

Do social ties lead to job referrals?

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Abstract

A growing number of empirical papers are investigating the effects of job referrals on labor market outcomes by using social network proxies. By combining very detailed data on social networks and actual job referrals for a large number of US firms between 2004 and 2008, this paper evaluates the use of such proxies. Because firms employ several workers and workers are employed in several firms in my dataset, I make use of worker and firm fixed effects to tackle endogeneity issues. I first estimate the effect of having a social tie with an employee on the probability to be hired and find a positive effect as in the literature - between 26.7 and 31.1 percentage points. I then relate the existence of social ties to the actual occurrence of job referrals and find that the important ties are the professional ones - professional ties increases the likelihood to be referred by 9.5 percentage points. I finally assess the value of using social networks and referrals for recruitment by estimating workers' ability and find that referred workers are significantly better than non-referred workers but connected workers do not significantly differ from unconnected workers suggesting that social network information might not be enough to proxy the information carried by job referrals.

JEL codes: M5, M12, J21, G34

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1 Introduction

Statistics across various countries and types of jobs show that around half of jobs are typically found through informal ways rather than through more formal methods (Topa, 2011). A growing number of empirical papers are therefore investigating the potential reasons for why firms use referrals (Simon and Warner, 1992; Fernandez et al., 2000; Beaman and Magruder, 2012; Dustmann et al., 2016; Hensvik and Skans, 2016; Pallais and Sands, 2016; Heath, 2017) and the consequences of referrals use in terms of individuals' and firms' outcomes (Kramarz and Skans, 2014; Burks et al., 2015; Schmutte, 2015; Brown et al., 2016). One major difficulty in this literature has been to obtain appropriate data on referrals. As a result, a large number of studies have relied on - what has been labeled under the generic term of - social networks as proxies for referrals. This paper, by combining data on social networks and actual referrals, investigates whether individuals do refer others they share a social tie with, therefore providing empirical support for the proxies extensively used in the literature.

Using referrals by current employees for recruitment might have two opposite effects from the firm perspective. On the one hand, referrals can help screening candidates and reduce firms' searching costs. When they know candidates, employees can provide firms with valuable and otherwise unobservable information in terms of candidates' productivity or match quality with the firm (Simon and Warner, 1992; Beaman and Magruder, 2012; Dustmann et al., 2016; Hensvik and Skans, 2016; Pallais and Sand, 2016). Referrals can also mitigate moral hazard if working with the referrer creates peer pressure or emulation to work efficiently or if the referrer's reputation is at stake (Kugler, 2003; Bandiera et al., 2010; Heath, 2017). On the other hand, because referrals rest on individuals' motivations, referrals might allow favoritism to take place. Employees' interests might not align with firms' ones as their motivations to refer a particular candidate might not be related to the candidate's productivity but rather to personal and non job related aspects (Bandiera et al., 2009; Beaman and Magruder, 2012). It is therefore important to understand whether referrals are valuable for firms - do referrals allow firms to select good candidates and firms to be more productive? - to evaluate the extent to which firms will be likely to use them for recruitment. This is the second contribution of this paper: assessing the value of using

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referrals for recruitment. Crossing referrals with social networks information of employees further allows to determine who are the individuals more likely to benefit from such referral recruitment policy: school mates, army fellows or past colleagues, to name a few.

The interest for the impact of referrals on labor market outcomes has led empirical scholars to gather two types of data. One strand of the literature uses direct data on referrals but at the detriment of focusing on one single firm and therefore casts doubts on the external validity of results (see Beaman and Magruder (2012), Pallais and Sands (2013) for experiments and Brown et al. (2014), Burks et al. (2015), Heath (2017) for firm-level data)¹. The other strand of the literature uses proxies for referrals and show that specific social ties cause or are correlated with several common employment patterns and the exact mechanism (job information transmission or recommendation) cannot be uncovered. Some of this literature presupposes that the mere existence of these social ties triggers actual referrals. Examples of social contacts considered include neighbors (Bayer et al. (2008), Hellerstein et al. (2011), Schumtte (2015)), family members (Kramarz and Skans (2014)), school mates (Oyer and Schaefer (2016), Zimmerman (2017)), ethnic group members (Aslund et al. (2014), Dustmann et al. (2016)), fellow countrymen (Munshi (2003), Edin et al. (2003), Beaman (2012), coworkers (Hensvik and Skans (2013), Cingano and Rosolia (2012), Glitz (2017)) and veterans (Laschever (2013)).

By using information on both referrals and social networks of employees for a large number of firms spanning all sectors in the economy, this paper investigates whether social networks actually drive job referrals, therefore bridging these two strands of the literature. I use data on independent board appointments to US publicly listed firms between 2004 and 2008². Following the Sarbanes-Oxley Act in 2003, the US Securities and Exchange Commission (SEC) made it mandatory for publicly listed firms to disclose detailed data on the board appointment process, including the nomination entity of new directors i.e. the employee who referred the new worker if a referral was made. By crossing CV of individuals working for these publicly listed firms, I reconstruct their social networks over their lifetime along several dimensions. Professional networks include the set of previous and current colleagues while nonprofessional networks include contacts made during studies (educational

¹One exception is Burks et al. who use data on nine firms but information availability and measures obviously vary between firms.

²The advantage of using data on a large number of firms in all sectors comes at the expense of focusing on a particular position: the independent directorship.

networks) but also contacts made through non for profit organizations such as charities, sporting clubs (leisure networks) or the army (army networks). I am therefore able to relate job referrals to social networks of various types.

I first estimate the effect of being socially connected with a current board member on the probability to be appointed to this board and find a positive effect as in the literature. Being connected with at least one current board member increases the probability to obtain a board seat between 26.7 and 31.1 percentage points. I then relate the existence of social ties to the actual occurrence of referrals and find that the important ties for job referrals are the professional ones. Sharing a social tie through a previous job at a listed company increases the likelihood to be referred by 9.5 percentage points. Unobserved individual characteristics, such as ability, might be driving both the existence of social ties (two talented individuals are likely to graduate from the same prestigious university) and job related outcomes (a talented individual is more likely to be referred and to be hired). Similarly, unobserved firm characteristics could also be the cause of the relationship between social ties, job referrals and appointment - for instance a particular corporate culture favoring the hiring of directors who have previously worked in start-up companies. The particular job I focus my analysis on - the directorship position - allows me to use both individual and firm fixed effects to mitigate these endogeneity concerns, as each firm has several directors on its board and each director usually sits on several boards at the same time³.

Finally I evaluate whether the use of referrals is beneficial for the firm - are the referred workers “good” workers? To that aim, I estimate newly hired workers’ unobservable ability, that is, information on workers’ productivity that goes beyond observable characteristics from their CV. This information, while unobserved by the firm at the time of hiring, is very likely to be (partially) known by the firm’s employees who know candidates from past history. Therefore, I use the estimated workers’ unobserved ability as a proxy for the information employees’ referrals bring to the firm. Because I observe the whole career history of new directors from their CV, I am able to measure their individual contribution to the performance of their previous employers. Following an earlier insight by Bertrand and Schoar (2003) on CEOs and more recently by Cavaco et al. (2017) on directors, I exploit the fact that directors change firms over time and usually sit on several boards in any particular time period to estimate director fixed effects from firm performance equations, controlling for observable individual characteristics such

³On average in my sample, firms have eleven directors and directors seat on two boards.

as education and experience. I then compare these fixed effects for referred directors and non referred directors and find that referred directors are of higher ability compared to non referred directors.

This paper contributes to the aforementioned labor market literature on the causes and consequences of using social networks and job referrals on recruitment by linking social networks and job referrals information and by showing that recommendations allow the screening of better candidates. This paper is also related to a growing literature in finance which investigates whether connections between independent board members and executives affect firm performance and corporate governance outcomes. While the earlier part of the literature shows that independent directors' ties to the CEO are associated with worse firm performance and corporate governance measures (Hwang and Kim, 2009; Nguyen, 2012; Fracassi and Tate, 2012; Kramarz and Thesmar, 2013; Coles et al., 2015), the more recent works show that this relation is mitigated when firms' advice needs are taken into account (such as firms operating in innovative industries or firms going through mergers and acquisitions) (Schmidt, 2015; Kang et al., 2017). To my knowledge, only one paper directly investigates the relationship between social ties and the board appointment per se (Cai et al., 2017) and, to assess the value of using social ties for recruitment, shows that firms with greater advice needs are more likely to hire connected directors and that shareholders positively react to the appointment of such directors.

2 The US Directors Labor Market

Publicly listed firms are very large firms whose governance is characterized by a separation of ownership (shareholders own firms) and control (managers run firms) (Jensen and Meckling, 1976; Fama and Jensen, 1983). Because of a misalignment of interests between shareholders and managers (Berle and Means, 1932), every publicly listed firm has a corporate board with shareholders' representatives whose role is to advice and monitor managers on behalf of shareholders. The corporate board is the entity where the firm's corporate policies are discussed and managers attend board meetings to give information on the firm's planned strategies. As a result, the board is composed of inside directors (or managers) and of outside directors (grey directors⁴ and shareholders' representatives - also called independent directors).

⁴Grey directors are not current employees but have particular interests with the firm so that they cannot be considered independent. A grey director is, for example, a provider's

Because appointments of inside and grey directors on the board follow peculiar processes⁵, I focus on independent directors' appointments only. Therefore, I investigate the role of job referrals and social networks in hiring an expert that will provide advice on a firm's policies and monitor its executives.

Independent directors are usually nominated by the board and are elected by shareholders at annual meetings. Existing studies show that in practice the board largely controls the entire process. The representative candidate runs unopposed and receives 94% of support from shareholders (Cai et al., 2009). Shareholders rarely exercise their proxy votes - allowing them to propose candidates (Hillman et al., 2011). And despite three major new reforms in the aftermath of the 2008 financial crisis (majority voting rule, eProxy and elimination of broker voting of uninstructed shares⁶), shareholders still have a limited influence on new directors appointments (Cai et al., 2010; Becker and Subramanian, 2013). As the former SEC chairman Arthur Levitt, Jr. said, "a director has a better chance of being struck by lightning than losing an election". Therefore, understanding how the nomination process occurs gives insights into how are chosen the new independent directors. New independent directors can be selected for nomination by four different entities: shareholders, an executive search firm (if the board outsources the search for candidates), the nomination committee (composed of independent directors), or one of the current board members. Because this information has to be reported in firms' proxy statements since August 23, 2004, it is possible to know for each independent board appointment after this date whether the new director was referred by a current employee (one director in particular or those belonging to the nomination committee) or not (selected by shareholders or executive search firms).

or a bank's representative.

⁵Managers who sit on board are the firm's top executives and are selected through specific promotion or hiring rules. Some grey directors are on the board because of legal requirements, for instance employees' representatives.

⁶Majority voting imposes that a director receives a majority of votes to be elected. Previously, for a director to be elected, it sufficed that one shareholder voted for him if the rest abstained. eProxy makes mandatory for firms to disclose the proxy material online. Elimination of broker voting of uninstructed shares forbids voting by brokers, who were previously allowed to vote in lieu of shareholders who did not vote on time, rendering their shares uninstructed.

3 Data and Descriptive Statistics

The dataset is composed of 4254 independent board appointments occurring between 2004 and 2008 in US publicly listed firms. These appointments are made by 1325 firms belonging to the S&P 1500 index and represent a total number of 3738 directors.

Table 1: Number of Independent Board Appointments by Year

Year	Appointments	Directors	Firms
2004	984	960	680
2005	835	813	597
2006	865	837	614
2007	775	751	556
2008	795	771	535
Total	4 254	3 738	1 325

Available information on directors includes age, gender, MBA degree, IVY League university, number of listed boards to date, number of current listed boards, average number of years on listed boards, number of years as an executive and whether the director is an industry or a financial expert. Available information on firms includes board and committees sizes, proportion of executives, independent, female and busy directors, whether the chairman is also an executive, average board tenure and firm size, performance, risk, leverage, growth opportunities and sector⁷. Tables 2 and 3 provides descriptive statistics on appointed directors and on appointing firms.

⁷Table 14 gives precise definitions of these variables.

Table 2: Summary statistics appointed directors

	Mean	Std.Dev.	N
Age	55.57	7.30	4254
Woman (prop.)	0.17	-	4254
MBA degree (prop.)	0.34	-	4254
IVY League university (prop.)	0.09	-	4254
Years as an executive	11.91	11.85	4254
Nb of listed board	3.01	2.41	4254
Avg years on listed board	3.26	2.32	4254
Nb of current listed boards	2.18	1.49	4254
Busy director (prop.)	0.32	-	4254
Industry expert (prop.)	0.65	-	4254
Financial expert (prop.)	0.24	-	4254

A busy director seats on more than two listed boards. An industry expert is a director who has already worked in the same industry. A financial expert is a director who has worked in the finance sector and/or with a finance degree. Definitions of all variables are provided in Table 14.

Table 3: Summary statistics appointing companies

	Mean	Std.Dev.	N
Board size	11.21	2.66	4254
Executives on board (prop.)	0.14	-	4254
Independents on board (prop.)	0.79	-	4254
Women on board (prop.)	0.12	-	4254
Busy directors on board (prop.)	0.31	-	4254
Executive chairman on board (prop.)	0.76	-	4254
Avg board tenure	13.14	3.70	4254
Nomination committee size	4.65	2.71	4254
Firm size	11392.58	31296.19	4254
Firm performance	0.09	0.08	4254
Firm risk	0.00	0.02	4254
Firm leverage	0.23	0.18	4254
Firm growth opportunities	1.23	1.11	4254
Sector: Manufacturing (prop.)	0.42	-	4254
Sector: Transportation (prop.)	0.11	-	4254
Sector: Retail Trade (prop.)	0.09	-	4254
Sector: Finance (prop.)	0.14	-	4254
Sector: Services (prop.)	0.15	-	4254

Board size is the number of directors on board. Busy directors seat on more than two listed boards. Firm size is the market value of equity (in millions USD). Firm performance is the return on assets. Firm risk is the variance of return on assets over the last five years. Firm leverage is the total debt over total equity. Firm growth opportunities is the market-to-book ratio. Definitions of all variables are provided in Table 14.

3.1 Social networks

Social network information is recovered from individuals' CV, provided by BoardEx, a UK supplier of data to headhunting companies. BoardEx gathers data on publicly listed companies who reach a market capitalization above 1 million USD (a threshold that is largely below the rough average of 11000 millions USD market capitalization among the firms in my sample) and collects CV of individuals who have been board members of these companies. By crossing this CV information, I am able to observe the opportunities to network and form social ties all these directors have had among themselves since the beginning of their career (and even before with respect to their education or military service). I reconstruct individuals' social networks from different environments: *professional networks* include the set of all other in-

dividuals who have worked at the same time in the same public or private companies; *education networks* include the set of all other individuals who have been studying in the same university or institution at the same time; *leisure networks* include the set of all other individuals who were members of the same non for profit organization at the same time such as a charity or a sports club; and *army networks* include the set of all other individuals who were at the same time in the army. While non professional networks might represent only loose social ties, especially if the university cohort, the sports club or the military unit were large, professional networks are likely to convey more precise information on actual social ties. Because these directors have had a large part of their career on corporate boards or in top management teams (the average number of board members for firms in my sample is 11, as an indication of how large are these groups), if they worked at the same time in a company, they are therefore very likely to actually know each other⁸. Based on this reconstructed social networks information, I am able to observe for each newly appointed director in my sample whether she shares a (past or present) social tie with board members or not, in a very detailed way (did the new director and the CEO graduated together from the same university? Was the new director previously working in the same company as another independent director on the board? Is the new director currently sitting in another board with an executive director? And so on.).

3.2 Job referrals

Following the Sarbanes-Oxley Act in 2003, the SEC made it mandatory for publicly listed firms to disclose detailed data on the board appointment process. Among the new disclosure rules that became effective on August 23, 2004, publicly listed firms were asked to report in their proxy statements the source of each new director nomination. I use hand-collected data kindly made available to me by Akyol and Cohen (2013). They selected the S&P 1500 firms in 2006 and tracked every new independent board appointments occurring in these firms between 2004 and 2008. From the proxy statements of these firms, they identified the source of each new director nomination⁹.

⁸As I exploit the whole CV of individuals to reconstruct these professional networks, current directors are likely to have started lower down the corporate hierarchy and therefore less likely to really know the higher ranked individuals at that time. Still, given that these individuals became directors later on, it seems likely they were more visible than other juniors because of their particular talent or motivation which make them part of the corporate elite later on.

⁹For further details on the identification and categorization of director nomination sources from proxy statements of firms, see Akyol and Cohen (2013).

For my analysis, I consider that, for each appointment, there is a job referral if the nomination source is the nomination committee or another board member and that there is no job referral if the nomination source is a shareholder or an executive search firm.

3.3 First evidence on the use of social networks and job referrals

Out of the 4254 new directorships, around 25% of them concern a director recommended by an executive search firm, 4% by a shareholder and the large remaining share by (at least) one current board member (see Table 2). Job referrals by the board itself are therefore widely used for filling directorship positions. This is in line with the fact that job referrals, by providing information on tacit knowledge and aptitudes, are highly valuable for high-skilled positions and for positions where experience substantially affects productivity, as in the case of board members. Moreover, because the work of the corporate board is collegial by nature, job referrals might also convey valuable information on match quality and productive complementarities. Among the sources of recommendations, the largest share of them come from the nominating committee (46% of cases), as expected from its role, while the CEO refers slightly less (10% of cases) compared to other independent directors on the board (17% of cases), contrary to some undefeating CEO power on board appointments.

Table 4 also provides statistics on new directors' social ties to the board. The social ties overwhelming shared with the board are the professional ones and, in particular, the professional ones from listed companies. Around 23% of new appointments display some direct connection between entrant and incumbent directors and this percentage goes up to 83% if we add the indirect connections (i.e. the connections of connections). This is not surprising given the relatively small population size of US directors (statistics on S&P 1500 firms between 2007 and 2016 gives 21396 directors for 139073 director seats). Corresponding percentages regarding private, education, leisure and army connections are 9.1%, 2.5%, 1.1% and 0.8%. Professional ties through listed companies between the new directors and CEOs occur in 7.6% of cases and in twice as many more cases (20% versus 8.7%) new directors share such professional ties with non executives rather than with executives. This evidence seems also contrary to an agency view, whereby executives - and in particular the CEO - aim to reduce the monitoring intensity of independent directors by adding to the board their own contacts.

Table 4: Job Referrals and Social Ties

	Mean	Std.Dev.	Min	Max
Job referrals				
Prop. referred by an Executive Search Firm	0.251	0.434	0	1
Prop. referred by the nomination committee	0.459	0.498	0	1
Prop. referred by the CEO	0.099	0.299	0	1
Prop. referred by another insider	0.042	0.201	0	1
Prop. referred by another independent director	0.171	0.376	0	1
Prop. referred by a shareholder	0.043	0.202	0	1
Professional ties - Listed companies				
Prop. with a (direct) tie to the board	0.228	0.419	0	1
Prop. with an indirect tie to the board	0.602	0.490	0	1
Shortest path to reach the board*	2.016	0.809	1	7
Shortest path to reach the board if indirectly linked to the board*	2.401	0.602	2	7
Nb of board members connected to	2.769	3.087	1	17
Nb of board members	11.401	2.731	5	24
Prop. with a tie to the CEO	0.076	0.265	0	1
Prop. with a tie to another insider	0.027	0.162	0	1
Prop. with a tie to the nomination committee	0.111	0.314	0	1
Prop. with a tie to another independent director	0.136	0.343	0	1
Prop. with a tie to the executives	0.087	0.283	0	1
Prop. with a tie to the non-executives	0.200	0.400	0	1
Nb of executives connected to	0.498	0.749	0	5
Nb of non-executives connected to	2.271	2.689	0	16

*Shortest path to reach the board measures the number of links before reaching the board. A shortest path of 1 means the individual is (directly) linked with a board member.

	Mean	Std.Dev.	Min	Max
Professional ties - Private companies				
Prop. with a tie to the board	0.091	0.287	0	1
Prop. with a tie to the CEO	0.019	0.135	0	1
Prop. with a tie to another insider	0.009	0.094	0	1
Prop. with a tie to the nomination committee	0.032	0.177	0	1
Prop. with a tie to another independent director	0.049	0.215	0	1
Personal ties - Education				
Prop. with a tie to the board	0.025	0.157	0	1
Prop. with a tie to the CEO	0.007	0.081	0	1
Prop. with a tie to another insider	0.001	0.034	0	1
Prop. with a tie to the nomination committee	0.008	0.086	0	1
Prop. with a tie to another independent director	0.012	0.110	0	1
Personal ties - Army				
Prop. with a tie to the board	0.011	0.102	0	1
Prop. with a tie to the CEO	0.002	0.046	0	1
Prop. with a tie to another insider	0.000	0.015	0	1
Prop. with a tie to the nomination committee	0.004	0.067	0	1
Prop. with a tie to another independent director	0.006	0.075	0	1
Personal ties - Leisure activities				
Prop. with a tie to the board	0.008	0.090	0	1
Prop. with a tie to the CEO	0.003	0.055	0	1
Prop. with a tie to another insider	0.000	0.000	0	0
Prop. with a tie to the nomination committee	0.004	0.065	0	1
Prop. with a tie to another independent director	0.004	0.065	0	1
Observations	4254			

4 Social ties help being hired

In this section, I detail how I measure the impact of social ties on the probability to be hired and provide a magnitude of this effect.

The empirical model I use to estimate this effect is the following:

$$Y_{ijt} = \alpha + \beta SocialTie_{ijt} + X_{it}\gamma_1 + Z_{jt}\gamma_2 + X_{it}\Gamma Z_{jt} + \delta_i + \eta_j + \theta_t + \epsilon_{ijt} \quad (1)$$

where the outcome variable Y_{ijt} is 1 if director i was appointed to the board of firm j in year t and 0 otherwise, variables X_{it} and Z_{jt} control for individual and firm characteristics¹⁰, δ_i , η_j and θ_t are individual, firm and time fixed effects. The dependent variable $SocialTie_{ijt}$ is 1 if director i shares at least one social tie with at least one director of firm j from before year t and 0 otherwise and I use different definitions of this variable to investigate the impact of more precisely defined social ties in terms of type (professional, education, leisure or army) and in terms of reach (CEO, other executive, nomination committee, other independent director). I compute robust standard errors, clustered at the firm level, given that, for firms hiring several directors during the sample period, there are multiple firm observations in the estimation.

There are two main interpretation and estimation issues with equation (1). First, social ties are likely to be endogenous to the probability of being appointed. For example, talented candidates will be more likely to be hired. Moreover, talented individuals are also more likely to have been appointed to several boards by the past and therefore to have a large network of professional ties - which increases the probability to have a professional tie with a current director of the hiring firm. Similarly, firms with particular corporate cultures, for example firms who choose to tackle economic crisis through massive lay-offs, will look for directors experienced with such policies. A candidate with such experience will therefore be more likely to be hired and to have worked in the past with a current director in another massive lay-offs style firm. Therefore, I include both individual and firm fixed effects to control for these unobserved individual and firm characteristics and limit the endogeneity problem. Because firms have several board members and

¹⁰Time-varying director characteristics include age and age squared, number of years as an executive, average number of years on listed boards, total number of listed boards. Time-varying board characteristics include board size, average tenure on board, audit, compensation and nomination committee sizes, proportions of insider, independent, busy and women on board, an executive chairman dummy. Time-varying firm characteristics include size, leverage, risk, performance. See Table 14 for more precise definitions of these variables.

because directors hold several board positions, I observe multiple appointments for some directors and some firms over the sample period, allowing me to include individual and firm fixed effects in the estimations¹¹.

Second, specific to the board appointment process is the fact that the list of candidates for a board position is not observed and only the nominated and appointed one is¹². To select a nominee, the board usually establishes a list of criteria that the new board member must satisfy to fulfill the firm's advice needs. For example, the firm might need an expert in finance as it has to make complex financial investments decisions or a director with previous work experience in China as it aims to export its products to China. The search for suitable candidates is then performed by either an executive search firm, the nomination committee or the board as a whole. Finally, the board interviews the suitable candidates in the short-list to select one, to be proposed for election to shareholders at the annual meeting. I first make the assumption that the appointed director has the specific characteristics the board was looking for. Based on this assumption, I mimic the screening job done by executive search firms, nomination committees or boards¹³ and reconstruct the set of short-listed candidates for each board position¹⁴. I perform several robustness checks by varying the number of short listed candidates and the list of criteria considered. In practice, I use a nearest neighbor matching algorithm that selects the n other individuals in the database with the m closest characteristics as the appointed director.

Social ties might affect the board recruitment process at two different - but not exclusive - levels. On the one hand, conditional of having the characteristics the board is looking for, social ties might help being selected out from the short-list of candidates. On the other hand, social ties might help being selected into the short-list of candidates, irrespectively of other individual characteristics. The global effect is likely to be a combination of both

¹¹12% of directors are appointed more than once during the sample period and 80% of firms are appointing more than one director during the sample period.

¹²Following the discussion in section 2, I indistinguishably treat nominated and appointed directors given that new directors usually never fail to be elected.

¹³The data used in this paper is provided by a company whose main business is to sell data to head hunters, such as executive search firms or board members looking for a new director. It is therefore very likely that the entity responsible for the short-listed candidates (the executive search firm, the nomination committee or the board) uses data similar to the one I use here.

¹⁴Results presented here are based on a short-list of ten candidates selected on: the number of years working as an executive, the average number of years on listed boards, the number of listed boards and the sector speciality, being defined as the sector in which the individual has worked for the longest period.

phenomena. Because I do not observe the short-list of candidates, I cannot decompose precisely this effect but I can obtain a lower and an upper bounds of it. By selecting a short-list of candidates based on the aforementioned assumption, I obtain the lower bound estimate of the effect of social ties on recruitment. If social ties play a role only from the short-list to the board seat, necessarily the new director has the characteristics the board was looking for. The estimate I obtain from the regression using such a defined short-list of candidates should therefore be considered as a lower bound of the total effect. But, social ties might also help being selected into the short-list of candidates in the first place and therefore, the new director might not even have the characteristics the board was particularly looking for. By using a pool of random candidates, I can therefore obtain the upper bound estimate of the effect of social ties on recruitment. The real estimate lies within these two bounds and is likely to be a combination of the two phenomena previously described.

Table 6: Do social ties affect board appointments?

	Dependent variable: Appointed by the Board	
	Selected Candidates	Random Candidates
Tie to the Board	0.267*** (0.0178)	0.311*** (0.0476)
Controls, director and firm FE	Yes	Yes
Observations	42540	42540

Robust standard errors in parentheses, clustered at the firm level. Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Director controls include age, age squared, number of years as an executive, average years on listed boards, number of listed boards. Firm controls include firm size, risk, leverage and performance, number of directors on board, proportions of executives, independent directors, busy directors and women on board, average board tenure, nomination committee size, executive chairman dummy. Remaining controls include all interactions of director and firm controls and year dummies.

Results in Table 6 reveal that sharing a social tie with at least one member of the board increases the probability to obtain a board seat between

26.7 and 31.1 percentage points. In comparison, Burks et al. (2015) find that referred candidates are 6 percentage points more likely to be hired in call centers, 10 percentage points more likely to be hired in the trucking industry and 0.27 percentage points more likely to be hired in the high-tech sector. Brown et al. (2016) show that, conditional on being interviewed, referred candidates are 13.9 percentage points more likely to receive an offer in a mid-sized US firm operating in the financial services industry. Again, the types of jobs investigated in these papers largely differ from the type of job under investigation here. Papers focusing on directorship positions have also found a considerable prevalence of past social ties among board members (Hwang and Kim, 2009; Nguyen, 2012; Fracassi and Tate, 2012; Kramarz and Thesmar, 2013; Cai et al., 2017).

Tables 7 and 8 decompose the effect by looking at the type of social tie (professional from listed or private firms, educational, from the army or leisure activities) and with whom the social tie is shared with (the CEO, another executive, nomination committee members or another independent director) and Table 15 in the Appendix presents results broken down by type and board entity. It appears that professional ties are the most important and, in particular the ones from listed companies (having a social tie from a previous job at a listed firm increases the probability to obtain the board seat between 31.6 and 26.6 percentage points). Social ties to independent directors - including those on the nomination committee - are the most helpful. I investigate in the next section whether these professional ties also are those that bring the job referrals.

Table 7: Which type of social ties affect board appointments?

	Dependent variable: Appointed by the Board	
	Selected Candidates	Random Candidates
Prof. (Listed) Tie	0.266*** (0.0197)	0.316*** (0.0558)
Prof. (Private) Tie	0.318*** (0.0358)	0.229* (0.0927)
Educ. Tie	0.0732** (0.0243)	0.178 (0.119)
Army Tie	0.0906 (0.0481)	0.138 (0.157)
Leisure Act. Tie	0.329*** (0.0965)	0.303 (0.228)
Controls, director and firm FE	Yes	Yes
Observations	42540	42540

Robust standard errors in parentheses, clustered at the firm level. Statistical significance levels:
 * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Director controls include age, age squared, number of years as an executive, average years on listed boards, number of listed boards. Firm controls include firm size, risk, leverage and performance, number of directors on board, proportions of executives, independent directors, busy directors and women on board, average board tenure, nomination committee size, executive chairman dummy. Remaining controls include all interactions of director and firm controls and year dummies.

Table 8: Social ties to whom affect board appointments?

	Dependent variable: Appointed by the Board	
	Selected Candidates	Random Candidates
Tie to the CEO	0.214*** (0.0355)	0.189 (0.107)
Tie to another Exec. Dir.	0.113* (0.0558)	0.158 (0.172)
Tie to the Nomin. Committee	0.203*** (0.0241)	0.153* (0.0767)
Tie to another Indep. Dir.	0.227*** (0.0255)	0.240** (0.0729)
Controls, director and firm FE	Yes	Yes
Observations	42540	42540

Robust standard errors in parentheses, clustered at the firm level. Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Director controls include age, age squared, number of years as an executive, average years on listed boards, number of listed boards. Firm controls include firm size, risk, leverage and performance, number of directors on board, proportions of executives, independent directors, busy directors and women on board, average board tenure, nomination committee size, executive chairman dummy. Remaining controls include all interactions of director and firm controls and year dummies.

5 Professional ties are the ones leading to job referrals

I investigate in this section whether previous meeting opportunities (i.e. social ties) lead to job referrals, and in particular which social ties are the most useful to be referred for a board position. Table 9 first presents evidence on the relationship between social ties and job referrals using t-tests. The distribution of social ties is not unrelated to job referrals: a referred new director has on average more social ties to the board than a non referred new director (34% chances of having a social tie versus 24%). In particular, referred directors are more likely to share a professional tie from a listed company or an education tie with someone on the board compared to non referred directors (25% chances versus 17% and 3% versus 2%) and are roughly twice more likely to be socially connected to the CEO or the nomination committee

(12% versus 5% and 17% versus 9%). Compared to a non referred director, a referred director also is more likely to share social ties with the specific board member who recommended her (see Tables 16, 17, 18 and 19 in the Appendix).

Table 9: Social Ties by Referred Status (t-tests)

	Referred by the Board		Diff.	Std. Error	Obs.
	Ref = 1	Ref = 0			
Any Social Tie	0.3379	0.2369	-0.1010***	0.0159	4254
Prof. (Listed) Tie	0.2496	0.1688	-0.0808***	0.0144	4254
Prof. (Private) Tie	0.0947	0.0801	-0.0146	0.0099	4254
Educ. Tie	0.0285	0.0172	-0.0112*	0.0054	4254
Army Tie	0.0110	0.0095	-0.0015	0.0035	4254
Leisure Act. Tie	0.0094	0.0052	-0.0042	0.0031	4254
Tie to the CEO	0.1157	0.0508	-0.0649***	0.0102	4254
Tie to another Exec.	0.0372	0.0224	-0.0148*	0.0062	4254
Tie to the Nomin. Com.	0.1665	0.0879	-0.0786***	0.0121	4254
Tie to another Indep. Dir.	0.1888	0.1576	-0.0312*	0.0132	4254

Statistical significance levels: * p<0.05 ** p<0.01 *** p<0.001

I now more formally explore the relationship between social ties and job referrals. To that aim, I construct a dyadic dataset. Each observation is a matched pair between a new director i and an already director k of firm j ¹⁵. I use this dataset to estimate the following model:

$$JobReferral_{ijkt} = \alpha + \beta SocialTie_{ikt} + X_{it}\gamma_1 + X_{kt}\gamma_2 + Z_{ijkt}\gamma_3 + \delta_i + \eta_j + \theta_t + \epsilon_{ijkt} \quad (2)$$

where the outcome $JobReferral_{ijkt}$ is 1 if director k refers director i for the board position in firm j at time t and 0 otherwise, and the dependent variable $SocialTie_{ikt}$ is 1 if directors i and k interacted before time t and 0 otherwise. As previously, I use different definitions of this variable to investigate the impact of different types of social ties (professional, education, leisure or army). Variables X_{it} and X_{kt} controls for director i 's and director k 's char-

¹⁵Tables 20, 21 and 22 in the Appendix show similar estimation results of a model defined at the board level, i.e. the dependent variable is whether the new director was referred or not by the board as a whole and not by a specific board member.

acteristics¹⁶ and variable Z_{ijkt} controls for the dyad's type, i.e. whether it is a dyad with the CEO, with another insider, with someone on the nomination committee, or with another independent director¹⁷. As before, δ_i , η_j , and θ_t are individual, firm and time fixed effects.

¹⁶Director i 's characteristics include age and age squared, number of years as an executive, average number of years on listed boards, number of listed boards, number of current listed boards and busy, financial expert and industry expert dummies. Director k 's characteristics include age and age squared, number of years as an executive, average number of years on listed boards and total number of listed boards. See Table 14 for more precise definitions of these variables.

¹⁷Table 23 in the Appendix shows results of a dyadic estimation on all possible dyads between any new director and all board members of the appointing firm. Results are roughly similar, even though one coefficient is significant only at the 10% level. I report in the main text results on the four dyads specification because measurement errors are likely to be larger in the all dyads specification. As I do not know the specific board member who provided the job referral - and only to which group she belongs (CEO, nomination committee, another executive or another independent director), I attributed the job referral to all nomination committee members when the nomination committee was said to have done the job referral (and similarly for the other groups on the board).

Table 10: Do social ties lead to job referrals?

	Dependent variable: Referred	
	I	II
Any Social Tie	0.0900*** (0.0175)	
Prof. (Listed) Tie		0.0951*** (0.0207)
Prof. (Private) Tie		0.0521 (0.0323)
Educ. Tie		0.0568 (0.0622)
Army Tie		-0.0702 (0.106)
Leisure Tie		0.106 (0.117)
Dyadic relation with CEO	0.0529*** (0.00643)	0.0531*** (0.00642)
Dyadic relation with Nomin. Com.	0.405*** (0.0105)	0.405*** (0.0105)
Dyadic relation with another Indep. Dir.	0.113*** (0.00821)	0.113*** (0.00820)
Controls, Director and Firm FE	Yes	Yes
Observations	17016	17016

Dyadic estimation with robust standard errors in parentheses, clustered at the director level. Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Controls include age, age squared, total years as an executive, average number of years on listed boards, total number of listed boards, total number of current listed boards and busy, financial and industry expert dummies for new directors; age, age squared, total years as an executive, average number of years on listed boards and total number of listed boards for already sitting directors; and year dummies.

Table 10 displays evidence in line with previous t-tests: sharing a social tie with a board member is positively associated with being referred by that particular board member. In particular, the important social ties are the professional (listed) ones: having previously worked in a listed company

with a current board member increases the chances of being referred by that specific board member by 9.5 percentage point. Other types of social ties do not have impact on the probability to be referred. These results seem to be in line with the scarce evidence on how directors are selected. In in-depth interviews with Australian non-executive directors, Elms et al. (2015) highlight two important selection criteria: the skills complementarity of the candidate and the group-fit with the board. While the first criteria might be available from candidates' CV, the second criteria is clearly more difficult to assess without extra information. Board members sharing social ties with candidates through previous working history in listed companies are in a better position to evaluate and provide information on this second criteria.

Kramarz and Thesmar (2013) investigate similar questions on French directors' appointments. They show the prevalence and detrimental effects of education networks. However, they do not have extensive information on other types of networks as I do. Moreover, the French setting greatly differs from the US setting I investigate here: first, the French elite schooling system is very specific and cannot be directly compared with the US schooling system and second, governance structures are very different between continental Europe and Anglo-Saxon countries, leading to different incentives in board composition. However, Cai et al. (2017), who use similar data from BoardEx although for a longer period, find results in line with mine: over 75% of the appointed directors share a professional tie with the board and they find evidence for a coordination hypothesis, namely that firms in greater need of board coordination are more likely to appoint connected directors.

Other papers in the literature showing evidence of the workings of other types of social ties (for instance, Beaman and Magruder (2012) on family ties, Bandiera et al. (2009) on ethnic ties) focus on very different types of jobs (task in a laboratory experiment in India, job in a fruit picking division of a UK soft fruit producer). Therefore, it could be argued that types of social ties are playing differently depending on the type of job. For the type of job investigated in the paper, where experience and "managing style" importantly matter, professional networks are more likely to bring valuable information than other social networks. However, even if professional ties are important for board referrals and seem more likely to bring valuable information on candidates, do job referrals help selecting "good" candidates or just allow favoritism to take place and a chain of reciprocal favors?

6 Job referrals are valuable for recruitment

I investigate here whether job referrals are valuable for recruitment and, in particular, whether they help firms screening workers of high ability. To estimate workers' ability, I use an idea first developed by Bertrand and Schoar (2003) for top managers and implemented for directors - as in my case - by Cavaco et al. (2017). In their paper, Bertrand and Schoar want to understand whether managers have styles i.e. whether different managers would run a same firm differently. To that aim, they run firm performance equation regressions with firm fixed effects, time-varying firm characteristics and manager fixed effects. For managers changing firm over time, they are able to recover their fixed effects - a proxy for their style. However, managers changing firms - movers - are very likely to be different compared to managers staying in the same firm for their whole career - stayers. Moreover, manager fixed effects cannot be recovered for stayers (separately from firm fixed effects) and therefore, no information on their style is available. Cavaco et al. (2017), who focus instead on directors and not only on top managers, use a technique developed by Abowd et al. (1999) (hereafter AKM) to recover director fixed effects for movers and (a substantial group of) stayers. In their paper, Abowd et al. (1999) show that director fixed effects can be recovered for all individuals working for connected firms. Connected firms are firms who share directors. Directors are shared by companies when they move from one firm to another or when they contemporaneously sit on the boards of different firms, therefore connecting them. For any given group of connected companies, one can recover director fixed effects for all individuals who have ever worked in these firms: movers and stayers.

I make use again here of the whole career history of directors, available from their CV. I keep all directors from the BoardEx database and not only the directors in my analysis sample i.e. those appointed between 2004 and 2008. Because directors do change firm over time (on average, directors have worked for 9.67 firms from the beginning of their career and until 2014) and because they usually hold several directorships in each year (on average, directors sit on 1.24 boards in each year), I am able to separately identify director fixed effects from firm fixed effects for most of the directors in my analysis sample (out of 4279 directors for whom I have social networks and job referrals information, I estimate 4254 director fixed effects¹⁸) using the AKM framework. I use the estimated director fixed effects as a proxy for the part

¹⁸The 25 directors without fixed effects are directors who sat on one board in one year and their fixed effects cannot be disentangled from the error term.

of their ability non observable in their CV by the hiring firm but potentially communicated to the firm by the referrer. For each estimated director fixed effects, I use the set of firms in which the individual has previously worked as a director (as an insider or outsider)¹⁹. I run firm performance equation regressions on time-varying director and firm characteristics, time dummies and firm and director fixed effects. Specifically, I estimate the following model:

$$Y_{jt} = \alpha + X_{it}\beta + Z_{jt}\gamma + \delta_i + \eta_j + \theta_t + \epsilon_{ijt} \quad (3)$$

where the dependent variable Y_{jt} is firm j performance at time t , the independent variables X_{it} and Z_{jt} capture time-varying director and firm characteristics²⁰, and δ_i , η_j and θ_t are director, firm and time fixed effects. As in Cavaco et al. (2017), director fixed effects are normalized - i.e. their sum is zero - such that no director fixed effect is used as a reference to which other director fixed effects depend upon for interpretation. I also compute robust standard errors, clustered at the firm-year level, given that I use multiple firm-year observations in the estimation. I finally exclude observations for directors observed only one period of time in one firm; for these directors, their fixed effects cannot be disentangled from the error term (this occurs in 0.5% of the sample and corresponds to 3708 directors).

To evaluate whether referrals help select talented workers, I compare abilities of referred directors and non referred directors. Assume that director abilities are normally distributed. If employees refer high ability directors, we should observe a distribution of referred directors that strictly dominates the distribution of non-referred directors (screening view). On the contrary, if employees refer “friends”, i.e. their referrals are not based on director abilities, the distribution of referred directors should be the same or even be strictly dominated (if these directors are of low ability) by the distribution

¹⁹Therefore, for the same director appointed at two different periods in time in my sample, say in firm A first and in firm B second, the two estimated director fixed effects used as proxies for director’s ability are different; the estimated director fixed effect for the appointment in firm B carries the extra information from her sitting on the board of firm A, while the estimated director fixed effect for the appointment in firm A does not.

²⁰Time-varying director characteristics include logs of age and age squared, of time on boards and time on board squared, of number of current listed boards, of number of total listed boards, executive, independent, busy, financial expert, industry expert, audit, compensation and nomination committee memberships dummies. Time-varying board characteristics include logs of board size, of average tenure on board, of audit, compensation and nomination committee sizes, proportions of insider, independent, busy and women on board, an executive chairman dummy. Time-varying firm characteristics include size, leverage, risk, growth opportunities. See Table 14 for more precise definitions of these variables.

of non-referred directors (favoritism view). A positive correlation between directors abilities and referred status therefore suggests that referrals help screening high ability workers. I first present evidence from t-tests and then estimate a more formal model.

Table 11: Director's ability by referral and social tie (t-tests)

	Ref. Board	Ref. CEO	Ref. Other Insider	Ref. Nomin. Com.	Ref. Indep. Dir.	Ref. Exec.	Ref. Non Exec.
Diff.	-0.00233* (-2.06)	0.000796 (0.47)	0.00601* (2.40)	-0.00232* (-2.29)	-0.000411 (-0.31)	0.00219 (1.46)	-0.00259* (-2.48)
Ref = 0	-0.00323	-0.00146	-0.00129	-0.00261	-0.00161	-0.00126	-0.00317
Ref = 1	-0.00091	-0.00226	-0.00730	-0.00029	-0.00120	-0.00345	-0.00058
N	4254	4254	4254	4254	4254	4254	4254

	Tie Board	Tie CEO	Tie Other Insider	Tie Nomin. Com.	Tie Indep. Dir.	Tie Exec.	Tie Non Exec.
Diff.	-0.000663 (-0.61)	-0.00241 (-1.42)	-0.00106 (-0.38)	-0.000394 (-0.27)	0.000325 (0.25)	-0.00140 (-0.88)	-0.000310 (-0.27)
Tie = 0	-0.00175	-0.00178	-0.00158	-0.00160	-0.00148	-0.00170	-0.00162
Tie = 1	-0.00108	0.00064	-0.00052	-0.00120	-0.00181	-0.00030	-0.00131
N	4254	4254	4254	4254	4254	4254	4254

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11 shows that referred directors' ability (proxied by the estimated fixed effect) is significantly higher than non-referred directors' ability. In other words, the board recommends new directors of larger ability compared to new directors recommended by shareholders or by executive search firms. When we further consider who on the board provides the referral, it appears that CEOs do not recommend higher or lower ability directors but other insiders do recommend directors of lower ability and the nomination committee and the other independent directors on the board do recommend directors of higher ability. When t-tests are replicated using social ties instead of job referrals, there are no significant differences in ability between connected directors and non connected directors. In other words, social networks information is not perfectly correlated with job referrals information and social networks information alone is not sufficient to discriminate between high and low productivity individuals, while job referrals information is.

I then run a regression of directors' abilities on a referral dummy together with time-invariant observable director characteristics to capture the extent to which referrals provide additional information on directors' abilities beyond the ones written in the CV and accessible to the firm. Such time-invariant individual characteristics are somehow included in the director fixed effects in firm performance equations and I therefore take them out here. Formally, I estimate the following model:

$$DirectorFE_i = \alpha + \beta JobReferrals_{ij} + X_i\gamma + \epsilon_i \quad (4)$$

where the dependent variable $DirectorFE_i$ is director i 's fixed effect estimated from the previous firm performance equation and the dependent variable $JobReferrals_{ij}$ is a dummy variable being 1 if director i got referred for the board position in firm j and 0 otherwise. As before, I vary the definition of this variable to investigate the impact of referrals from different individuals on the board (by the CEO, another insider, the nomination committee or another independent director). The variables X_i control for director time-invariant characteristics that might affect directors' ability such as gender, a MBA degree and having studied in an IVY League university. Because the outcome variable is estimated, I bootstrap standard errors with 100 replications.

Table 12: Are referred directors of higher ability?

	Dependent variable: (log of) Director Ability		
	I	II	III
Board Referral	0.00188*		
	(0.00110)		
Exec. Referral		-0.00159	
		(0.00160)	
Non Exec. Referral		0.00196*	
		(0.00105)	
CEO Referral			0.000752
			(0.00171)
Other Exec. Referral			-0.00619*
			(0.00344)
Nomin. Com. Referral			0.00226*
			(0.00117)
Other Indep. Dir. Referral			0.00163
			(0.00135)
Female	0.00164	0.00162	0.00171
	(0.00122)	(0.00123)	(0.00125)
MBA	-0.00188*	-0.00193*	-0.00197*
	(0.00102)	(0.00102)	(0.00102)
IVY league	-0.000618	-0.000612	-0.000711
	(0.00170)	(0.00171)	(0.00170)
Year dummies	Yes	Yes	Yes
Observations	4254	4254	4254

OLS estimation with bootstrapped standard errors in parentheses. Statistical significance levels: * $p < 0.10$, ** $p < 0.05$,

*** $p < 0.01$

Table 13: Are connected directors of higher ability?

	Dependent variable: (log of) Director Ability		
	I	II	III
Tie to the Board	0.000902 (0.00102)		
Tie to Exec. Dir.		0.00108 (0.00178)	
Tie to Non Exec. Dir.		0.000343 (0.00103)	
Tie to the CEO			0.00248 (0.00199)
Tie to the Nomin. Committee			-0.0000250 (0.00122)
Tie to another Exec. Dir.			-0.000512 (0.00398)
Tie to another Indep. Dir.			-0.000485 (0.00140)
Female	0.00164 (0.00123)	0.00164 (0.00123)	0.00163 (0.00123)
MBA	-0.00205** (0.00102)	-0.00203** (0.00102)	-0.00200** (0.00102)
IVY league	-0.000630 (0.00168)	-0.000629 (0.00168)	-0.000641 (0.00169)
Observations	4254	4254	4254

OLS estimation with bootstrapped standard errors in parentheses. Statistical significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Consistently with the t-tests results, regressions results similarly show that referred directors are of higher ability compared to non referred directors: referred directors are 0.19% more “talented” than non referred directors (at the 10% level). The effect comes from referrals from non executive board members, which is in line with the previous results, and in particular from members of the nomination committee. It seems that referrals from executives other than the CEO, refer less able directors. Holding a MBA degree

seems negatively related to ability, as I measure it. Running the same regression with social ties as independent variables instead of referrals ones, does not show any significant impact of social ties on directors' ability. In other words, connected new directors seem not to be of larger ability compared to unconnected new ones. In line with the previous results, social network information alone is not enough to discriminate between high and low productive workers.

7 Conclusion

Job referrals are disproportionately used in the labor market and have important economic impacts for both firms and workers. Yet, a large part of the literature relies on social network data, rather than actual job referrals, to investigate the causes and consequences of the use of this informal search method. This paper crosses data on both social networks of various types and job referrals to understand better which social networks matter for obtaining referrals and jobs. I find that professional networks - the set of previous colleagues - matter the most for both obtaining job referrals and be hired in high-skill positions, where implicit knowledge and fit with the team are important determinant of productivity. Given that other research has shown the importance of family, neighbors or ethnic ties on different types of jobs, my work suggests that different social networks matter for different jobs.

Understanding why firms use job referrals, to select suitable candidates or by favoritism, further help explain whether it is pervasive for the economy or not, in terms of firm performance and systematic exclusion of unconnected "good" workers. This paper contributes to the empirical evidence that job referrals provide signals on workers' quality beyond the one that can be inferred from the CV (Simon and Warner, 1992; Beaman and Magruder, 2012; Dustmann et al., 2016; Hensvik and Skans, 2016; Pallais and Sands, 2016). Job referrals in my setting also are likely to convey information on the match quality. Further research should investigate this aspect, to contribute to the labor market but also corporate governance literatures.

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Appendix

Table 14: Control Variables

Variables	Description
<u>Director Controls</u>	
Female dummy	1 if the director is female and 0 otherwise
MBA dummy	1 if the director holds an MBA degree and 0 otherwise
IVY League dummy	1 if the director graduated from an IVY League university and 0 otherwise
Age	Director's age in years
Number of boards to date	Number of listed boards on which the director has sat to date
Number of current boards	Number of listed boards on which the director is sitting
Busy director dummy	1 if the director is sitting on more than two listed boards and 0 otherwise
Average number of years on boards	Average number of years spent on listed boards
Number of years as executive	Number of years spent as an executive
Industry expert dummy	1 if the director has already worked in the same industry by the past and 0 otherwise
Financial expert dummy	1 if the director has worked in the finance sector by the past and/or if he holds a financial degree and 0 otherwise
<u>Firm Controls</u>	
Board size	Number of directors on board
Proportion of executives	Proportion of executives on board
Proportion of independent directors	Proportion of independent directors on board
Proportion of busy directors	Proportion of busy directors on board
Proportion of women	Proportion of women on board
Executive chairman dummy	Executive Chairman on board
Average board tenure	Average board tenure over all directors on board
Nomination committee size	Number of directors on the nomination committee
Firm performance	Return on assets, excluding extreme 1% percentile
Firm risk	Variance of return on assets over the last five years
Firm size	Log of market value of equity
Firm leverage	Total debt over total equity
Firm growth opportunities	Market-to-book ratio
Sector dummies	Sectors categorized at the one-digit level

Table 15: Which social ties affect board appointments?

	Dependent variable: Appointed by the Board	
	Selected Candidates	Random Candidates
Prof. (Listed) Tie - CEO	0.197*** (0.0360)	0.178 (0.107)
Prof. (Listed) Tie - Nomin. Com.	0.188*** (0.0238)	0.152 (0.0782)
Prof. (Listed) Tie - Other Exec.	0.0680 (0.0567)	0.139 (0.176)
Prof. (Listed) Tie - Other Indep. Dir.	0.204*** (0.0238)	0.216** (0.0722)
Prof. (Private) Tie - CEO	0.244** (0.0918)	0.395 (0.245)
Prof. (Private) Tie - Nomin. Com.	0.242*** (0.0535)	0.159 (0.142)
Prof. (Private) Tie - Other Exec.	0.197* (0.0911)	0.144 (0.247)
Prof. (Private) Tie - Other Indep. Dir.	0.264*** (0.0474)	0.202 (0.130)
Educ. Tie - CEO	0.248** (0.0878)	-0.0330 (0.417)
Educ. Tie - Nomin. Com.	0.0668 (0.0347)	0.209 (0.186)
Educ. Tie - Other Exec.	0.0104 (0.0999)	-0.142 (0.484)
Educ. Tie - Other Indep. Dir.	0.0375 (0.0300)	0.199 (0.147)
Army Tie - CEO	0.359* (0.161)	0.678 (0.359)
Army Tie - Nomin. Com.	0.0558 (0.0696)	0.0224 (0.262)
Army Tie - Other Exec.	0.387 (0.364)	0.105 (0.158)
Army Tie - Other Indep. Dir.	0.0787 (0.0479)	0.113 (0.155)
Leisure Act. Tie - CEO	0.0865 (0.204)	-0.101 (0.354)
Leisure Act. Tie - Nomin. Com.	0.313** (0.113)	0.332 (0.181)
Leisure Act. Tie - Other Indep. Dir.	0.292* (0.141)	0.350 (0.374)
Controls, director and firm FE	Yes	Yes
Observations	37 42540	42540

Robust standard errors in parentheses, clustered at the firm level. Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Director controls include age, age squared, number of years as an executive, average years on listed boards, number of listed boards. Firm controls include firm size, risk, leverage and performance, number of directors on board, proportions of executives, independent directors, busy directors and women on board, average board tenure, nomination committee size, executive chairman dummy. Remaining controls include all interactions of director and firm controls and year dummies.

Table 16: Social Ties and Job Referrals by the CEO (t-tests)

	Referred by the CEO		Diff.	Std. Error	Obs.
	Ref = 1	Ref = 0			
Any Social Tie	0.2109	0.0856	-0.1253***	0.0151	4254
Prof. (Listed) Tie	0.1730	0.0652	-0.1077***	0.0135	4254
Prof. (Private) Tie	0.0379	0.0164	-0.0215**	0.0069	4254
Educ. Tie	0.0071	0.0065	-0.0006	0.0041	4254
Army Tie	0.0024	0.0021	-0.0003	0.0024	4254
Leisure Act. Tie	0.0071	0.0026	-0.0045	0.0028	4254

Statistical significance levels: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 17: Social Ties and Job Referrals by the Nomination Committee (t-tests)

	Referred by the Nomin. Com.		Diff.	Std. Error	Obs.
	Ref = 1	Ref = 0			
Any Social Tie	0.1638	0.1291	-0.0346**	0.0108	4254
Prof. (Listed) Tie	0.1279	0.0970	-0.0310**	0.0097	4254
Prof. (Private) Tie	0.0379	0.0278	-0.0100	0.0054	4254
Educ. Tie	0.0087	0.0065	-0.0022	0.0027	4254
Army Tie	0.0031	0.0057	0.0026	0.0021	4254
Leisure Act. Tie	0.0041	0.0043	0.0003	0.0020	4254

Statistical significance levels: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 18: Social Ties and Job Referrals by another Executive (t-tests)

	Referred by another Exec.		Diff.	Std. Error	Obs.
	Ref = 1	Ref = 0			
Any Social Tie	0.0667	0.0317	-0.0350*	0.0136	4254
Prof. (Listed) Tie	0.0611	0.0253	-0.0358**	0.0123	4254
Prof. (Private) Tie	0.0167	0.0086	-0.0081	0.0072	4254
Educ. Tie	0.0000	0.0012	0.0012	0.0026	4254
Army Tie	0.0000	0.0002	0.0002	0.0012	4254
Leisure Act. Tie	0.0000	0.0000	0.0000	0.0000	4254

Statistical significance levels: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 19: Social Ties and Job Referrals by another Independent Director (t-tests)

	Referred by another Indep. Dir.		Diff.	Std. Error	Obs.
	Ref = 1	Ref = 0			
Any Social Tie	0.2393	0.1681	-0.0712***	0.0156	4254
Prof. (Listed) Tie	0.1747	0.1284	-0.0463***	0.0140	4254
Prof. (Private) Tie	0.0591	0.0465	-0.0126	0.0088	4254
Educ. Tie	0.0220	0.0102	-0.0118**	0.0045	4254
Army Tie	0.0069	0.0054	-0.0015	0.0031	4254
Leisure Act. Tie	0.0096	0.0031	-0.0065*	0.0026	4254

Statistical significance levels: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 20: Which social ties matter for job referrals?

	Dependent variable: Referred by the Board			
	I	II	III	IV
Tie to the Board	0.100*			
	(0.0456)			
Prof. (Listed) Tie		0.133**		
		(0.0446)		
Prof. (Private) Tie		0.0404		
		(0.0704)		
Educ. Tie		0.124		
		(0.106)		
Army Tie		-0.0807		
		(0.139)		
Leisure Act. Tie		-0.0121		
		(0.149)		
Tie with Exec. Dir.			0.0416	
			(0.0631)	
Tie with Non Exec. Dir.			0.0944*	
			(0.0448)	
Tie with the CEO				0.0288
				(0.0708)
Tie with another Exec. Dir.				-0.00832
				(0.107)
Tie with the Nomin. Committee				0.0283
				(0.0508)
Tie with another Indep. Dir.				0.135**
				(0.0498)
Director and firm controls, Director FE	Yes	Yes	Yes	Yes
Observations	4254	4254	4254	4254

OLS estimation with director FE, robust standard errors in parentheses. Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Director controls include log of age, log of age squared, log of number of boards to date, log of number of current boards, busy director dummy, log of average number of years on board, log of number of years as an executive, industry expert and finance expert dummies. Firm controls include log of board size, proportion of executive, independent, busy and women directors on boards, executive chairman dummy, log of average board tenure, log of nomination committee size, firm performance, risk, size, leverage and growth opportunities, sector and year dummies.

Table 21: The impact of professional ties from listed firms on job referrals

	Dependent variable: Referred by the Board			
	I	II	III	IV
Prof. (Listed) Tie	0.134** (0.0442)	0.113* (0.0520)		
Nb of Dir. connected to		0.00905 (0.0124)		
Prof. (Listed) Tie with Exec. Dir.			0.0734 (0.0652)	
Prof. (Listed) Tie with Non Exec. Dir.			0.112* (0.0451)	
Prof. (Listed) Tie with the CEO				0.0630 (0.0758)
Prof. (Listed) Tie with another Exec. Dir.				0.00772 (0.119)
Prof. (Listed) Tie with the Nomin. Com.				0.0467 (0.0586)
Prof. (Listed) Tie with another Indep. Dir.				0.124* (0.0541)
Director and Firm Controls, Director FE	Yes	Yes	Yes	Yes
Observations	4254	4254	4254	4254

OLS estimation with director FE, robust standard errors in parentheses. Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Director controls include log of age, log of age squared, log of number of boards to date, log of number of current boards, busy director dummy, log of average number of years on board, log of number of years as an executive, industry expert and finance expert dummies. Firm controls include log of board size, proportion of executive, independent, busy and women directors on boards, executive chairman dummy, log of average board tenure, log of nomination committee size, firm performance, risk, size, leverage and growth opportunities, sector and year dummies.

Table 22: Which type of social ties to whom matter for job referrals?

		Dependent variable: Referred by the Board	
		I	II
Prof. (Listed) Tie with Exec. Dir.		0.0813	(0.0676)
Prof. (Private) Tie with Exec. Dir.		-0.157	(0.168)
Educ. Tie with Exec. Dir.		0.371*	(0.168)
Army Tie with Exec. Dir.		0.147	(0.236)
Leisure Act. Tie with Exec. Dir.		-0.239	(0.165)
Prof. (Listed) Tie with Non Exec. Dir.		0.104*	(0.0459)
Prof. (Private) Tie with Non Exec. Dir.		0.0988	(0.0696)
Educ. Tie with Non Exec. Dir.		0.0348	(0.105)
Army Tie with Non Exec. Dir.		-0.0838	(0.141)
Leisure Act. Tie with Non Exec. Dir.		0.0491	(0.165)
Prof. (Listed) Tie with the CEO		0.0941	(0.0729)
Prof. (Private) Tie with the CEO		-0.295	(0.235)
Educ. Tie with the CEO		0.364*	(0.169)
Army Tie with the CEO		0.219	(0.186)
Leisure Act. Tie with the CEO		-0.290	(0.201)
Prof. (Listed) Tie with another Indep. Dir.		0.112*	(0.0551)
Prof. (Private) Tie with another Indep. Dir.		0.135	(0.101)
Educ. Tie with another Indep. Dir.		0.178	(0.135)
Army Tie with another Indep. Dir.		-0.0722	(0.172)
Leisure Act. Tie with another Indep. Dir.		0.0770	(0.162)
Director and firm controls and director FE	Yes	Yes	Yes
Observations		4254	4254

OLS estimation with director FE, robust standard errors in parentheses. Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Director controls include log of age, log of age squared, log of number of boards to date, log of number of current boards, busy director dummy, log of average number of years on board, log of number of years as an executive, industry expert and finance expert dummies. Firm controls include log of board size, proportion of executive, independent, busy and women directors on boards, executive chairman dummy, log of average board tenure, log of nomination committee size, firm performance, risk, size, leverage and growth opportunities, sector and year dummies

Table 23: Do social ties lead to job referrals? Dyadic regressions - all dyads

	Dependent variable: Referred	
	I	II
Any Social tie	0.0225** (0.0112)	
Prof. (Listed) Tie		0.0230* (0.0135)
Prof. (Private) Tie		0.0193 (0.0209)
Educ. Tie		0.0447 (0.0426)
Army Tie		-0.0194 (0.0609)
Leisure Act. Tie		-0.0358 (0.0639)
Dyadic relation with CEO	0.232** (0.0906)	0.232** (0.0908)
Dyadic relation with Nomin. Com.	0.596*** (0.0909)	0.595*** (0.0911)
Dyadic relation with another Indep. Dir.	0.324*** (0.0911)	0.323*** (0.0913)
Controls, Director and Firm FE	Yes	Yes
Observations	40780	40780

Dyadic estimation with robust standard errors in parentheses, clustered at the director level. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Controls include age, age squared, total years as an executive, average number of years on listed boards, total number of listed boards, total number of current listed boards and busy, financial and industry expert dummies for new directors; age, age squared, total years as an executive, average number of years on listed boards and total number of listed boards for already sitting directors; and year dummies.