010 (0.466)	0.013 (0.299)	0.013 (0.299)	0.013 (0.298)
Twitter X Female			0.001 (0.962)	
Twitter X Minority				-0.025 (0.108)
Observations	228	228	228	228
Adjusted R-squared	0.029	0.062	0.058	0.069
Fama-French 10 Industry FE	No	Yes	Yes	Yes

Figure 1. Panel A Directors Joining Twitter

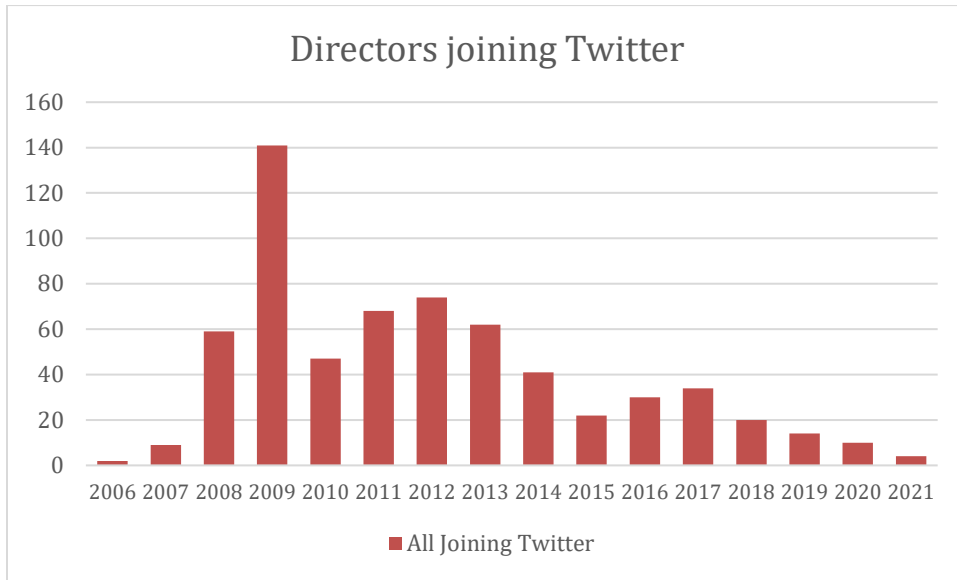


Figure 1 Panel B. Directors on Twitter

