The Properties of Interlocking Directorates in the Philippines: An Exploratory Analysis

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Abstract

Governance has become an increasingly important factor in the investment decisions of firms and investors. Thus, it is important to determine the quality and composition of corporate boards, which are vital overseers who act in the best interests of shareholders to improve and strengthen them. While interlocking directorates are not a recent occurrence in the Philippines, updated literature on the structure of the country's board interlock network is sparse. Thus, this study provides a baseline snapshot by analyzing all 251 publicly-listed companies on the Philippine Stock Exchange at the director and board levels. More so, the study utilizes social network analysis tools to describe the properties of interlocking directorates and visually maps out the social network that underpins these relationships. It reveals that the board network is extensive, with almost 90% of firms connected, thanks to a handful of key directors who have high degrees of connectivity.

Keywords: Board interlock, interlocking directorate, network analysis, Philippines, centrality

1.0 Introduction

Environmental, social, and governance (ESG) factors are becoming increasingly more important in investment decisions (Bernow & Nuttall, 2020; Nelson, 2022; Wolinsky, 2022), with 2021 declared as the "year of ESG investing" (Kerber & Jessop, 2021). Corporate governance is one of the major pillars of ESG, and has been linked to increased transparency of operations (CFA Institute, 2021), better accountability (Rowles, 2021), and superior performance (Tang, 2019).

As the elected representatives of its shareholders (Conmy, 2021), a company's board of directors is tasked with oversight of its strategy and operations (Adams et al., 2010). It is expected to act in shareholders' best interests (Fama & Jensen, 1983) and is the primary influence on the quality of a company's corporate governance (Chen, 2021). As such, the composition and quality of the board are particularly important to shareholders.

When companies share the same directors, an interlocking directorate is formed. A director who is a member of multiple boards is called an interlocking director, and the connection created between firms is called a board interlock (Lamb, 2017).

Board interlocks are controversial. Louis Brandeis, former associate justice of the U.S. Supreme Court, considered the practice of bankers who join the corporate boards as "the root of many evils," offending "laws human and divine" (Etzion & Davis, 2008). It is codified in U.S. antitrust law that, with few exceptions, corporations that compete directly, other than banks, banking associations, and trust companies, may not have interlocking directors or officers (Commerce and Trade, 1925).

In the Philippines, interlocking directors are legally acceptable – contracts between corporations that share interlocking directors are allowed, as long as the contract is deemed fair and reasonable and is not fraudulent (Revised Corporation Code of the Philippines, 2018). The Securities and Exchange Commission recommends, but does not mandate, a maximum of ten public company directorships for non-executive Board members, which is reduced to five if at least three of the companies are publicly-listed (Philippine Securities and Exchange Commission [SEC], 2019).

The Bangko Sentral ng Pilipinas prescribes additional policies for financial institutions under its purview, and poses restrictions on banks in the same category with similar business models and target markets that are not part of the same banking group. However, interlocking directorships are generally allowed (Bangko Sentral ng Pilipinas, 2021).

This exploratory study examines the network of directors in the Philippines and describes its characteristics through the lens of network analysis. How closely interlocked are the directors of publicly-listed companies, and which directors and companies are the most highly connected? To our knowledge, no comparable study has been conducted for the Philippines. By establishing a baseline measurement, we aim to facilitate a greater understanding of the relationships that connect the country's publicly-listed firms.

Review of Literature

Interlocking Directorates

Why do interlocking directorates form? The most widely supported perspective is the resource dependence theory, which posits that the company uses interlocked directors to access other companies, thus providing it with external resources that helps maximize performance (Pfeffer & Salancik, 1978).

Many studies are conducted through the lens of resource dependence (Chu & Davis, 2016; Dooley, 1969; Zahra & Pearce, 1989) and explain why banks used to be very tightly interlocked with other companies. In addition to resources, interlocking directors also serve as conduits to facilitate the transfer of knowledge (Shropshire, 2010) and diffusion of strategies (Battiston et al., 2003; Braam & Borghans, 2009) and practices (Karim et al., 2021).

The control perspective proposed by John Scott (Stokman et al., 1985) views interlocking directorships as a means for families to supervise their holdings. While not as relevant for American firms due to their mostly-diversified ownership structures, this model still applies to countries with closely-held family-owned corporations, such as Hong Kong (Au et al., 2000).

The class hegemony perspective contributed by Soref and Zeitlin (1988) considers interlocks as an expression of "class cohesion" perpetuated by wealthy and well-connected families. The aim is to form an inner circle with other peers to exercise economic power and influence (Carroll & Sapinski, 2011).

Finally, Santos et al. (2012) theorize that board interlocks in Brazil may occur due to the relative scarcity of qualified board members as a result of the small size of the country's business community, a situation that is shared by the Philippines.

Impact of Interlocking Directorates

The literature is divided on how interlocking directorates affect company performance. Resource dependence theory predicts that performance should improve when constraints are relaxed, while the agency theory proposed by Jensen and Meckling (1976) predicts the opposite. Since interlocked board members must split their time and attention between multiple boards, their performance should decline.

Some studies found a positive relationship between interlocking and performance, thus supporting the resource dependence theory (Drees & Heugens, 2013), while other studies found

a negative relationship, supporting the agency theory (Farwis & Nazar, 2019; Kaczmarek et al., 2014; Roudaki & Bhuiyan, 2015). Some studies also found no relationship, thus supporting neither view (Fligstein & Brantley, 1992; Meeusen & Cuyvers, 1985).

Interestingly, Zona et al. (2018) attempt to reconcile the two viewpoints by examining the balance of power between interlocked firms and the primary purpose of the interlock. Resource-rich firms that seek to interlock to gain power and influence lead to bad performance, while resource-poor firms that interlock to gain access to resources benefit from it.

Network Diagrams

A network graph or diagram graphically shows how various entities are interconnected. It consists of two elements: nodes, which represent entities, and edges, which represent relationships between entities. A directed graph has edges that indicate the direction of the relationship, with an arrowhead pointing to the destination node. On the other hand, social network diagrams are typically undirected since relationships between nodes are reciprocal – if A knows B, then B also knows A.

Interlocking directorships can be represented in a network diagram in three ways. A bipartite graph consists of both company boards and board directors. Boards are connected to directors, with interlocks occurring when one director is connected to more than one board. Bipartite networks can be converted into unimodal networks, which can either consist of directors or company boards. Directors (boards) are joined with other directors (boards) if they have at least one company board (director) in common (Battiston & Catanzaro, 2004). Figure 1 illustrates how a bipartite network would be converted into unimodal director and corporate board networks.

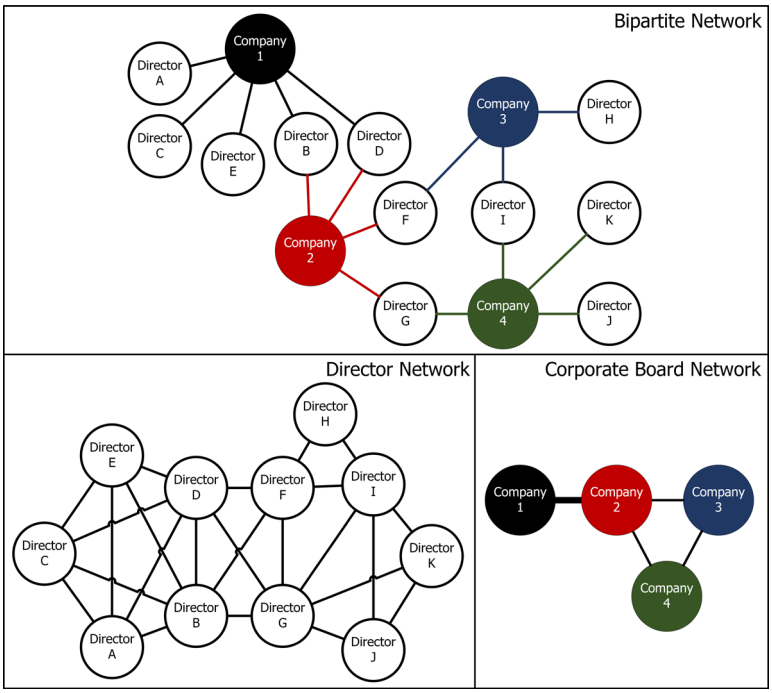


Figure 1. *Three Types of Network Diagrams*

Computers are integral in the development of social network analysis, with anthropologist Alvin W. Wolfe arguing that the fields could not have developed without them. Programs commonly used to analyze networks include STRUCTURE, GRADAP, and particularly, SONIS and UCINET (Mizruchi, 1996). Free open-source alternatives include Gephi, Cytoscape, Graphviz, and SocNetV.

Related Studies

Studies that involve interlocked directors are broadly segmented into two categories. The first category uses interlocks as a variable in a regression, while the second category applies network analysis and examines the characteristics of the interlocked network.

One of the oldest studies on corporate director networks examined the relationship of big German banks to industrial companies (Jeidels, 1905). More recently, Dooley (1969) found that interlocking with financial corporations increases as the solvency of the focal non-financial corporation decreases.

The earliest instance of the second category is John Hobson's hypergraph in 1894, which showed how De Beers and Rand Mines used interlocking directorates to control other firms in South Africa (Freeman, 2004).

American Studies

Numerous studies have been conducted on companies in the United States. Hallock (1997) found that interlocked CEOs earn higher pay than non-interlocked CEOS. Davis et al. (2003) determined that banks formed the linchpin in interlock networks, with no apparent change in connectivity from 1980 to 1990, although this has declined by 1999 (Battiston & Catanzaro, 2004). Conyon and Muldoon (2006) determined that the average board size consists of ten directors, holding 1.63 seats on average. 80% of companies are linked to other companies by one interlocking director, a fact corroborated by Saavedra et al. (2014). Saavedra also calculated a median board size of nine, an average degree of separation of 4.6 for interlocked firms, and concluded that connectedness was not linked to stock returns.

A study in Canada examined factors that affected the connectivity of board members, and concluded that age, gender, and earning a foreign degree were impactful. Additionally, it found that female interlocked directors tend to have denser networks (higher degree and betweenness centrality) but lower closeness centrality, thus having less overall reach (Samarbakhsh & Tasic, 2020) compared to male counterparts.

A Brazilian study found a non-linear relationship between interlocks and return on assets, concluding that a low to moderate degree of interlocking is beneficial. Higher interlocks (having directors with three or more directorships) are harmful, supporting the agency theory (Santos et al., 2012). A later study found that interlocks have no impact on a firm's market value (Dal Vesco & Beuren, 2016).

A study covering five Latin-American countries concluded that Mexican and Chilean firms have highly-connected and robust interlock networks, while Brazilian and Colombian firms are disconnected and fragile. Peru is in between but closer to Chile (Cárdenas, 2016). In times of uncertainty, interlocked directorates increased organizational performance in both Chile and Mexico, although the effect was stronger in Chile (Watkins-Fassler et al., 2016).

European Studies

A number of studies were conducted in Italy, including Bianco and Pagnoni (1997), who found

that interlocks have replaced actual ownership stakes as control mechanisms between companies. Drago et al. (2011) studied blue-chip companies and found that interlocks siphon value from minority shareholders in favor of the majority. However, interlocks and cliques have declined due to the 2008 economic crisis (Romano & Favino, 2013) and the passage of a 2011 law discouraging them (Fattobene et al., 2018).

In Spain, family-owned firms were less connected than their corporate counterparts; however, the largest family firms developed dense links to other companies through their independent directors (Salvaj et al., 2008). More recently, Hernández-Lara and Gonzales-Bustos (2019) found that having independent or outside-industry interlocking directors have a beneficial impact on the company's innovation.

Interlocks were shown to facilitate the diffusion and adoption of the Balanced Scorecard in the Netherlands (Braam & Borghans, 2009). In Belgium, interlocking directorates negatively affect profits of stand-alone firms, but not companies belonging to a group (Rommens et al., 2007).

Pan-European studies include a 10-country study that included the United States and nine other European countries (Stokman et al., 1985) and a study that found an increase in the degree of interlocks over time for a network that transcended national borders and facilitated the creation of a pan-European business elite (Heemskerk, 2013).

African and Middle East Studies

In South Africa, Durbach and Parker (2009) applied network analysis tools and determined the South African interlock network was comparable to the networks of developed countries. Senekal and Stemmett (2014) generated network maps to identify the most central players in the interlock networks of banks, and in a later study found that banks occupy central positions in the country's overall network (Senekal & Stemmet, 2019).

Hamdan (2018) corroborated the Brazilian study by Santos et al. (2012), finding that firms in Saudi Arabia with interlocked boards tended to have better performance, although the effect was limited to interlocked directors serving on six or fewer boards.

Australasian Studies

In India, a study by Shaw et al. (2016) supported the resource dependence view, with highly-connected companies earning higher stock returns. However, the opposite applies in Sri Lanka, which supported the agency theory when director interlock, board size, and CEOs holding a dual role as the chairman of the board decreased company performance (Farwis & Nazar, 2019).

In China, board interlocks are correlated with firms successfully executing cross-border acquisitions (Xie et al., 2020). In South Korea, a study found that CEOs tend to recruit directors from within their school's alumni group, supporting the class hegemony perspective (Y.H. Kim & Kim, 2008).

Lee and Velema (2014) conducted a comprehensive study that calculated statistics for Taiwan's board interlock network throughout the 20th century. The results show that although the intensity and degree of connectedness have declined through time, the network remains dense and resilient.

Murray (2001) found no support for resource dependence in Australia – it was not evident that bank interlocks are used as a source of capital; thus, interlocks may be political in nature in Australia. A later study showed that although companies tended to interlock with financial companies, companies in the same industry, companies of

the same size, large companies, and companies in the same region, the degree of connectedness has decreased in recent years (Etheridge, 2012).

A study in New Zealand supported the agency theory: interlocks resulted in worse performance, especially when there is concentration of ownership. However, only 29% of companies are interlocked, linked only to an average of five other companies (Roudaki & Bhuiyan, 2015).

Southeast Asian Studies

In Thailand, a study compared the interlock networks of local companies to multinational enterprises (MNEs), and found that MNEs have denser networks, are more connected, and are more likely to have directors linked with the military.

An exploratory study in Malaysia found that the business network has moderate connectivity overall, although a small portion is highly interconnected (Jamaludin & Hashim, 2018). In Indonesia, Pertiwi and Yulianto (2020) found support for the resource dependence theory, with interlocked firms having higher profits.

Ong et al. (2003) conducted an exploratory study to determine factors that correlate with the degree of interlocks of Singaporean firms. The study found that interlocked companies tend to have more assets, are more profitable, and have higher market capitalization, supporting the resource dependence theory. A later study by Tan et al. (2009) compared Chinese firms that listed on the Singapore Stock Exchange to their local counterparts and found that the Chinese companies are more heavily interlocked.

Philippine Studies

The literature on interlocking directorates in the Philippines is relatively sparse. A 1978 study examined the interlocking directorates that the 12 largest commercial banks shared with other enterprises (Doherty, 1983).

A follow-up study in 1988 traced interlocking directorships from banks to the 1,000 largest corporations and found a high degree of conglomeration, with major banks interlocked with firms in highly-concentrated industries (Tan, 1993).

More commonly, Philippine studies in this area typically use corporate board attributes such as multiple directorship positions, board size, the presence of independent directors, and the percentage of accountants on the board of directors to measure the impact on potential earnings manipulation (Banderlipe, 2009; Cudia & Dela Cruz, 2018; Descalzo et al., 2017), share price (Banderlipe, 2012), and return on equity (Ferrer & Banderlipe, 2012).

Node Parameters and Attributes

Nodes can be described in one of two ways: how it stands in relation to all other nodes in the network and how well it is connected to them. The shortest path length measures how far each node is, on average, to the other nodes in the network, while eccentricity refers to the maximum distance that a node has to the node furthest away from it (Hage & Harary, 1995). Lower values for both measures indicate a higher degree of connectivity.

Neighborhood connectivity is a second-order measure of average connectivity that measures the number of neighbors of the focal node's neighbors (Maslov & Sneppen, 2002). A higher value indicates greater connectivity.

A node's clustering coefficient, as proposed by Watts and Strogatz (1998), measures how densely connected a node is, by taking the ratio of how many edges it shares with its direct neighbors,

to how many edges could exist between the neighbors. A higher value indicates greater density.

In network analysis theory, a particular node's importance or degree of influence is measured by centrality. There are four standard measures of centrality. The most basic measure, degree centrality (Proctor & Loomis, 1951), counts how many edges a node has. Based on this measure, whoever has the most ties is the most central.

Betweenness centrality was developed by Anthonisse (1971) and measures how influential a node is by counting how many times it appears in the shortest path between every node pair in the network. A high betweenness indicates that the node plays an important role in transmitting information in the network.

Closeness centrality, as defined by Sabidussi (1966), also uses the shortest paths between every node pair but measures how many steps it takes to reach all other nodes in the network. Closeness is a reciprocal of this distance, and a smaller value indicates the node can reach other nodes more quickly.

Finally, Bonacich's (1987) eigenvector centrality measures a node's influence by the influence of the nodes it is connected to. Nodes that are connected to other nodes with high influence are considered to be influential. Google's PageRank algorithm is a famous variant of this algorithm.

Network Parameters and Attributes

On a basic level, the network's density is measured by calculating the number of connected nodes and edges. The unimodal networks can omit certain elements; for example, the corporate board unimodal network excludes companies that do not have any interlocking directors.

A connected component is the connection of two or more nodes. Depending on how interconnected the network is, a network can have a single massive component or several clusters with nodes that are tightly connected to other nodes in the cluster but not to the rest of the network. The strength of connections can be measured by the number of connected components, and the number of nodes that are disconnected from the central cluster or the network's largest connected component. In both cases, a smaller number indicates stronger connections.

Connectivity can also be measured by the shortest path length, which is the average distance between any two connected nodes. On the other hand, the network diameter measures the largest distance between the two most distant nodes in the network, while the network radius is the minimum of the maximum distance of all the nodes. A smaller number indicates greater network connectivity and faster transmission of information in all cases.

A node's average number of neighbors measures how well-connected the network's nodes are. This can be normalized to calculate network density, which gives a network with zero connections a density of 0, and a clique with all nodes connected to each other a density of 1. Alternatively, the network's clustering coefficient averages the cluster coefficient of all nodes in the network, with a higher coefficient indicating a dense network composed of cliques.

Finally, the topography of a network can be measured through network centralization, which determines if there are a few nodes that are more important than the other nodes. A star network with all nodes connected to a single central node has a value of 1, while a fully-decentralized network where all nodes are interconnected will have a value close to 0.

2.0 Methodology

We scraped the Philippine Stock Exchange (PSE) website on October 31, 2021, capturing data on the stock ticker symbol, company name, industry classification and subclassification, market capitalization, and the names and positions of the board of directors and managerial team. Since the PSE organized the information by share issue, duplicate data were discarded in cases where a company has issued multiple classes of shares (e.g., preferred stock).

Since there were differences in how names were reported, the list was manually cleansed. Name variations were consolidated where applicable. For example, "Arsenio Alfiler, Jr." and "Arsenio A. Alfiler, Jr." were considered to be the same person, while "Max Francisco Jose O. Borromeo" was considered distinct from "Max Francisco Jose R. Borromeo."

We classified names into male and female by analyzing the name itself. Filipino names ending in "o" are almost always male, while names ending in "a" and "e" are almost always female. All names with generational suffixes, such as Sr., Jr., II, and III, were encoded as male. If there was potential confusion in the gender, as in the case of gender-neutral names such as Alex or Ariel, or for foreign names in Chinese and Japanese, we examined corporate disclosures and searched on social media to determine the gender. The cleansed director names were cross-referenced with the management names to ascertain whether the director is an insider director (i.e., holds a position in the management team) or not.

Our final dataset consists of 251 publicly-listed corporations on the Philippine Stock Exchange, accounting for 2,325 board seats and 1,634 directors. From this data, we generated a bipartite network table consisting of two types of nodes – directors and company boards – that connect to the other type of node. We then applied an algorithm in Microsoft Excel to generate tables for the director network and the corporate board network.

All three networks were imported into the free open-source software Cytoscape 3.9.0 and were visualized using the yFiles Organic Layout algorithm. The algorithm treats nodes as mutually repulsive physical objects attached with a spring, which is a layout suitable for social networks with densely-connected cores and looser regions at the periphery (yWorks, n.d.). Network statistics were calculated using Cytoscape's Analyzer feature, and centrality calculations were derived using the CytoNCA plugin (Tang et al., 2015).

3.0 Results and Discussion

Table 1 summarizes demographic statistics on corporate boards. Many companies opt for large boards, with a median of 9 and a maximum of 16 (First Philippine Holdings Corporation). While data suggest that 2,325 board seats allocated to 1,634 directors should result in an average of 1.42 positions per director, the actual quantity (2.10) is much higher due to some directors participating in more than two boards.

Over 45% of directors hold multiple board seats, although some industries, particularly financial institutions, have more single-seat directors. The cumulation ratio, which divides total positions held by interlocking directors by the number of board seats (Fattobene et al., 2018), is high at 1.57. The degree to which boards are interlocked varies with the industry. Financial companies have the lowest proportion of interlocking directors and the lowest cumulation ratio, while holding firms have the highest figures. This suggests that corporate control is exerted through holding firms and not through affiliated financial firms.

Diversity is relatively low, with female directors accounting for less than a fifth of total directors. However, there are a few outliers with boards whose memberships are majority female (BH, FDC, HOME, LTG, MONDE, and TFHI).

Despite the relatively high degree of interlocking, over ¾ of all directors serve on a single board (Table 2). The frequency distribution for the number of boards served by directors roughly follows a power distribution among all demographics: male directors, female directors, independent directors, and insider directors.

The two most prolific directors, holding nine directorships each, are Lance Gokongwei (APVI, CEB, JGS, MER, OPM, RCR, RLC, RRHI, URC) and Sergio Ortiz-Luis, Jr. (ACE, AGI, FPI, JOH, MREIT, PHES, SPC, WIN, WPI).

Table 1. *Descriptive Statistics, Corporate Boards*

	Sample	Average Board Size	Board positions per Director	Interlock directors %	Cumulation Ratio	% of Female Directors	% of Independent Directors	% of Insider Directors
Overall	251	9.26	2.10	45.68%	1.57	17.96%	29.27%	24.11%
Maximum		16.00	5.00	100.00%	4.89	63.64%	80.00%	71.43%
Median		9.00	1.91	44.44%	1.57	14.29%	28.57%	22.22%
Minimum		5.00	1.00	0.00%	0.18	0.00%	0.00%	0.00%
Breakdown by Industry								
Financials	28	11.54	1.64	33.85%	1.04	19.57%	30.47%	15.65%
Holding Firms	37	9.22	2.47	57.79%	2.03	20.21%	29.31%	25.47%
Industrial	63	9.22	2.06	42.17%	1.57	18.92%	31.06%	22.87%
Mining & Oil	23	8.91	2.18	55.58%	1.80	13.69%	26.17%	22.65%
Property	43	8.77	2.12	48.62%	1.56	17.45%	28.77%	26.76%
Services	57	8.74	2.08	41.31%	1.51	16.75%	28.32%	27.33%

Table 2. *Descriptive Statistics, Directors*

No. of Boards Served	Total		Male		Female		Independent		Insider	
	No.	%	No.	%	No.	%	No.	%	No.	%
1	1,260	77.11	1,002	75.91	258	82.17	339	75.67	329	80.44
2	209	12.79	179	13.66	30	9.55	55	12.28	52	12.71
3	86	5.26	73	5.53	13	4.14	30	6.70	10	2.44
4	39	2.39	33	2.50	6	1.91	12	2.68	9	2.20
5	23	1.41	17	1.29	6	1.91	7	1.56	4	0.98
6	9	0.55	8	0.61	1	0.32	2	0.45	4	0.98
7	2	0.12	2	0.15	-	-	1	0.22	-	-
8	4	0.24	4	0.30	-	-	1	0.22	-	-
9	2	0.12	2	0.15	-	-	1	0.22	1	0.24
TOTAL	**1,634**		**1,320**		**314**		**448**		**409**	

Table 3 shows statistical information for board interlocks, as measured by the average degree centrality of each connected board. 10% of the companies have isolated boards whose directors do not hold positions on other boards, although on average, a company is connected to 6.36 other companies. Degree centrality varies with the industry; holding companies are more heavily connected (7.49 on average), while property companies have fewer connections (5.37 on average). This is consistent with how Philippine capitalism is organized – business groups are clustered around flagship companies and expand through diversification into service and high-yielding, non-manufacturing industrial activities (Raquiza, 2014).

Two service industries in particular, banking and real estate, capitalize on the fastest-growing segments of the Philippine economy. Remittances by foreign workers, most of which are coursed through banks, account for almost 10% of GDP and 8.9% of GNI in 2021 (de Vera, 2022), while demand for real estate is driven by the country's business process outsourcing sector (Valmonte, 2022). Since most companies in these two industries are newer, they would have fewer links to other companies.

How diverse are the connections of Philippine firms? Table 4 shows that boards mainly share directors with firms outside their industry, even when applying a stricter standard for interlocks (2 or more shared directors) to filter out weaker connections. The intra-industry linkages of most industries hover around the 20% mark, signaling a need for intra-industry communication and transmission of information.

However, holding firms and financial firms have significantly greater interlocks outside their industries (4.82% and 3.13% respectively). This suggests that business groups use both types of firms as a control mechanism for affiliated businesses, given that board interlocks are created with firms in different industries.

Table 3. *Descriptive Statistics, Board Interlocks*

	Overall	Financial	Holding Firms	Industrial	Mining & Oil	Property	Services
Maximum	22.00	18.00	19.00	21.00	16.00	15.00	22.00
Median	5.00	5.50	7.00	5.00	5.00	4.00	5.00
Average	6.36	5.71	7.49	7.06	6.57	5.37	5.82
Frequency Distribution							
No interlocks	10.4%	17.9%	8.1%	11.1%	8.7%	7.0%	10.5%
1 to 2 interlocks	15.9%	14.3%	10.8%	19.0%	8.7%	16.3%	19.3%
3 to 5 interlocks	27.5%	17.9%	21.6%	23.8%	34.8%	39.5%	28.1%
6 to 10 interlocks	26.3%	35.7%	32.4%	20.6%	21.7%	25.6%	26.3%
11 to 15 interlocks	12.4%	10.7%	16.2%	9.5%	21.7%	11.6%	10.5%
15 to 22 interlocks	7.6%	3.6%	10.8%	15.9%	4.3%	0.0%	5.3%
No. of firms	251	28	37	63	23	43	57

Table 4. *Inter-Industry Interlocks*

	SECTOR	A	B	C	D	E	F	Total	% within industry
At least one shared director									
A.	Financials	10	28	51	12	12	37	150	6.67%
B.	Holding firms	28	22	87	28	40	50	255	8.63%
C.	Industrial	51	87	63	36	56	89	382	16.49%
D.	Mining & oil	12	28	36	13	23	26	138	9.42%
E.	Property	12	40	56	23	24	52	207	11.59%
F.	Services	37	50	89	26	52	39	293	13.31%
At least two shared directors									
A.	Financials	1	11	8	1	3	8	32	3.13%
B.	Holding firms	11	4	21	11	16	20	83	4.82%
C.	Industrial	8	21	19	8	18	21	95	20.00%
D.	Mining & oil	1	11	8	8	2	6	36	22.22%
E.	Property	3	16	18	2	13	21	73	17.81%
F.	Services	8	20	21	6	21	16	92	17.39%

Table 5 summarizes the characteristics of the initial bipartite network (Figure 2), as well as the derivative corporate board (Figure 3) and director (Figure 4) networks. The board and director networks have high inclusiveness – over 85% of boards and over 80% of directors are linked to the largest connected component of the network (the "central cluster").

The networks are relatively short, with companies in the central cluster able to access any other connected company in less than four steps, while directors are connected to other directors in less than five degrees of separation. This is confirmed by the network diameter and radius, which are relatively low given the size of the network.

The high clustering coefficient for the director network suggests that it is highly cliquish in nature, and that directors can be readily subdivided into smaller groups that know each other. Network heterogeneity is moderately-high for both networks, which means a handful of companies and directors serve as key hubs that connect one portion of the network to another.

The networks do not have a central component, as is exhibited by the low degree of network centralization. This means that the networks are generally decentralized and rely on key players to hold everything together. In the Philippines, interlocking directorates have created a decentralized network that consists of mostly-separate cliques connected by key well-connected individuals.

Table 5. *Summary Network Statistics*

Statistic	Bipartite	Corporate Boards	Director
No. of connected nodes	1,885	225	1,634
No. of edges	2,325	798	9,493
No. of connected components	31	5	31
No. of disconnected nodes	—	26	—
Connected nodes outside central cluster	335	10	301
Nodes in central cluster as % of total	82.23%	85.66%	81.58%
Central Cluster Attributes			
Shortest path length	8.782	3.672	4.508
Network diameter	20	9	10
Network radius	10	5	5
Average number of neighbors	2.604	7.367	12.379
Clustering coefficient	0.000	0.438	0.866
Network density	0.002	0.034	0.009
Network centralization	0.009	0.069	0.043

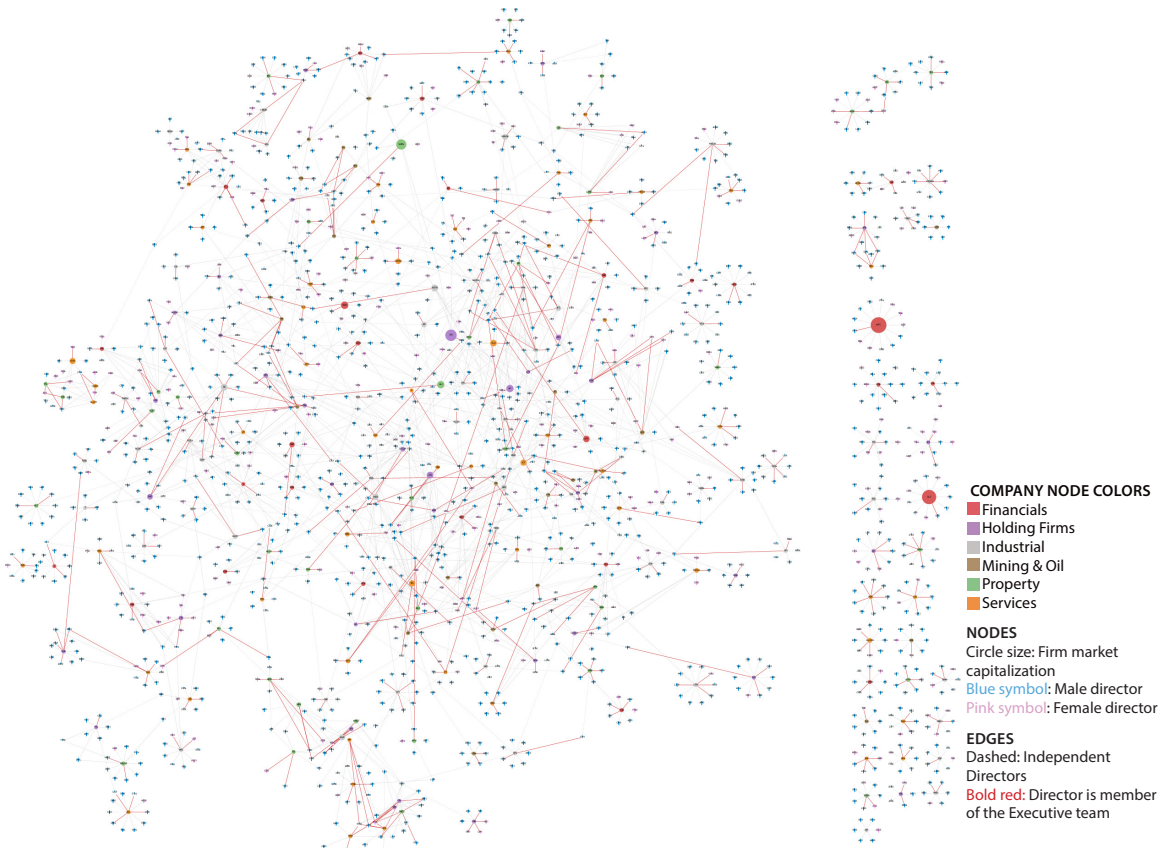
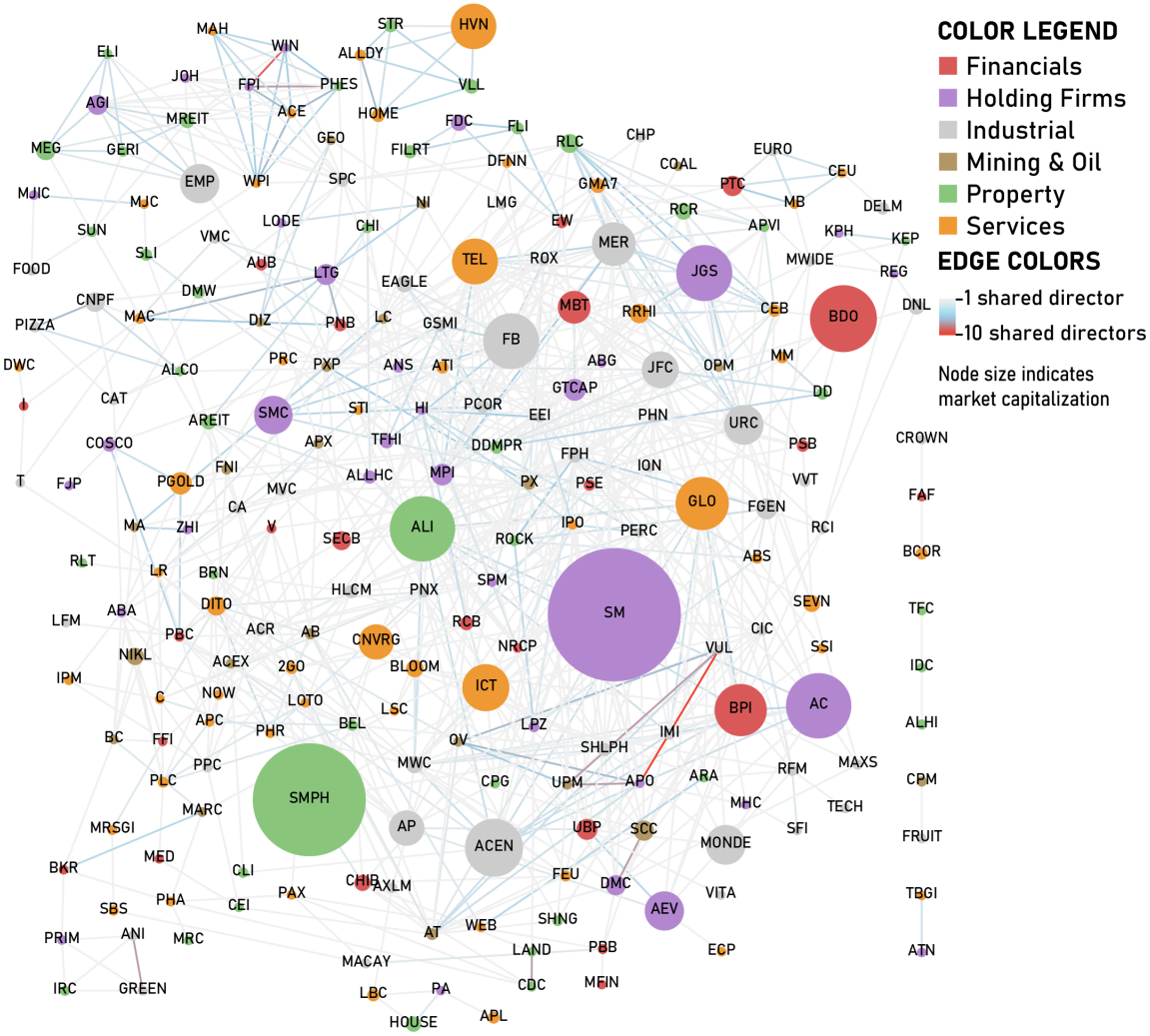


Figure 2. *Bipartite Network*



The following companies are isolated and do not share any board member with any other firm:

1. BHI
2. BMM
3. BSC
4. CIP
5. COL
6. CSB
7. EVER
8. FERRO
9. GPH
10. IMP
11. JAS
12. KPPI
13. MBC
14. MFC
15. MGH
16. OM
17. OPM
18. PMPC
19. PRMX
20. SGI
21. SLF
22. SOC
23. SRDC
24. SSP
25. TUGS
26. WLCON

Figure 3. *Corporate Board Network*

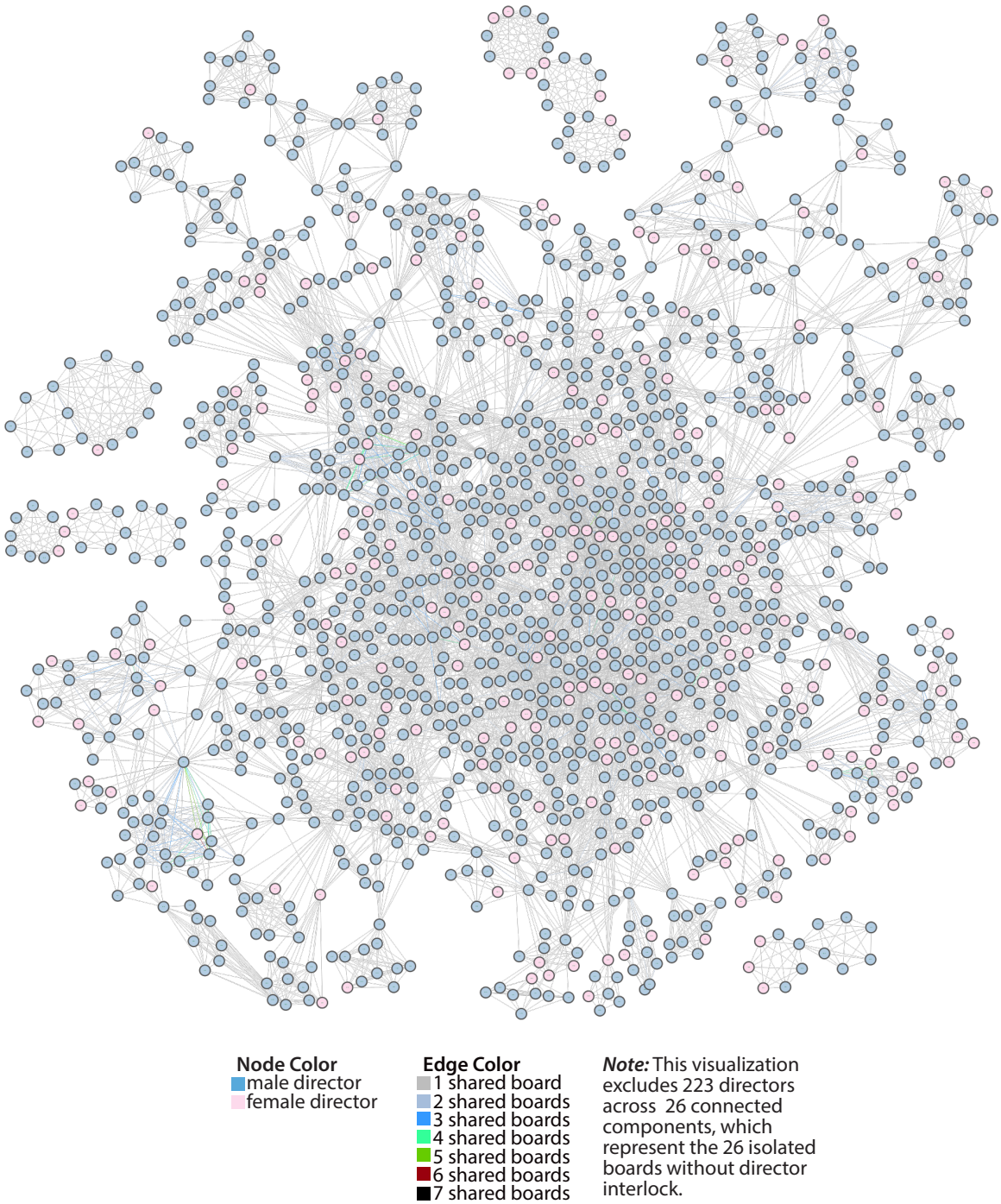


Figure 4. *Director Network*

Turning our attention to the corporate board network, the industries exhibit broadly similar levels of connectivity, save for property firms exhibiting a marginally higher clustering coefficient and eccentricity. Considering their lower closeness centrality, this suggests that property firms are easier to reach due to a greater degree of connectivity.

Based on the centrality measures, there is no specific industry that is the most centralized. Holding firms have more direct first-order connections, industrial companies have more connections to the most influential companies, while financial firms serve as bridges that connect firms, and exert more influence over the flow of information in the network.

Table 6. *Summary Network Statistics*

Statistic	Overall	Financial	Holding	Industrial	Mining & Oil	Property	Services
No. of firms	215	22	33	54	20	37	49
Total capitalization*	13,976	1,746	3,545	3,491	301	2,317	2,576
Average Capitalization*	65.00	79.36	107.42	64.65	15.05	62.62	52.57
Connectivity Measures							
Shortest path length	3.67	3.49	3.64	3.62	3.41	3.92	3.76
Clustering Coefficient	0.4383	0.2841	0.4657	0.4281	0.3661	0.5394	0.4535
Eccentricity	6.86	6.55	7.03	6.91	6.45	7.14	6.80
Neighborhood Connectivity	9.35	9.31	9.18	10.09	9.90	8.54	9.05
Centrality Measures							
Betweenness	571.86	763.00	626.35	612.91	659.72	404.75	494.43
Closeness	0.2821	0.2935	0.2850	0.2878	0.2964	0.2646	0.2763
Degree	7.37	7.18	8.36	8.20	7.50	6.14	6.73
Eigenvector	0.0430	0.0395	0.0459	0.0566	0.0419	0.0297	0.0383

* Market capitalization is indicated in billions of pesos, and is as of October 31, 2021

Which companies are the most centrally located? It depends on which definition of centrality is used. Based on Table 7, SPC Power Corporation, a power producer, is a vital linchpin that connects other companies. On the other hand, PLDT Inc., a telecommunications company, is better connected, with the most direct connections and needing the least number of "steps" to access all other companies. However, if centrality is measured by the number of connections to influential companies, Philippine Infradev Holdings Inc., a property developer, is the most central.

Table 8 presents key statistics on the director network. Directors who are part of the central cluster are well-connected, with the majority having a maximum shortest path of fewer than five steps. Most directors are clustered into groups, with a select few having a very high degree of influence and connectivity.

Most centrality measures consider former Chief Justice Artemio V. Panganiban as the most central figure in the network. This is confirmed by the sheer number of boards he serves in and the number of directors he shares a board with (Table 9).

Table 7. *Most Central Companies*

Betweenness	Closeness	Degree	Eigenvector
1. SPC	1. TEL	1. TEL	1. IRC
2. EEI	2. EEI	2. EEI	2. GREEN
3. GTCAP	3. SHLPH	3. MER	3. ANI
4. ABA	4. GTCAP	4. MWC	4. APL
5. CHI	5. HI	5. SHLPH	5. MJIC
6. FPH	6. MER	6. FPH	6. PRIM
7. BC	7. JFC	7. JGS	7. DWC
8. LOTO	8. ATI	8. BPI	8. MRC
9. ALI	9. MPI	9. GTCAP	9. HOUSE
10. AREIT	10. MWC	10. JFC	10. PA

Legend: Financial | Holding | Industrial | Mining | Property | Services

Table 8. *Directors Network Summary (Central Cluster only)*

Statistic	Average	Minimum	Quartile 1	Quartile 2	Quartile 3	Maximum
Shortest path length	4.51	3.08	3.92	4.31	4.90	7.16
Clustering Coefficient	0.8662	0.1558	0.7778	1.0000	1.0000	1.0000
Eccentricity	7.76	5.00	7.00	8.00	8.00	10.00
Neighborhood Connectivity	16.46	6.00	11.94	15.25	20.18	40.33
Betweenness Centrality	4,680	0	0	0	269	164,011
Closeness Centrality	0.2281	0.1397	0.2043	0.2323	0.2550	0.3250
Degree	12.38	4.00	8.00	10.00	14.00	70.00
Eigenvector Centrality	0.0141	0.0000	0.0009	0.0045	0.0165	0.1923

Table 9. *Directors Network Summary (Central Cluster only)*

	Director	Boards Served	Linked Directors
1.	Artemio V. Panganiban	8: ATI, GMA7, JFC, JGS, MER, MPI, PCOR, TEL	70
2.	Cirilo P. Noel	5: FB, FPH, GLO, RRHI, SECB	61
3.	Willy N. Ocier	7: ABA, APC, BEL, LOTO, LR, PLC, V	59
4.	Cesar A. Buenaventura	8: CIC, DMC, ICT, IPO, MWC, PERC, SCC, SHLPH	56
5.	Fernando M. Zobel de Ayala	8: AC, ACEN, ALI, BPI, GLO, IMI, MWC, SHLPH	56
6.	Eric Ramon O. Recto	6: AB, AP, DITO, MWC, PBC, PHR	55
7.	Medel T. Nera	7: EEI, HI, HLCM, ION, IPO, NRCP, SPM	52
8.	Lance Y. Gokongwei	9: APVI, CEB, JGS, MER, OPM, RCR, RLC, RRHI, URC	50
9.	Ramon S. Ang	6: EAGLE, FB, GSMI, PCOR, SMC, TFHI	48
10.	James L. Go	8: CEB, JGS, MER, OPM, RLC, RRHI, TEL, URC	48

Study Limitations

This study has several limitations that can provide fruitful avenues for future expansion. First, it relies solely on the validity and freshness of the data provided on the Philippine Stock Exchange website. One way to improve data integrity would be to examine the governance reports filed by each company.

Second, due to data availability issues, the study only includes companies listed on the Philippine stock exchange, which excludes the majority of corporations in the country. As such, the interlock network may not be representative of the actual business linkages in the country.

Third, the study only considered interlocked directors and excluded interlocked officers (e.g., board directors in a company who also serve as executives in another company). A more comprehensive study could include these insiders in the network.

Fourth, the study is highly reliant on companies properly identifying which board directors are independent. It is possible for an "independent" director to be intimately linked, either by blood relation, affiliation, or social circle, to officers in the company, which would bring into question their actual degree of independence.

Fifth, while the study encompassed the entirety of all listed companies in the country, it is nevertheless limited to a single point in time. A natural point for further study would be to track how the interlock network evolves through time.

Finally, it would be instructive to see how the Philippine interlock network compares with the networks of other countries. Thus, inter-country comparisons are a natural avenue for expansion.

4.0 Conclusion

The Philippine interlock network is characterized by a director network split into tightly-knit cliques. Key directors with outsized influence and connections glue these cliques together, creating a highly-connected corporate board network. Unlike the United States, control is administered mainly through holding companies, not financial institutions.

Given the nature of intra-industry interlocks of holding and financial firms, preliminary results appear to support the control perspective theory. Since this study was not designed to capture why interlocking directorships formed in Philippine firms, no determination can be made on whether resource dependence theory, the class hegemony perspective, or the scarcity of qualified board members are applicable to the local context.

In conclusion, the study has established a baseline measurement showing that publicly-listed Philippine firms are generally well-connected, and readily able to communicate with other companies should the need arise. These results have implications on the efficient dissemination of government policies, academic knowledge, and research throughout the business community. Additionally, direct comparisons can be drawn with business networks in other countries, all of which service to strengthen corporate governance in the country.

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