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Coordination, control, or charade? The role of board interlocks among business group members

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Abstract

Purpose – How do business groups manage their internal processes? The purpose of this paper is to explore how board interlocks between members serve as control and coordination mechanisms within business groups. The authors propose that centrality of groups' affiliates in the group network of interlocking directorates is shaped by agency and resource dependence forces. In particular, the authors examine the role of international board ties as a resource and information conduit.

Design/methodology/approach – This study leverages proprietary information on firm-to-firm transaction ties among all 155 affiliates belonging to a large Italian business group. The authors use network analysis to develop multiple measures of the centrality of each group member, and link these to resource transactions, ownership patterns and geographic distributions. The authors test the hypotheses in a structural equation model using LISREL.

Findings – The results demonstrate that both resource exchanges and the presence of cross-national relations increase an affiliate's central position in the group's network of board ties. In contrast, ownership ties between members were unrelated to affiliate centrality.

Originality/value – Internal governance mechanisms of business groups are rarely studied. While groups are often portrayed as inefficient or value-destroying, the analysis of proprietary firm data suggests a very different scenario: inter-unit ties are much more supportive of a model of business groups as strategic portfolios, using internal ties to share information and resources.

Keywords Network analysis, Boards of directors, Interlocking directorates, Ownership, Business groups

Paper type Research paper

Business groups, also known as pyramidal organizations, are collections of firms that are bound together, despite being legally separate entities (Granovetter, 2005). Business groups are a prominent feature of the global economic landscape, and can be found in both developed and emerging economies (Denis and McConnell, 2003). However, business groups are studied less frequently than other ownership forms, such as family firms or institutional investors (Boyd and Solarino, 2016). Additionally, work on business groups has been characterized as "highly fragmented" (Yiu *et al.*, 2007, p. 1551). Further, due to data limitations, most analyses of business groups are from an external perspective, with a limited focus on their inner organization (Cainelli and Iacobucci, 2011). We aim to provide a unique perspective on business groups through examination of how they manage their internal processes.

Examination of business group processes is significant for several reasons. First, there is an ongoing debate about whether business groups are inherently helpful or harmful: do



groups create or expropriate value (Chang and Hong, 2000)? Empirical evidence is highly mixed, as prior studies have reported a mix of positive, null and negative links between business group affiliation and firm performance (Boyd and Solarino, 2016). To explore this question more fully, DiCarlo (2014) suggested that researchers try to infer whether decision-making mechanisms in a group are more aligned with opportunistic vs efficiency-oriented viewpoints. Consequently, we propose to develop new predictions regarding the internal operations of business groups. By studying internal coordination activities, we hope to lay the groundwork for a better understanding of what drives the performance of business groups.

Second, we contribute to the research stream on governance and coordination among group affiliates. Board interlocks arise when the same individual sits on the board of two different firms (Mizruchi, 1996). Prior work has noted that interlocking directorates are a relevant aspect of business groups (e.g. Khanna and Rivkin, 2006); however, the way that these inter-firm ties serve as coordination or control devices within a group is largely unexplored. We draw on the theoretical framework developed by Yiu *et al.* (2007), which uses resource dependence theory to suggest that board ties may be useful to coordinate activities among transacting affiliates. Yet, a test of this proposition has been limited by difficulties in collecting data on firm-to-firm transactions, leaving this idea in need of an in-depth empirical validation. Additionally, a number of management scholars draw from alternative perspectives, such as agency theory, to suggest that – in independently-managed firms – board ties reflect equity ties and control rather than coordination purposes (Fich and White, 2003; Zona *et al.*, 2018). By adopting a dual theory approach, we can compare the relative importance of each perspective in explaining connections between group members. Additionally, this approach allows us to extend widely used theories to an organizational form, such as business groups, which are relatively less explored by management scholars (Cainelli and Iacobucci, 2011).

Third, a relatively unexplored area in business group research is the role of geography. It is noteworthy that the detailed literature review by Yiu *et al.* (2007) does not mention any work on geography or cross-national ties. In fact, the role of geography has been mostly examined in the domain of multinational corporations. Nevertheless, there is evidence that business groups do develop internationally (Gaur and Kumar, 2009). Given the complexity inherent in exchanging information across different countries (Caiazza and Simoni, 2015), cross-national relations may represent core nodes in coordinating business groups' activities, and may be reflected in the network of interlocks among group members.

In order to address these issues, we were able to overcome a notable limitation of previous research. Micro-level research on coordination within business groups has long been impeded by lack of data on firm-to-firm ties. Data on transaction ties among firms are not generally available to scholars (Khanna and Rivkin, 2006), because these data are price and competition sensitive (e.g. they involve profit/resource transfer among group members). To overcome such an obstacle, we involved in the research project the top management of a large Italian business group, and obtained access to a valuable data set on 155 group members, involving data on ownership, firm-to-firm transaction ties and geographic location of group members. These data provide a unique opportunity to test control/coordination mechanisms and activities in business group. We constructed multiple measures of network centrality in the group using UCINET. Using a structural equation model, we determined that a firm's position in the corporate network is driven heavily by resource and coordination roles and cross-national ties. Ownership has no significant effect on patterns of board ties.

Through this study, we make several contributions to the strategic management literature. We test the boundary conditions of resource dependence theory, and extend its relevance beyond standard contexts of competitive markets. As far as we know, this study

is the first empirical test of the interlocking/resource dependence hypotheses to use data on firm-to-firm transaction ties. Additionally, by examining cross-national ties, we extend resource dependence to geography, to encompass dependence on information from foreign ties. Finally, we contribute to research on business groups, by showing how coordination, rather than control, shapes the inner network structure of in intra-group board ties.

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Literature review

Business group research has been characterized as having “incurred both frustrating confusion as well as heated discussion regarding their organizational nature and economic contributions (Colpan and Hikino, 2010, p. 16).” In part, this stems from the breadth of the topic, and the ensuing variability in the foci of individual studies. For example, while the bulk of research examines economic performance of groups (Chang and Hong, 2000; Khanna and Palepu, 2000), other work explores issues in the definition and identification of groups (e.g. Khanna and Rivkin, 2006), while a third stream uses a case study approach or focuses on identifying descriptive characteristics of groups (e.g. Zattoni, 1999). In an effort to create an integrative framework for business group research, Yiu *et al.* (2007) developed a model that classified business groups along two dimensions. The first dimension, vertical linkages, taps the degree of ownership among member firms. For instance, Italian and Korean groups have equity relationships between group members, while groups in other regions might have minimal or no equity ties. The second dimension involves horizontal linkages, and is defined by the degree of interaction or interdependence between group members. For example, a group that shares resources across members would have high levels of horizontal interdependence. Given the variability between business groups, there are multiple configurations of these dimensions. For example, there may be high levels of either equity or resource ties, high levels of both, or low levels of each type. For purposes of theory development, we focus on what Yiu *et al.*, describe as the M-form business group, which has both equity and resource connections between group members.

Despite the extensive and comprehensive review of published business-group research, the framework by Yiu *et al.* (2007) suffers from two core limitations. First, it does emphasize role of interlocks in business groups; yet, based on a resource dependence emphasis, it conceives of board ties solely as a coordination mechanism reflecting transaction ties, to the exclusion of board’s role as an agency alignment tool Yiu *et al.* (2007, p. 1568). Second, it does not emphasize geography as a core dimension of business group functioning. Yet, the extant research recognizes that internationalization constitutes a core dimension of business group functioning (Gaur and Kumar, 2009). This dimension is especially salient for coordination: given country level differences in market and institutions, cross-national relations increase the information needs, possibly shaping information flows and board interlocks (Caiazza and Simoni, 2015).

In this paper, we address both limitations, exploring the determinants of board interlocks among business group affiliates, as emerging from ownership considerations, transacting issues and geographic concerns.

Hypothesis development

The purpose of this paper is to study interlocks as a control/coordination device for a business group as a whole. Consequently, our focus is on the centrality of an affiliate in the group’s network of interlocking directorates as our dependent variable. Centrality refers to a firm’s relative position in a broader network of firms (Faust, 1997). “Centrality is a structural attribute of nodes in a network, not an attribute of actors themselves, but of their structural position in the network” (Hossain and Wu, 2009, p. 796). Network researchers conceive centrality as the degree of importance, influence and prominence of an actor in a network (Borgatti *et al.*, 2002; Freeman, 1979). Central nodes in a network

“can exert more influence by virtue of being linked with a large number of actors in the network” (Hossain and Wu, 2009, p. 796); further, central actors are more likely to potentially receive information of higher quality (Ahuja *et al.*, 2003). Centrality has been used to explore both control and coordination issues in organizations (Ove, 2002). For instance, it has been shown that actors more centrally positioned in a network exhibit more coordination activity (Hossain and Wu, 2009). Chen and Jaw (2014) found network variables to be significant predictors of strategic outcomes (diversification and innovation activities) for a sample of Taiwanese business groups.

Anecdotally, members of a given business group are often linked via common directors on their respective boards; however, such ties have rarely been the focus of research (Boyd and Hoskisson, 2010). Similarly, Chen and Jaw (2014) concluded that the network structure of a business group is an important element, which is in need of more detailed assessment. The first step in that assessment is the choice of theoretical perspectives to assess the centrality of business group members.

Although business groups are primarily studied with an agency theory lens (Boyd and Solarino, 2016), multiple theoretical perspectives can be applied to the governance of these organizations (Boyd and Hoskisson, 2010). Additionally, multi-theoretic approaches often have superior explanatory benefits when studying governance phenomena (Boyd *et al.*, 2011). Consequently, as we develop below, we will predict that agency and resource dependence factors shape an affiliate’s centrality in that network

Board interlocks in business groups: an agency perspective

Board interlocks are common in business groups across a variety of contexts. They are found in regions that typically have strong equity ties, as well as in both emerging and mature economies (Lefort, 2009; Fracchia *et al.*, 2009; Kosenko and Yafeh, 2009; Bianco and Pagnoni, 1997; Khanna and Rivkin, 2006). According to Yiu *et al.* (2007, p. 1561), the vertical chain of ownership “functions as a command chain along the hierarchy from the dominant owner to individual firm management.” Along this vertical chain of ownership, the focal firm receives commands from the top and allocates sub-orders to the affiliates it controls (Cainelli and Iacobucci, 2011). Once orders have been assigned to lower levels, the focal firm is in charge of ensuring that the controlled affiliates behave as ordered.

We contend that, in the context of business groups, board interlocks can serve as a control-mechanism along the vertical chain of ownership, linking the business-group apex and the affiliates. Agency theory represents the most suitable framework to inquire into this issue. In the standard agency framework, agency costs arise from the separation of ownership and control (Berle and Means, 1932) and the board monitors the CEO on behalf of shareholders (Jensen and Meckling, 1976). Two core drivers are especially salient for the emergence of agency problems: information asymmetries and individual’s opportunistic behaviors (Dalton *et al.*, 2007). These two drivers characterize equity ties among business groups’ affiliates, giving rise to monitoring needs and the adoption of interlocking directorates.

As regards information asymmetries: group’s affiliates are significantly involved in joint cooperation, particularly in a M-form group characterized by strong strategic interdependence. In such a context, group’s affiliates exchange business-related information, which involves far greater complexity and ambiguity compared to the financial information needed by investors in public companies (Eisenhardt, 1989). Particularly, affiliated firms hold firm-specific knowledge that is paramount for strategy making, including information on work processes (Gong, 2003), required resources (Mirchandani and Lederer, 2004) and local markets (Fey and Furu, 2008). This information is hard to access externally (Steinberg and Kunisch, 2016), giving rise to information asymmetries between an affiliated firm and its equity-holding company.

Regarding utility maximization and opportunistic behaviors, the personal interests of an affiliate's CEO may not necessarily align with the needs of the group as a whole. As loosely coupled systems (Orton and Weick, 1990), business groups involve separateness and identity of individual group affiliates (Yiu *et al.*, 2007, p. 1559). Thus, while expected to cooperate dutifully and execute orders, group affiliates also exhibit distinct goals and local interests. They compete with each other for resources (Holmes *et al.*, 2018; Birkinshaw and Hood, 1998), fostering the potential for opportunistic behaviors and the pursuit of private goals. In this regard, the CEO of an affiliated firm is relatively more entrenched compared to a manager of a corporate sub-unit. For example, whereas a division manager might be easily transferred to other business units at any time, the CEO of an affiliated firm often has a multiyear appointment, and may be more difficult to remove. As a result, the agency theory's assumption about individuals' tendency to pursue their private interests can hold for CEOs of a group's affiliates, given strong information asymmetries and goal conflicts. Under such conditions, close monitoring through the boards of directors may serve to align CEO behaviors, detect early signals of misalignment and remind the CEO of the power and interests of the controlling owner.

Control needs outlined above are exacerbated as the number of equity ties of an affiliate increases. Multilateral agency relations – involving multiple agents/principals – magnify agency problems, given they involve “controlling strategic behaviors of several parties interacting with each other” (Bolton and Dewatripont, 2005, p. 25). For example, the presence of multiple agents may lead to collusion among themselves at the expense of the principal (Hoenen and Kostova, 2015, p. 107), magnifying the need of establishing interlocking directorates as monitoring devices. Moreover, the presence of multiple principals may lead the dominant actor to expropriate other minority shareholders (i.e. the principal-principal problem, Young *et al.*, 2008), increasing the monitoring needs. As the number of equity-linked affiliates increases, the focal firm increasingly plays the role of a “core node” for transferring orders along the vertical chain of ownership (i.e. functioning as a sub-holding for other affiliates) through interlocking directorates. Therefore, we hypothesize that as the number of ownership ties increases, so does the number of ties to other boards and a firm's centrality within the network of board ties. Stated formally:

- H1. The number of an affiliate's equity ties is positively related to centrality in the network of interlocking directorates within business group.

Board interlocks in business groups: a resource dependence perspective

Resource dependence theory was developed to explain behaviors of independently managed, stand-alone (i.e. non-affiliate) firms, that exchange resources under competitive market forces. Given their dependency on resource providers for critical resources, these organizations set up linkages (such as board interlocks) with external actors, to the benefit of both the firm and the economy as a whole (Simoni and Caiazza, 2013). These connections help to attenuate resource constraints (Pfeffer, 1987; Pfeffer and Salancik, 1978) and to acquire critical resources, such as legitimacy (Selznick, 1949), advice and counsel (Kim and Kim, 2015; Lorsch and MacIver, 1989) and financial resources (Mizuchi and Stearns, 1988).

It has been emphasized that “despite the obvious application and relevance of resource dependence theory to business groups, there have been surprisingly very few studies on this subject” (Sambharya and Banerji, 2006, p. 12; see also Brouthers *et al.*, 2014; Kim *et al.*, 2004). We submit that, when applied to business groups, this theory suggests that interlocks among business group members serve to gather information from other affiliates and coordinate business activities within the broader group context.

Firms affiliated to a business group constantly exchange resources among themselves under a “quasi market” (Yiu *et al.*, 2007), and are thus relatively less exposed to market

pressures and expropriation by competitive actors. Yet, affiliated firms are also called to make common efforts for the realization of the group's global purpose. Common goals and joint actions foster interdependence, raising uncertainty and coordination needs (Thompson, 1967).

In this regard, it has been documented that "affiliated firms emphasize close cooperation between themselves to coordinate actions" (Sambharya and Banerji, 2006, p. 10). Dependencies generated by resource exchanges are usually reciprocal, "enabling the exchange partners to influence each other's behaviors and profitability" (Sambharya and Banerji, 2006, p. 11), calling for the need of information exchanges. Needs for information exchanges are also magnified, given most affiliates specialize either by products or by processes, working together for the realization of a unitary output (Odaka *et al.*, 1988). Further, assets specificity of cooperating affiliates leads to even more interdependencies, fostering the need for close coordination and information exchanges among business group members (Dyer, 1996).

In sum, transacting affiliates must coordinate their activities in order to accomplish higher-order ends. Board ties may have a potentially important role to play in managing transaction-based uncertainty, by serving as a connection to other members of the same group (Kim *et al.*, 2004; Boyd and Hoskisson, 2010). Specifically, we submit that those affiliated units that exchange resources with a larger number of other group's affiliates will play a significant role in coordinating the group's business activities, and will, thus, be more centrally positioned in the network of board interlocks. Indeed, transacting with a larger number of actors increases coordination uncertainty for the focal firm, both in resource in-flow and in resource out-flow. As for resource in-flow, the focal firm acquires resources from a larger number of counterparts, raising the need to coordinate strategic plans, operations and, hence, the many flows of incoming resources in terms of timing, quality, quantity, etc. As for resource out-flow, the focal firm provides resources to other group affiliates: organizing resource-outflows toward a larger number of counterparts requires a close coordination and timely information relative to their potentially conflicting needs and demands.

Anecdotal evidence supports this view. As the number of transacting partners increases, the focal firm becomes the "hub" through which resources and information flows are channeled to various members of the business group (Fruin, 1992; Miyashita and Russel, 1994): the focal firm "is in a position to influence the flow of information and resources both between itself and its suppliers, and between the suppliers themselves" (Sambharya and Banerji, 2006, p. 15). It thus develops a high level of network centrality and acts as a focal coordinator for the group as a whole, by bridging information across multiple affiliates (Sambharya and Banerji, 2006, p. 13).

Board ties may be particularly effective as a mechanism to convey information. Board ties can be conceived as weak inter-unit ties, characterized as a focused and relatively inexpensive channel to convey high-quality information (Granovetter, 1973; Haunschild and Beckman, 1998). Board ties may thus function as a useful mechanism for inter-unit information exchange: through the establishment of board ties, connecting directors possess and share unique information specific to the firms, facilitating coordinated planning and organizing of business activities. The benefit of board ties would be particularly important as the number of group transacting partners increases, and the risk of coordination problems for the overall business group becomes more severe. Therefore, we hypothesize the following:

- H2.* The number of an affiliate's transacting partners is positively related to centrality in the network of interlocking directorates within business group.

Resource and coordination needs of geographically dispersed group members

An important contextual aspect of these mechanisms is geography. The notion of geographic distance is a fundamental and practical challenge in management. One of the earliest frameworks dealing with the issues surrounding geography and internationalization is

Dunning's (1977) "ownership – location – internationalization" paradigm. Yet, even though the importance of geographic distance in the world of business was recognized over 40 years ago, there is significant work to be done on this aspect of management. Much of the research related to geographic distance and location advantages and disadvantages was done in the realm of the multinational enterprise. Indeed, Zaheer *et al.* (2012, p. 19) characterize international management as "the management of distance" (Williams and Grégoire, 2015).

Geographic distance has been studied in relation to regional multinationals (Rugman and Oh, 2013), the location of foreign direct investment (Yang *et al.*, 2013), spatially disaggregated headquarters (Baaij and Slangen, 2013), foreign acquisition activity by US firms (Ragozzino, 2009) and acquisition vs alliance decisions (McCann *et al.*, 2016). Further, Boeh and Beamish (2012) summarize additional contributions to the literature on distance metrics to include the cost of separation (Rosenkopf and Almeida, 2003), borders (Davidson and McPetridge, 1985) and even distance measured in air miles (Hansen and Lovas, 2004), while noting that the most relevant aspect of distance is physical separation, which "inhibits the ability to monitor and control resources" (Boeh and Beamish, 2012, p. 526). This is significant, because physical separation increases costs and puts strain on managerial time and resources (Boeh and Beamish, 2012). In response to the strain, organizations might choose to treat proximal and distant entities differently (Mingo *et al.*, 2018).

Geographic distance is an important factor in business groups whose members might be located in multiple countries or even continents and have varying resource needs. For example, in business groups, the uncertainty surrounding resource exchanges among interdependent actors partially depends on the distance among the actors. Geographic proximity and distance from headquarters for example, might influence the resources a unit has access to through its linkages. All other aspects equal, a more distal group is likely less visible than a more proximal one, leading to differences in assessing resource needs. Therefore, geographic distance is a relevant aspect of the relationship between the provider of access to a particular resource and the business group member in need of the resource.

Thus, our final hypothesis concerns the role of cross-national factors as a determinant of board ties, and is a second test of resource dependence perspective. Many business groups have operations that span multiple countries and continents (Gaur and Kumar, 2009). A recent literature review on business groups and international strategy, points out that little is known about business group boards, and particularly how they relate to business group strategy such as business internationalization (Holmes *et al.*, 2018). We expect that the boards of more distant group members will be more densely connected than members located closer to the parent organization. Our rationale for this effect is based on both the information advantages of such ties, and also the greater coordination and cohesion needs of more distant members.

When a group operates in multiple regions, the complexity of decision making increases substantially and dependency on valuable information rises. Dubbed the "liability of foreignness" (e.g. Zaheer, 1995), a firm that ventures beyond national borders must overcome many barriers, including gaps in knowledge and securing access to resources. Geographic complexity is consequently linked to a need for greater interlocks (Kono *et al.*, 1998). Using a resource dependence argument, we propose that business group members can draw on counterparts in other countries as a tool to overcome problems such as insufficient market information, or access to local suppliers and customers. In support of this rationale, Belderbos and Sleuwagen (1996, p. 216) noted that "important barriers to foreign investment can be overcome by information sharing" among business group members. Similarly, Rauch (2001) concluded that transnational networks can provide market information, access to distribution channels, supplier contacts and local sources of capital. In a related vein, Ragozzino and Reuer (2011) found that geographic distance hampered the effectiveness of venture capital firms when investing in public offerings,

as distance limited the extent of information available to investors. In accord with resource dependence theory, interlocking directorates may help manage dependencies on a critical resource such as information and linkages to valuable actors (Hillman and Dalziel, 2003). Thus, foreign board ties could serve as a strategically useful source of information for other group members.

The utility of foreign interlocks is consistent with related arguments originating in a variety of complementary theoretical perspectives. Drawing on network models, board ties to a more distant group member will provide more unique sources of information than closer members. For example, consider four directors: two from Milan, one from Berlin and the other from Buenos Aires. The extended networks of the Milanese directors have greater potential to overlap due to geographic proximity, which can reduce the unique information and resources provided by each director. In comparison, the extended network of the German director is less likely to have such redundancy, and the Argentinian director even less likely to contain overlap. Ahuja (2000, p. 425) argued that networks with a diverse set of indirect ties “may be an effective way for actors to enjoy the benefits of network size without paying the costs of network maintenance associated with direct ties.”

Similarly, research on organizational demography underscores the utility of foreign directors. A key challenge for a geographically dispersed business is that competencies may have different utility from one region to the next (Rangan and Drummond, 2004). Exposure to different international contexts is an important tool to promote organization learning (Yli-Renko *et al.*, 2001; Zahra *et al.*, 2000), which in turn can help a firm maximize the return to its competencies. While foreign ties have the potential to be cumbersome (Gupta and Govindarajan, 2000), they also offer great utility. For example, one study found that, in the long run, highly heterogeneous teams were as effective as highly homogeneous ones (Earley and Mosakowski, 2000). Similarly, a study of multinational project teams found that ties across subsidiaries can offset any negative effects of spatial distance (Hansen and Lovas, 2004). Finally, an analysis of subsidiary executives found that cultural heterogeneity of team members was positively associated with the quality of decision making and overall team performance; additionally, diversity of team members did not have any negative effects on social cohesion (Elron, 1997). Given the many advantages of foreign ties, we propose that the boards of foreign group members will make for more prominent interlock partners. Therefore:

- H3.* Distance from the corporate parent is positively related to centrality in the network of interlocking directorates within business group.

Methods

Sample

Data on business groups are normally difficult to collect (Cainelli and Iacobucci, 2011). Our hypotheses required access to within-group transactions. Such data are proprietary, and not subject to disclosure requirements. The parent firm of the business group used for our sample agreed to provide internal data in exchange for feedback regarding our results. We collected data from 155 firms, which represent the membership of a large, Italian business group. Italian groups fall into Yiu *et al.*'s (2007) M-form category, which would make it an optimum setting for testing both agency and resource dependence hypotheses. Stated differently, Italian groups are known to have high levels of resource exchange between units, as well as strong ownership ties. In Italian business groups, the controlling shareholder – i.e., the parent firm – controls the board of directors. The Italian Civil Code also delegates coordination among group members to the parent – specifically including any links between affiliates (DiCarlo, 2014). Consequently, the parent firm has the ability to design each of the subsidiary boards, and the ensuing network structure.

In 2005, the group had revenues of approximately Euro 30bn, and assets of roughly Euro 100bn. Approximately one-third of member firms of which were headquartered in Italy, with the remainder being located worldwide. Given our focus on geography, our sample is consistent with large-sized Italian business groups, whereby the geography dimension is most relevant. Italy's multinational business groups, such as ours, represent the vast majority (73.1 percent) of Italian large-sized groups (Istat, 2015).

The chief legal officer was our liaison for the project, and both the financial and legal affair offices were involved in data collection. Data for year 2005 were collected and cross-checked internally upon our request. We also cross-checked the data with available external sources when available. Research in leading management journals often relies on data from a single corporation, in a cross-section design, when the study involves an in-depth analysis of intra-organizational relations that are not accessible at a large scale (e.g. Hult *et al.*, 2004; Tsai, 2002; Hansen, 1999; Gresov and Carrol, 1993). Additionally, network research accepts that reliance on data from one single corporation is often the only viable option, given complexity of network design and boundaries (see Halinen and Tornroos, 2005, p. 1291). Thus, this study aligns with these standard for research design.

Measurement

Network centrality. Many studies of interlock centrality utilize a measure of degree centrality, which is a simple count of interlocks with other firms (e.g. Davis, 1991; Haunschild, 1993). Through the study of an entire population – in this case, all members of a common group – we are able to construct indicators of each firm's centrality relative to other group members. Relational data based on a full census of firms (Marsden, 2005) allows creation of centrality variables that are richer and more nuanced than a simple count of interlocks (Scott, 2007).

Using detailed lists of directors for each firm, we created an inventory of board ties among group members. On average, each board had roughly four directors and seven ties with other group members. Based on these data, we used UCINET 6.0 (Borgatti *et al.*, 1999) to create three measures of centrality: betweenness, power and reach. Betweenness taps a firm's position as an intermediary between other firms. As such, this variable measures a firm's ability to grant or deny access to information and resources. Power is an advanced and refined variation of "degree centrality": degree centrality is a measure of direct ties that are held by a firm. In comparison to degree centrality, power factors in the position of the direct ties in the overall network. For example, consider two firms, each with five direct ties. Firm A is tied to companies that are well connected, while firm B's ties are on the periphery. These firms would have the same levels of degree centrality, while firm A would be considered more powerful. Finally, indirect ties are thought to serve an important, but qualitatively different role than direct ties. Reach measures the scope of a firm's indirect connections (Ahuja, 2000; Brass and Burkhardt, 1992; Freeman, 1979). These variables were expected to load significantly on a multi-indicator factor model. Appendix 1 illustrates and explains our measures in more detail.

Resource dependence. We received a list of all economic and financial firm-to-firm ties between group members. We created a summary measure of the number of other firms a given company had engaged in transactions with. A total of 32 of our sample firms reported no transactions at all with any other members of the group. At the other extreme, one firm reported having financial transactions with over half of group members. On average, a typical firm reported having financial transactions with approximately five other group members.

Ownership. The group's financial office provided data on ownership ties for all of the 155 firms. To test our hypotheses, we created a variable Own-All, which represented the

sum of the number of other group members a firm had an equity stake in, plus the number of other group members that had an equity position in that firm. On other words, Own-All was a count of the number of inward and outward equity ties for any given firm with other group members. To test for possible directionality effects, we ran supplementary models based separately on the count of inward and outward ties. These supplementary variables are included in the Table I descriptive statistics.

Geographic distance. The bulk of studies examining geographic effects have utilized dummy variables (Doh and Hahn, 2008). Over 60 percent of group members were headquartered outside Italy. We created a dummy variable for nationality that was coded as "1" for firms located in Italy, and "0" for firms located elsewhere.

Firm size was measured by the logarithm of sales.

Analyses. Our hypotheses were tested in a structural model using LISREL, using maximum likelihood estimation. A graphic model of our analysis is shown in Figure 1.

Results

Descriptive statistics for sample variables are shown in Table I. Summary fit measures indicate that our model is a good fit to the data: Overall χ^2 is 36.84 (8df), with an adjusted χ^2/df of 4.6. Goodness of fit (GFI) was 0.94 and the root mean square residual (RMSR) was 0.07. Our factor model for board centrality also reported a strong fit to the data. The factor loading for power was set to 1.0 as the referent indicator. Factor loadings were 0.56 for betweenness, and 0.86 for reach, both significant at $p = 0.001$. Our hypothesized model explained substantial amounts of variance in the three dependent variables: The mean R^2 for centrality indicators was 0.62.

H1 stated that ownership would be positively related to firm network centrality. While the coefficient was in the expected direction ($\gamma = 0.09$), it was not statistically significant. Since the direction of ownership might affect results, we ran supplementary versions of the Figure 1 model. One version substituted counts of external owners (Own-In) as the ownership indicator, while an alternate version used counts of ownership stakes (Own-Out). The path coefficient for ownership was non-significant in each of these models. Other path coefficients and factor loadings showed only minor fluctuations with these substitutions, and the results of other hypothesis tests were unaffected. Thus, *H1* was not supported, despite multiple analyses.

H2 stated that resource dependence would be positively related to firm network centrality. This hypothesis was supported, with a coefficient of 0.25 ($p = 0.01$). Thus, firms with more intra-group transactions were more centrally positioned within the group network.

	1	2	3	4	5	6	7	8	9
1. Betweenness	1.00								
2. Power	0.51	1.00							
3. Reach	0.38	0.78	1.00						
4. Resource dependence	0.37	0.34	0.36	1.00					
5. Own-in	-0.04	-0.10	-0.07	-0.15	1.00				
6. Own-out	0.45	0.33	0.30	0.47	-0.04	1.00			
7. Own-all	0.43	0.28	0.27	0.42	0.24	0.96	1.00		
8. Same nationality	0.08	-0.19	-0.07	0.25	-0.10	-0.09	-0.12	1.00	
9. Size	0.30	0.35	0.39	0.54	-0.23	0.39	0.31	0.21	1.00
Mean	0.91	6.78	31.31	1.00	0.12	0.95	1.35	0.49	8.26
SD	2.76	6.27	18.69	0.99	0.29	0.50	0.41	0.50	3.27

Notes: Log transforms used for financial ties, all ownership measures and firm size; all correlations greater than 0.15 significant at $p = 0.05$

Table I.
Descriptive statistics

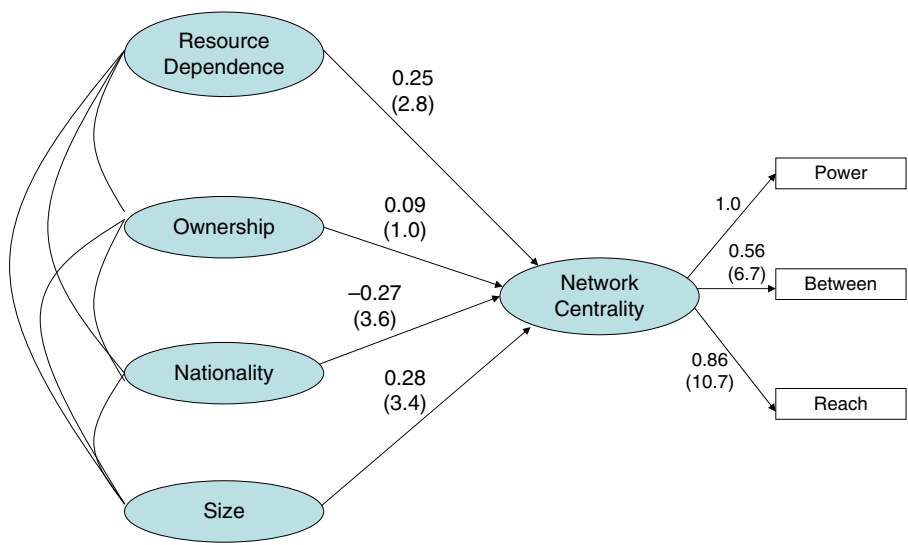


Figure 1.
Structural model
of hypotheses

Notes: *T*-values for parameter estimates are shown in parentheses. The following thresholds can be used to determine the significance levels of individual coefficients: $t \geq 2.0$, $p < 0.05$; $t \geq 2.7$, $p < 0.01$; $t \geq 3.5$, $p < 0.001$. Certain parameters (e.g. λ -x and θ matrices) are omitted from the diagram for ease of representation

H3 stated that foreign headquartered firms would be positively related to firm network centrality. The dummy variable for nationality was coded as “1” for Italy headquarters, and “0” for foreign headquarters. Consequently, the negative coefficient of -0.27 ($p = 0.01$) indicates that foreign firms are more central in the corporate network. Thus, *H3* was supported.

Finally, firm size had a positive, significant link with firm network centrality ($\gamma = 0.28$). This finding is consistent with other studies that have linked firm size with information and resource needs.

Robustness checks

We ran a number of supplementary analyses to help validate our hypothesis tests. These included possible bias due to estimation method, concerns regarding causality and *post hoc* models that examined whether results varied for high and low performing business group affiliates. In the interest of parsimony, we will briefly summarize each of these findings.

Our first analysis concerned possible bias due to data issues. Maximum likelihood is the most common form of estimation used for structural equation modeling, but can be sensitive to data non-normality issues. Consequently, we re-ran the Figure 1 model using generalized least squares, which is less sensitive to such problems. The ensuing model reported comparable results, with only minor changes in coefficient estimates and fit measures.

Second, because our data were cross-sectional, we ran two supplementary models to assess the causal structure implied by our hypotheses. The first scenario is that we have an omitted variable problem, and that all of the variables in our model are the consequence of some unobserved phenomenon. If so, we would expect that all study variables would load on a common dimension. Therefore, we ran a baseline single-factor model, which reported a χ^2 of 117.17 (14 df). The highly significant reduction in χ^2 enables us to reject a null hypothesis that study variables represented a common factor, and provides further support

for our hypothesized model. Second, it is possible that board interlocks might actually be a predictor of the other study variables, instead of a consequence. For example, the centrality of board ties could direct resource exchange between group members, an opposite direction than predicted in *H2*. Similarly, board interlocks could be used as an information tool to help groups decide on potential acquisitions. To test this scenario, we reversed the structure of the Figure 1 model: interlocks were the sole predictor, and the four remaining variables were modeled as endogenous. This model reported a significantly worse fit on χ^2 , and poorer fit scores on both GFI and RMSR [1]. Together, the results of these two supplementary tests provide additional support for our hypothesized model.

Finally, it is possible that high and low performing group members might have some variability in results. For example, a devil's advocate could argue that low performing affiliates could alternately be more or less central in the network – e.g., more central because of greater need for oversight, or less central because of the reduced value of their connections. Thus, although we did not hypothesize different results for high performers, we ran a supplementary model in the hopes of yielding normative information. To develop this model, we rank ordered each firm on both return on equity and return on assets. Using the combined ranks of both measures, we broke the sample into comparably sized high and low performing subgroups. We then replicated the Figure 1 model using data for the high performers. The magnitude of the path coefficients were largely the same as for the full sample results. For example, the high-performer coefficient for firm ties was 0.23, and ownership was 0.11; the respective coefficients for the full sample model were 0.25 and 0.09. However, neither of these subset coefficients were significant, reflecting the weaker power of the smaller sample used for this secondary analysis.

Discussion

The general contribution of our study rests on testing the boundaries of established and consolidated theories of the firm. By analyzing board ties among affiliated firms, we test the generalizability of agency theory and resource dependence theories to business groups (Ridder *et al.*, 2009; Edmondson and McManus, 2007; Snow, 2004).

Agency theory predicts that, because of information asymmetries and goal conflict, CEOs may pursue their private interests at the expense of shareholders; boards of directors – and interlocking directorates in particular (Zona *et al.*, 2018; Fich and White, 2003) – can function as a monitoring device to keep managerial opportunism in check. While scholars have assessed the validity of this perspective under varying conditions of ownership concentration (Dalton *et al.*, 2007), we extend the analysis to business groups.

Contrary to our expectations, the empirical test does not provide evidence that interlocking directorates play a monitoring role in business groups: along the vertical chain of ownership, a larger number of equity ties does not associate with a more central position in the business group network of board ties. Ownership appears to play a relatively minor role in shaping the interlock network structure.

This finding places a boundary to the generalizability of agency theory, regarding the role of equity ties and board interlocks. In recent decades, agency theory has been proved to powerfully explain behaviors in contexts other than public companies, such as family firms (e.g. Schulze *et al.*, 2001; Chrisman *et al.*, 2018), joint ventures (e.g. Lai *et al.*, 2017; NyoNyo Aung and Theingi, 2009; Hou *et al.*, 2013) and alliances (e.g. Rivera-Santos *et al.*, 2017; Villalonga and McGahan, 2005). This body of research aimed at exploring the validity of agency claims independently of ownership power. Along this line of research, our paper suggests that beliefs of a generalized validity of agency theory, independently of ownership power, may be misleading. In business groups, the agency view plays a relatively minor role to explain board control among business group members. Thus, this study constrains the explanatory power of agency theory, imposing limitations to the generalizability of its propositions regarding equity and board monitoring.

A second contribution regards the role of interlocking directorates as a reflection of resource dependencies among transacting partners. Resource dependence theory has long been the dominant perspective in the study of board interlocks (Hillman *et al.*, 2009). The theory conceives board ties as a mechanism to govern inter-firm uncertainty arising from business transactions among independently-managed corporations (Caiazza and Simoni, 2015). Thus, according to Pfeffer and Salancik (1978), board interlocks are devices to govern market-derived uncertainty. Within business groups, such market forces are attenuated. Thus, the original source of interlocking directorates, as outlined by Pfeffer and Salancik (1978) is substituted by firms operating in a “quasi market,” whose transactions are motivated by the pursuit of a common goal.

Despite lack of market competitive forces, we predict and find that resource dependence theory does powerfully predict board ties among transacting partners. This finding extends resource dependence theory to encompass an additional source of uncertainty beyond market-power, that is, the uncertainty associated with coordinating business activities of complementary assets in an administrative setting (Thompson, 1967). In sum, by testing resource dependence theory within business group, we extend its validity to encompass a different source of uncertainty, and in a context of “quasi market” such as the business group, whereby competitive market forces are attenuated (Yiu *et al.*, 2007; Granovetter, 1995).

It is worth noting that the examination of the resource dependence hypothesis has a more general value in the interest of resource dependence theory. Lack of data on firm-to-firm transactions has long constituted a severe limitation of previous test of this theory: “because the authors lacked data on direct business transactions between firms, they were forced to measure resource dependence at the industry level and then either restrict themselves to industry-level conclusions (as in Burt’s, 1980 work) or infer back to the firm level from the industry-level data” (Mizruchi, 1996, p. 274). As for our knowledge, our study is the first study on resource dependence, which is based on information at the firm level of analysis, as we build on transactions between specific firms (firm A delivers resources to firm B). Therefore, our research represents the first study on how patterns of resource exchanges between specific firms affect board ties.

Finally, our study also applies resource dependence theory to the geographical domain of business groups. Drawing on resource dependence theory, we posit that internationalization elevates the need for valuable information and resources (Kono *et al.*, 1998). Hence, cross-national ties should influence the network of interlocking (Caiazza and Simoni, 2015). We find evidence supporting this hypothesis, challenging some existing view on cross-national management and relations. Specifically, contrary to our resource dependence hypothesis, a legalistic perspective would suggest that boards are set up with no other means than the satisfying of legal requirements of the host country (Kriger, 1988; Leskell and Lindgren, 1982). Such reasoning would suggest no impact of foreignness on patterns of board ties: directors would likely be chosen in the local business community, as local directors would have a better knowledge of the local systems of law and administrative rules; moreover, accomplishment of legal requirements *per se* does not call for the establishment of linkages among boards of different affiliates. Our findings tell a different story. We do find that foreignness is a key variable, which explains the centrality of affiliated firms in the network of board ties. Such result reinforces the idea that board ties do function as a mechanism for information transfer among group’s member, as foreign affiliated firms operate in a different institutional context and, as such, deal with the problem of matching adaptation to local environment and expectations from the group holding company (Caiazza *et al.*, in press).

Our study also contributes to the literature on business groups. Scholars have devoted relatively limited attention to business groups, and their research efforts have mostly focused on business groups as “a financial device for corporate governance rather than an

organizational form” (Cainelli and Iacobucci, 2011, p. 1551). In their comprehensive literature review, Yiu *et al.* (2007, p. 1570) examine previously published studies in business groups, and conclude that – while coordination and control represent a core source of organizing and performance in business groups – little is known about how affiliated firms ensure coordinated action for the pursuit of common goals. “How do affiliates coordinate with each other to achieve objectives with mutual interests?” Our findings suggest that board interlocks play a key role in the coordination and exchange of information among board affiliates. Board ties among affiliated firms do exist, and such ties are more than vestigial appendages; rather, they mirror patterns of resource exchanges and areas of business criticality such as management of distant, foreign affiliated firms. Overall, this study contributes to clarify board roles under differing organizational settings (Sánchez *et al.*, 2017; Zona *et al.*, 2013).

Additionally, our paper adds to the work by Yiu *et al.* (2007, p. 1559), suggesting that the geographical dispersion of group affiliates represent an important consideration for the inner functioning and coordination of business group activities. Thus, our study contributes to research on business groups across borders. Scholars are placing an increasing attention to internationalization strategies of business groups (e.g. Choi *et al.*, 2014; Holmes *et al.*, 2018). In their extensive and recent literature review on international strategy and business groups, Holmes *et al.* (2018, p. 143) emphasize that “we still know little about the functioning of business groups boards across geographic markets,” calling for new research on this topic. Our paper contributes to this line of inquiry, outlining how affiliated firms located in geographically distant areas increase resource dependence and coordination needs, placing those firms in a more central position in the network of board ties. Thus, our study documents how interlocking directors are a core mechanism to manage complexity associated with internationalization strategies in business groups.

Our study also offers some practical implications. A common view of business groups in management research is that they emerged because of local market imperfections (Granovetter, 1995). By extension, the need for business groups would decline as markets evolve. However, groups in many regions – such as Argentina and Korea – have adapted successfully to fundamental shifts in their market conditions. Groups can also be found in a number of mature economies, including Belgium, France, Italy, Japan, Spain and Sweden. Studying the inner functioning of business group in a mature economy, such as the Italian economy, may not only advance theory regarding within-group processes, but also provide some guidance for groups in economies that are becoming more mature. Particularly, the evidence from this study suggests that business group management in emerging economies should pay attention to the design of board ties, in order to tap coordination and information needs among transacting partners and foreign relations.

Limitations and suggestions for future research

Our data were collected from one of the larger Italian business groups: the sample is a prominent component of the MIB30, the top firms traded on the Borsa Italia. Our business group and affiliated firms are representative of Italian large-sized groups (Istat, 2015). Further, our sample is consistent with previous research on business groups in Italy. For example, Zattoni (2002) conducts an in-depth analysis of a selected sample of five large-sized business groups: the average number of employees of large-sized groups is 70,000 (80,000 in our sample); the average revenues is Euros 31bn (slightly less than 29 in our sample); the average number of affiliated firms in examined groups is 157 (155 in our sample). Further, Zattoni (2002, p. 65) emphasizes how distinct features and ownership structures are strongly uniform within the country.

Business groups are socially and institutionally embedded within specific and distinct country settings: thus, as outlined by Holmes *et al.* (2018), research on this topic is commonly

understood to be exposed to potential issues of generalizability. To mitigate this concern, we follow indications by Yiu *et al.* (2007) that recommend to situate business group research within a broader framework, formalizing business group types across national settings. Given our focus, our research can be representative and generalizable to other M-form business groups. While the sample selection and insights from Yiu *et al.*'s (2007) frameworks help mitigate concerns for generalizability, this issue does represent a limitation of our study, as in much published research on business groups (see Holmes *et al.*, 2018). Cross-country research on business groups, comparing keiretsu, chaebol, Italian groups and the like, is certainly needed to push the forefront of business group research ahead. Thus, extending our analyses to other types of business groups is an important avenue for future studies.

A second limitation common to most board research is our use of archival data. While our analysis can track patterns of ownership and transactions, we still do not know how directors within a group perceive their roles, or what types of information flow between boards. Kriger's (1988) analysis of subsidiary boards provides an exemplar for future studies on business group boards, as he collected survey data on how executives perceived the roles of boards, and whether perceptions varied across parent and divisions. Consequently, survey analysis of business group directors would offer a more fine-grained extension of our analysis.

Another opportunity for future research concerns the link between nationality and network position. We hypothesized that subsidiaries that are further from the parent would have more extensive board ties: such ties represent an important source of information, and also help the parent to create a cohesive organization. There are a number of empirical questions that emerge from our findings. The first is the relative importance of the two roles, information and cohesion, and whether parent and subordinate firms differ in the perception of these roles. Earlier work on subsidiary boards (Kriger, 1988) illustrated how perceptions of board roles differed across parent and subsidiaries. A second question is how a firm's strategic orientation may affect these roles. For example, a firm that competes in multiple markets and regions – regardless of whether it is a group or MNC – will make choices that affect its structure, information processing, control and other organization design needs. In turn, these elements shape a firm's internal network structure (Ghoshal and Bartlett, 1990). Consequently, it may be worthwhile to examine whether a firm's strategic orientation affects the centrality of foreign subsidiaries. Finally, there is some speculation that subsidiary boards with only partial control by an owner may be more active than the boards of wholly-owned subsidiaries (Leskell and Lindgren, 1982; Kriger, 1988). To test this argument, a future study could examine whether there is a difference in the prominence for foreign subsidiaries for wholly vs partially owned subsidiaries.

Future research could also consider alternate metrics of distance from the parent organization. While many studies have used dummy variables to capture proximity (e.g. Agrawal, 2006; Bell, 2005), an alternate approach is to create a continuous measure of distance – e.g., Ragozzino and Reuer (2011) used zip code data to measure the distance between IPO firms and their investors. This approach assumes that the effects of distance are purely linear. Alternately, metrics such as Hofstede's dimensions or GLOBE indices could tap cultural dissimilarity.

Conclusion

Business groups and corporate governance are both prominent topics in the management and strategy literature. Despite the importance of these topics, however, there has been only limited work to date that looks at the intersection of these two streams. Our paper helps to fill this gap through identification of roles played by directors of a large Italian business groups. We hope that this work stimulates further research on the boards of directors in different types of business groups.

Note

1. We ran this alternate model two ways: first, keeping the disturbance terms of the dependent variables independent, and second, allowing them to covary. Both versions reported worse fit than our hypothesized model on all three fit measures.

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Appendix 1. Illustration of different network measures

The three network measures used in our analysis – betweenness, power and reach – tap overlapping yet distinct aspects of a firm's position in the group. This Appendix uses a simple network model to illustrate different types of centrality. The system shown has 17 members. There are three distinct groups within the network. The first, comprised of firms 1, 2, 3, 4 and 6, is a traditional hub-and-spoke model, reflecting one central member, and subordinate firms on the periphery. The second group, comprised of firms 7 through 10, resembles the former group, with the exception of slightly more lateral ties among members. The third group, made of up firms 13 through 17, is characteristic of a decentralized form, with extensive lateral ties. Two firms, 5 and 11 are isolates – i.e., they have no ties to any other firm in the network. Finally, firm 12 could be a member of either or both the second and third groups (Figure A1).

We used UCINET to calculate measures of betweenness, power and reach centrality for each firm in the network (Figure A2).

Firm 8 scores highest on betweenness, as it is a key intermediary between members of all three groups. Firm 12, despite having only two direct ties, scores next highest on betweenness, as it is the only conduit between the second and third groups. Finally, firms 13 and 3 score next highest on this variable, reflecting their roles as intermediaries as well (Figure A3).

Scores for power reveal a very different pattern. The variable is dominated completely by the third group: firms 14 through 17 are tied for the second highest scores, while firm 13 is ranked first due to its extra tie to firm 12. Firm 12 would be consider the sixth most powerful member of the network (Figure A4).

Finally, scores for reach yield another set of rankings. Reach measures indirect ties, and the key firms are the three hubs of the respective groups: firm 3 has the highest score on this variable, followed by firms 8 and 13.

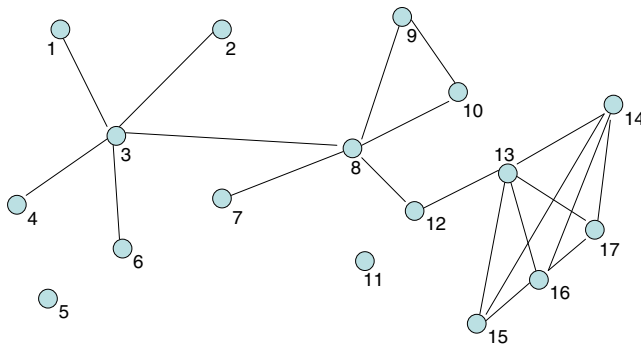


Figure A1.
Basic network
diagram

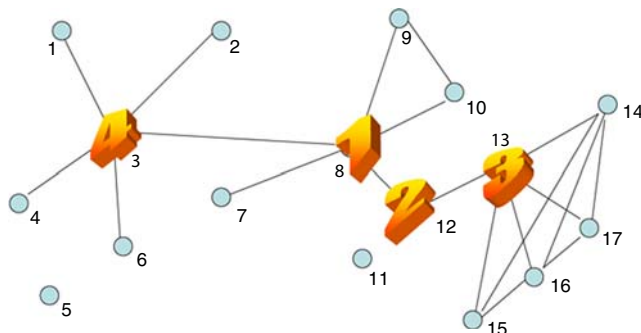


Figure A2.
Top firms for
betweenness

Figure A3.
Top firms for power

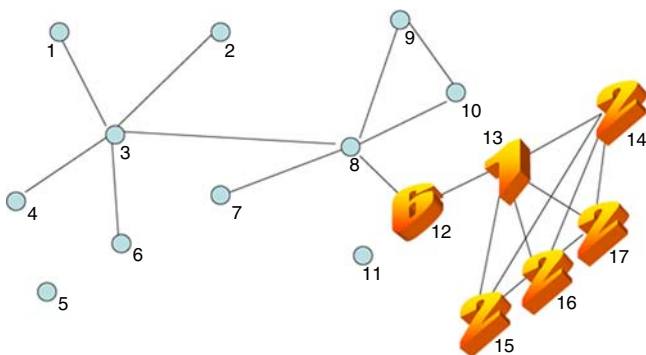
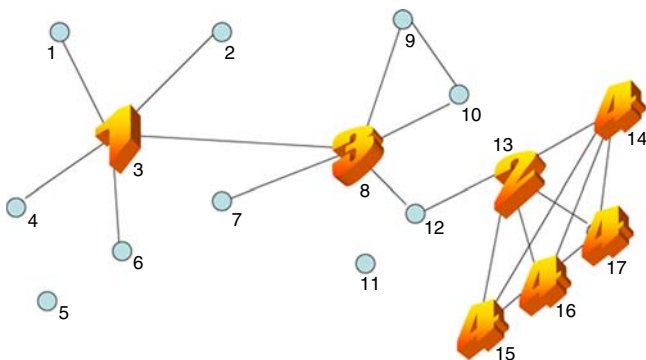


Figure A4.
Top firms for reach



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