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Differential Impact of Directors' Social and Financial Capital on Corporate Interlock Formation

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Chapter 20

Differential Impact of Directors' Social and Financial Capital on Corporate Interlock Formation

Nicholas Harrigan and Matthew Bond

20.1 Bipartite Society: The Individual and the Group

The interdependence of the individual and the organization is an enduring theme in sociological thought. Cooley wrote that "man may be regarded as the point of intersection of an indefinite number of circles representing social groups, having as many arcs passing through him as there are groups" (1902/1964, 148). Simmel (1955) captured the tension between the individual and the organization when he defined two types of group affiliation: "organic membership," where the organization is not chosen by the individual as an expression of his or her traits (e.g., as in the case of the family), and "rational membership," where the organization is chosen as a conscious expression of the individual's traits. For Simmel, the most important outcome of an individual's affiliation to an organization was the constraint and socialization of the individual; an individual, he laments, "is determined sociologically in the sense that groups 'intersect' in his person by virtue of his affiliations with them" (150).

Social network analysis has developed a distinctive and highly systematic set of methods for representation, measurement, and (more recently) modeling of this interdependence called, variously, "membership networks," "affiliation networks," "bipartite networks," and "two-mode networks" (Breiger, 1974; Robins & Alexander, 2004; Wang, Sharpe, Robins, & Pattison, 2009). The advantage of bipartite networks is that they preserve the dualistic structure of organization–individual relations, representing the network as ties between a set of individuals and a set of organizations. They avoid simplifying the relationships into the one-mode form of either a network of individuals or a network of organizations (see Chapter 10, Section 10.2, for more on bipartite networks).

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Corporate interlocks have been one of the most studied affiliation networks in sociology (Domhoff, 1967, 1970, 1978, 1998, 2009; Domhoff & Dye, 1987; Dooley, 1969; Emerson, 1962; Fitch & Oppenheimer, 1970; Koenig, Gogel, & Sonquist, 1979; Levine, 1972; Mace, 1971; Mills, 1956; Mintz & Schwartz, 1985; Mizruchi, 1982; Ornstein, 1984; Pfeffer & Salancik, 1978; Scott, 1997; Scott & Griff, 1984; Stearns & Mizruchi, 1986; Sweezy, 1953; Useem, 1984; Zeitlin, 1974; Zweigenhaft & Domhoff, 2006). Corporate interlocks are formed by the affiliation of directors of corporations to corporate boards of governance. The popularity of the study of corporate interlock networks stems from the data's public nature and therefore its relative accessibility, and the importance of these networks of the governing boards of the largest economic actors in the private economy.

20.1.1 Director Capital and Interlock Formation

This chapter models an Australian corporate interlock data set with a bipartite exponential random graph model (ERGM) (see Chapter 10) using the BPNet software, a version of the PNet software (Wang, Robins, & Pattison, 2009) for bipartite data. By using bipartite modeling, we are able to directly examine the interdependence long talked about in the sociological literature. That is, we are able to study social tie formation (corporate interlocks) as a function of (1) the individuals' attributes (directors), (2) the groups' attributes (corporations), (3) the interaction of individual and group attributes, and (4) purely structural network effects (social ties that form without reference to actor attributes).

Our primary substantive objective is to study the effects of director characteristics on the pattern of corporate interlock formation. In particular, we are interested in the effects of three types of corporate director power on the formation of corporate interlocks: (1) physical or financial capital (i.e., wealth), (2) membership of exclusive businessmen's clubs, and (3) attendance at elite private schools.

Traditional elite and corporate interlock studies have tended to emphasize the unifying role of director social capital and the convergence of the many dimensions of director, corporate, social, and economic power at the apex of the corporate community. We argue that there is considerable differentiation in the purpose and effects of the many different forms of social and economic power within the corporate community. In particular, we argue that the alienability of the benefits of physical capital (Coleman, 1990/1994) leads owners to place relatively low emphasis on their own social capital (e.g., interlocks). We also argue that businessmen's clubs and elite private schools, traditionally viewed as markers of upper-class membership and facilitators of corporate unity, play different roles within the Australian corporate community: we hypothesize

that businessmen's clubs are bonding social capital (Putnam, 2000, 22–24) closer to in-group social capital, binding those corporations with common interests and identities, whereas private schools act as bridging social capital, providing between-group social capital, drawing together the disparate parts of the corporate community, with little differentiation on the basis of interests and identities of corporate groups united by private school ties.

In addition, we make three methodological contributions. First, we demonstrate that there are purely structural network effects that operate on corporate interlocks, independent of the economic, political, and sociological attributes of directors and corporations. In this, we are looking for effects similar to the one-mode effects we call "path closure" (Robins, Pattison, & Wang, 2009) or "transitivity" (Granovetter, 1973; Holland & Leinhardt, 1976; Watts & Strogatz, 1998), and other effects such as "popularity" (Barabasi & Albert, 1999; Frank & Strauss, 1986; Wasserman & Pattison, 1996), in which ties form purely in response to the pattern of ties that comprise the local neighborhood. In the case of bipartite networks, we expect to find effects such as a tendency for 3-paths (L3) to close and become 4-cycles (C4), and a tendency for popular directors to become more popular (modeled with star configurations of various sizes). Second, we demonstrate the added benefits, both in terms of model fit and sociological explanatory power, of introducing director and corporation attributes into bipartite modeling. We model the effects of corporate attributes such as political donations, public listing, foreign ownership, regulated industries, and turnover. We model the effect of director attributes such as individual wealth, members of businessmen's clubs, and education at elite private schools. Finally, we explore the benefit of the inclusion of interaction effects for the increased or decreased likelihood of directorship formation between particular types of directors and corporations.

20.2 Data and Measures

20.2.1 Social Network Data

The data comprise a network of directors and corporations collected by Harrigan (2008). It is the network of the largest 248 corporations (as measured by revenue) in Australia in February 2006. It includes publicly listed and private corporations, as well as Australian and foreign-owned corporations. There are 1,251 directors, who hold a total of 1,464 directorships. Data on corporations and directors were obtained from IBISWorld (2006), the company that compiles the yearly *Business Review Weekly*'s "Top 2000 Enterprises."[1]

[1] The authors want to express their gratitude to IBISWorld and Crown Content for their provision, respectively, of the "Top 2000 Enterprises" and the "Who's Who" databases.

20.2.2 Actor-Relation Measures

Corporations have six binary attributes. Company size is a binary variable that divides the corporations into two equal groups: the largest 124 corporations and the smallest 124 corporations, as measured by revenue. Revenue data were also provided by IBISWorld. Corporations have two (mutually exclusive) binary donation variables: "donate to both major parties" (an indicator of moderate political activity) and "donate to conservatives only" (indicating donations to either the National Party or the Liberal Party – the two major conservative parties that are typically in coalition). Political donation data were downloaded from the Australian Electoral Commission (AEC; 2006) Web site. Companies that were publicly listed corporations were coded by the variable "public" ("1" indicates that the company was listed on the stock exchange). Australian ownership (=1) or foreign ownership (=0) was coded by the variable "Australian." As an indicator of interest in and interaction with the political process of the state, firms were classified as to whether they were located in "highly regulated industries." The regulated industries were coded using Burris's (1987) classification and matched against the two-digit Standard Industry Codes in the IBISWorld data set. "Regulated industries" can be thought of as comprising four categories: transport (road, rail, and air), communication, utilities (water, gas, and electricity), and banking and insurance.[2]

Individual directors have three binary attributes: director wealth (or, more accurately, "superwealth" = 1), attendance at an exclusive private school (=1), and membership of an exclusive establishment gentlemen's club (=1). Previous studies suggest that wealth, especially old wealth, may lead to political conservatism (Bond, 2003, 2004; Bond, Glouharova, & Harrigan, 2010; Burris, 2000). Directors are classified as "superwealthy" (=1) if they were listed in the *Business Review Weekly*'s (2005) "Rich 200" list. In Australia, data were obtained from the social directories "Who's Who in Australia" and "Who's Who in Australian Business" (Crown Content, 2005a, 2005b). The majority (59.1%) of the Australian directors had an entry in "Who's Who." This sample compares favorably to previous studies, for example, 33.7% of Useem's (1984) UK sample and 30.3% of Bond's (2007) UK sample were found in directories.

"School" was defined as attendance at one of 17 exclusive private schools.[3] This list was obtained by comparing the 3,000 secondary

[2] Industries classified as highly regulated were air and space transport, communication services, electricity and gas supply, finance, insurance, other transport, rail transport, road transport, services to finance and insurance, services to transport, water supply, sewerage and drainage services, and water transport.

[3] These exclusive private schools include Anglican Church Grammar School (QLD), Brisbane Boys College (QLD), Brisbane Grammar School (QLD), Geelong Grammar School (VIC), Melbourne Grammar School (VIC), Scotch College (VIC), Wesley College (VIC),

schools in Australia on a range of socioeconomic and status measures, including the socioeconomic status of parents, school fees, listing in "Who's Who," and the percentage of ex-students who were members of the exclusive businessmen's clubs. In Australia, "clubs" were defined as a list of eleven prominent businessmen's clubs.[4] This list was identified through the use of secondary sources such as studies of upper-class clubs, reciprocal membership arrangements, and membership procedures.

Summary statistics for the attributes and derived attribute interaction effects are provided in Table 20.1. All variables are binary. We provide a count of corporations/directors/directorships with each attribute (column 1). To provide a baseline value (expected value) for interaction effects, we calculate the number of directorships that would occur if directorships arose from the random assortment of ties between corporations and directors. The second column (percentage of total corporations/directors/expected directorships) divides the first column by the total number of corporations (248), directors (1,251), or directorships (1,464), respectively. Column 3 is a count of the total observed directorships for this attribute–attribute interaction. Column 4 is column 3 divided by the total number of directorships (1,464). Column 5 "over-representation" is percent directorships (column 4) divided by column 2: a value greater than one indicates that directors/corporations/director–corporation interactions have more directorships than would be expected given a random assortment of directorships. Column 6 indicates whether the over- or underrepresentation is statistically significant (using a chi-square test on the 2×2 matrix of the expected and realized number of directorships).

20.2.3 Analyses

The analyses in this chapter begin with a brief discussion of the bivariate analysis presented in Table 20.1, attempting to show what can be achieved with cross-tabulation and establishing a baseline against which to judge the added utility of more complex modeling, in particular, the bipartite ERGM. The remainder of the chapter uses the bipartite social selection model presented in Chapter 10.

Xavier College (VIC), Knox Grammar School (NSW), St. Ignatius' College, Senior School (NSW), Sydney Church of England Grammar School (NSW), Sydney Grammar School (NSW), The King's School (NSW), Aquinas College (WA), Scotch College (WA), Hale School (WA), and Collegiate School of St Peter (SA).

[4] These prominent businessmen's clubs include Athenaeum (VIC), Australian (VIC), Melbourne (VIC), Australian (NSW), Union (NSW), Brisbane (QLD), Weld (WA), Adelaide (SA), Tasmanian (TAS), Launceston (TAS), and Elanora (NSW).

Table 20.1. *Summary statistics for attributes and attribute interactions*

corporation attributes	(1) count corporations	(2) % corporations	(3) count directorships	(4) % directorships	(5) over-representation	(6) sign. (chi-square test)
Conservative	10	4.0	47	3.2	0.80	
Bipartisan	45	18.1	346	23.6	1.30	***
Australian	144	58.1	1070	73.1	1.26	***
Listed	115	46.4	958	65.4	1.41	***
Regulated	67	27.0	419	28.6	1.06	
Revenue	124	50.0	837	57.2	1.14	***
director attributes	**count directors**	**% directors**	**count directorships**	**% directorships**	**over-representation**	**sign. (chi-square test)**
Wealth	34	2.7	36	2.5	0.90	
Club	155	12.4	229	15.6	1.26	***
School	83	6.6	135	9.2	1.39	***
interaction effects	**expected directorships**	**expected % directorships**	**count directorships**	**% directorships**	**over-representation**	**sign. (chi-square test)**
Conservative&Wealth	2	0.1	3	0.2	1.87	
Bipartisan&Wealth	7	0.5	12	0.8	1.66	
Australian&Wealth	23	1.6	35	2.4	1.51	*
Listed&Wealth	18	1.3	27	1.8	1.46	
Regulated&Wealth	11	0.7	6	0.4	0.56	
Revenue&Wealth	20	1.4	16	1.1	0.80	
Conservative&Club	7	0.5	5	0.3	0.68	
Bipartisan&Club	33	2.2	76	5.2	2.31	***
Australian&Club	105	7.2	199	13.6	1.89	***
Listed&Club	84	5.7	191	13.0	2.27	***
Regulated&Club	49	3.3	89	6.1	1.82	***
Revenue&Club	91	6.2	159	10.9	1.75	***
Conservative&School	4	0.3	1	0.1	0.26	
Bipartisan&School	18	1.2	50	3.4	2.84	***
Australian&School	56	3.9	114	7.8	2.02	***
Listed&School	45	3.1	114	7.8	2.53	***
Regulated&School	26	1.8	50	3.4	1.91	***
Revenue&School	49	3.3	94	6.4	1.94	***

* p value < .05.
*** p value < .001.

20.3 Model Specification

20.3.1 Independent Bivariate Attribute Analysis

A considerable section of the interlocking directorates research does not go beyond descriptive statistics similar to those in Table 20.1. The purpose of these studies is to find over- or underrepresented groups by comparing directorships across groups and with a baseline random distribution.

20.3.2 Purely Structural Effects

In our bipartite ERGM, up to five structural effects are used in various combinations: the edge parameter [L], alternating *k*-stars for directors [K-Sp] and corporations [K-Sa], and alternating *k*-cycles for directors [K-Cp] and corporations [K-Ca]. The edge parameter [L] represents the baseline probability of forming a tie and is similar to the intercept in a classic regression model. The star effects can be thought of as a "popularity" effect or a "rich get richer" effect (also called the "Matthew effect"), whereby actors with ties have an increased likelihood of receiving further ties. In this chapter, we use the alternating *k*-star parameters described in Chapter 10 (see Figure 10.8; the rationale for the alternating version of these statistics is given in Chapter 6). The alternating *k*-cycles ([K-Cp] and [K-Ca]) parameters capture the propensity of directors (p) and corporations (a) to be part of 4-cycles (i.e., to engage in closed bipartite network structures) (see Chapter 10 and Figure 10.11).

20.3.3 Models with Attributes: Actor-Relation Effects

Three types of attribute parameters are used in our models: director attribute activity [rP], corporation attribute activity [rA] (see Figure 10.12), and corporation–director attribute interaction [rAP] (see Figure 10.15). rP and rA are simply the main effect for each director and corporation attribute. Thus, our models include nine of these effects (six corporation effects: [rA_Conservative], [rA_Bipartisan], [rA_Australian], [rA_Listed], [rA_Regulated], and [rA_Revenue], and three director effects: [rP_Wealth], [rP_Club], and [rP_School]). A significant positive parameter estimate for one of the attribute effects would mean that corporations (directors) with this attribute have a greater probability (than corporations (directors) who do not have this attribute) of holding directorships.

rAP parameters capture the increased (or decreased) likelihood of a tie forming between a corporation with a particular attribute (e.g., "Australian") and a director with a particular attribute (e.g., "school"). These were described as "between node set" parameters in Chapter 10. For our data set, there are eighteen possible interaction effects (6 corporation

attributes × 3 director attributes). A range of higher-order attribute parameters are available in BPNet (see Chapter 10), but for reasons of parsimony, we restricted ourselves to the thirty-two parameters mentioned.

20.4 Results

20.4.1 Results for Independent Bivariate Analysis

Table 20.1 presents a classic bivariate overrepresentation analysis that is common to the interlock literature. There are three notable effects present. First, bipartisan donor corporations, Australian and publicly listed corporations, and directors with elite private schooling or membership of exclusive gentlemen's clubs have, on average, considerably more directorships. Second, the wealthy are significantly overrepresented in Australian-owned corporations. Third, directors from exclusive clubs and schools are significantly overrepresented in bipartisan, Australian, public-listed, regulated, and large corporations.

In addition, a number of characteristics seem to predispose directors and/or corporations to underrepresentation (e.g., conservative directors and the interaction of regulated corporations and wealthy directors). However, the "law of small numbers" means that it is difficult to be statistically confident that a "rare event" is even rarer than (un)expected. Thus, none of the underrepresentation findings in Table 20.1 are statistically significant.

These bivariate tables, however, involve no controls for either structural network effects or any of the other attribute effects. As is shown, the addition of these elements to our modeling considerably changes the interpretation of the underlying data.

20.4.2 Results for Purely Structural Effects

Table 20.2 presents two fitted models with purely structural effects. We found for this particular network that we cannot have both K-Cp and K-Ca in the same model due to convergence issues. In line with Wang, Sharpe, Robins, and Pattison (2009), we present two alternative models, one with each possible *k*-cycle parameter.

Both models perform significantly better than a random graph in capturing structural graph statistics (results of which are not shown but that were estimated with edge parameter [L] = −5.34). There is a negative value of the director popularity [K-Sp], indicating that there is little variation on the degree distribution and not many high-degree nodes. However, in line with Wang, Sharpe, Robins, and Pattison (2009), we had a poor fit on the classic 4-cycle parameter [C4], which suggests that improving these structural effects is a substantial area of future research.

Table 20.2. *Results of two bipartite ERGMs of directorships including only purely structural effects*

	estimates (SEs)	
parameter	model A	model B
Purely structural effects	**with director 4-cycle effect**	**with corporation 4-cycle effect**
Edge [L]	−3.47 (0.26)*	−2.38 (0.37)*
Director popularity [K-Sp]		−4.54 (0.21)*
Corporation popularity [K-Sa]	0.65 (0.10)*	0.15 (0.18)
Director 4-cycles [K-Cp]	−4.00 (0.19)*	
Corporation 4-cycles [K-Ca]		0.06 (0.01)*

* Significant effect

20.4.3 Results for Models Including Purely Structural and Actor-Relation Effects

Table 20.3 presents two fitted models: the first (model C) with structural and actor-relation effects; and the second (model D) with structural, actor-relation, and interaction effects for actor-relations.

For model D, several interaction effects had to be dropped because estimations showed that they were unstable, either because there were almost no ties (e.g., [rAP_Conservative&School] had one observation) or because they represented virtually all ties of the main effect (e.g., [rAP_Wealth&Australian] overlapped with thirty-five of the thirty-six directorships of the [rA_Wealth] statistic). All main effects for attributes were left in model D as controls for the interaction effects.

The purely structural effects from model B are robust and remain significant in both models C and D, despite the addition of up to sixteen attribute effects. The main effects of the actor-relation effects in model C suggest a slightly different interpretation to descriptive statistics in Table 20.1. In particular, bipartisan donor corporations, the second most over-represented type of corporation in Table 20.1, do not have significantly greater directorships in either model C or model D.

The addition of interaction effects to the bipartite ERGM draws out two further findings. Although in Table 20.1, club and school interaction effects follow almost identical patterns, model D shows that they operate according to very different principles. In model D, the effect of the clubs variable loads completely on the club interaction effects. The main effect for club becomes insignificant, and the high number of directorships of club members is explained by their high propensity to hold directorships on Australian, public listed, regulated, and large (revenue) corporations. In contrast, the main effect for schools remains highly significant, and only seems to be associated with positive interaction effects with public

Table 20.3. *Two bipartite ERGM of directorships, with structural, actor-relation, and actor-relation interaction effects*

parameter	estimates (SEs)	
	model C	model D
	structural effects and director and corporation attribute effects	**structural effects, attribute effects, and company-director attribute interactions**
Purely structural effects		
Edge [L]	−2.14 (0.22)*	−1.98 (0.24)*
Director popularity [K-Sp]	−4.90 (0.23)*	−4.91 (0.23)*
Corporation popularity [K-Sa]		
Director 4-cycles [K-Cp]		
Corporation 4-cycles [K-Ca]	−0.05 (0.02)*	−0.05 (0.02)*
Actor-relation effects		
Corporation (a) attribute main effects		
rA_Conservative		−0.17 (0.18)
rA_Bipartisan		0.01 (0.08)
rA_Australian	0.28 (0.09)*	0.25 (0.10)*
rA_Listed	0.78 (0.11)*	0.67 (0.12)*
rA_Regulated		0.01 (0.07)
rA_Revenue	0.17 (0.06)*	0.13 (0.07)
Director (p) attribute main effects		
rP_Wealth	−0.87 (0.48)	−0.59 (0.52)
rP_Club	1.08 (0.19)*	−0.06 (0.29)
rP_School	1.37 (0.24)*	0.82 (0.34)*
Interaction effects		
rAP_Revenue&Wealth		−0.55 (0.37)
rAP_Australian&Club		0.34 (0.27)
rAP_Listed&Club		0.65 (0.27)*
rAP_Regulated&Club		0.54 (0.15)*
rAP_Revenue&Club		0.36 (0.17)*
rAP_Bipartisan&School		0.44 (0.20)*
rAP_Listed&School		0.53 (0.29)

* Significant effect

listed corporations and bipartisan donor corporations. As is discussed in the next section, these patterns of interaction suggest very different social and socializing roles for these two upper-class institutions.

In line with the bivariate analysis, there remains sharp contrast between the high numbers of directorships held by directors belonging to elite clubs or from elite schools and the low number of positions held by wealthy directors. There is a negative but nonsignificant relationship between wealthy directors and fewer directorships in model C. In model D, there is a negative but nonsignificant interaction of wealth and revenue. Although

both effects are nonsignificant, they are both negative, and importantly, we would expect wealth to be positively related to directorships.

20.5 Discussion

Substantively, there are three major lessons about the nature of the "capital" that directors wield in the corporate boardroom and broader corporate community. In this Australian sample, different forms of "capital" lead to diametrically opposed director behavior. Directors with "financial" or "physical" capital (i.e., the owners and superwealthy) have fewer directorships than would be expected for their status. They have the same, or possibly fewer, directorships than the average director of a top 248 company. The reason for this is not entirely clear. One possible mechanism is provided by Coleman's (1990/1994, 315–316) observation that physical capital is alienable, and therefore the benefits of an investment may be captured by the owner. In contrast, the social capital contained in interlocks is inherently inalienable; that is, it belongs in the relationships between people. The observed effect may be driven by a mechanism that is as simple as follows: for an owner-director, the returns of focused attention on one company are much greater than they are for any other type of director. An owner not only gains the benefits of improvement to his or her own property, but he or she can also focus attention on what is potentially the greatest loss. In contrast, a non-owning director appropriates less of his or her own work in any particular company and has *less* to lose by serving on multiple boards, particularly if one of the companies fails.

Directors with upper-class social capital appear to fulfill very different functions depending on their specific social capital. Directors with membership of exclusive businessmen's clubs appear to have a form of social capital that is much like Putnam's (2000) "bonding social capital": it is specific to a particular group of Australian, regulated, large, and public listed corporations. Outside this circle, it provides little advantage (no main effect). However, within this grouping, it provides a substantial social bond, integrating a particularly important grouping of the Australian corporate elite. Undoubtedly, the specificity of this form of social capital arises partly because of its constant renewal. Clubs are not a place you graduate from at age 18. Rather you join them at 40 or 50 years of age, and they introduce you to a specific active social world that has a physical location, events, membership lists, and culture.

In contrast, elite private school attendance appears to provide a much more diffuse and generalized form of social capital, and one that is in many ways akin to Putnam's (2000) "bridging social capital." Private school attendance is much less specific to a particular corporate

community. The main effect of school attendance on directorships is still highly significant once interactions are taken into account. The specific corporations that school attendance interacts with are very general categories of corporations: bipartisan corporations are not a community, but rather a set of more politically active corporations that potentially need directors with social capital. Thus, the relationship between bipartisan corporations and school graduates could simply reflect a form of mutually beneficial exchanges taking place between more "political" corporations and more "reputable" directors. Similarly, public listed companies have concerns with public and investor relations. Director social capital can add prestige to a public company that would be completely superfluous for a private corporation with two shareholders. The view of school attendance as "bridging social capital" is further supported by the lack of a significant relationship with other corporate attributes: they are equally likely to serve on foreign or Australian boards, small or large companies, and companies with high government regulation or those with little.

Methodologically, there are a number of important findings. We note that with this data set, we had trouble fully modeling the purely structural features of bipartite networks. Specifically, 4-cycles were an issue. Nonetheless, we found substantial purely structural network effects that could not be effectively accounted for by the incorporation of director and company attribute effects into an ERGM. There are tendencies toward dispersal of degree and the generation of 4-cycles, which require purely structural network effects to properly model director networks. The importance of this finding is that it provides evidence that directorships cannot simply be explained by the attributes of companies and directors. Methods that focus only on director and company attributes may overestimate the impact of these attributes and therefore underplay some of the purely structural social processes through which directorships emerge.