

Corporate Governance Networks and Interlocking Directorates in the Czech Republic

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Abstract—This paper presents an exploration into the structure of the corporate governance network and interlocking directorates in the Czech Republic. First a literature overview and a basic terminology of the network theory is presented. Further in the text, statistics and other calculations relevant to corporate governance networks are presented. For this purpose an empirical data set consisting of 2 906 joint stock companies in the Czech Republic was examined. Industries with the highest average number of interlocks per company were healthcare, and energy and utilities. There is no observable link between the financial performance of the company and the number of its interlocks. Also interlocks with financial companies are very rare.

Keywords—Corporate Governance, Interlocking Directorates, Network Theory, Czech Republic.

I. INTRODUCTION

BOARDS are central to corporate governance and their important feature is that they are often connected to each other by means of shared members. As Fama and Jensen remark “Most outside directors of open corporations are either managers of other corporations or important decision agents in other organizations.” Such network connectivity has important economic consequences [13].

A. Literature Review

Most previous research on the network structure of boards has focused on the United States. Board interlocks, which occur when corporate directors sit on the board of more than one firm, increase the cohesion of the business elite, favor cooperation, facilitate coordination of economic activities and permit mutual control [5]. Hallock presents evidence, based on a sample of 602 US companies in 1992, that 20 percent are any-employee interlocked (defined as a current or retired employee from firm A sits on the board of firm B and a current or retired employee from firm B who sits on the board of firm A) and 8 percent of firms are CEO interlocked. He also demonstrates a positive correlation between CEO pay and the presence of an interlocked board [2]. Booth and Deli report the average number of off-board directorships held by CEOs in over 400 US companies in 1989, is 1.87. The median and maximum values are 2 and 8 respectively [3].

Canyon and Muldoon investigated the ownership and control of British firms and found that the corporate governance network structures are more clustered than would be predicted by the random-graph model. In addition, they

investigated the role of financial institutions and found that their exclusion from the network leads to its lower connectivity, lower clustering, and longer paths [6].

There may be two reasons for such structural importance of financial interlocks. First, companies that are in financial difficulty, particularly those occasionally threatened with insolvency, tend to form a close association with one or more financial houses. By electing a banker to the board of directors, a company may expect while the banker can watch over the operation of the company and reduce the risk of lending to a distressed borrower.

Second, banks apparently find it advantageous to become associated with large companies by electing company officers to the bank's board of directors. This may attract large deposits as well as secure a reliable customer for bank loans [1].

Heemskerck and Schnyder discuss that corporate networks of board interlocks in the Netherlands and Switzerland disintegrated and the number of interlocks decreased over the last decade of the 20th century [7]. Duman and Postalci analyzed corporate governance networks of 319 companies listed on Istanbul Stock Exchange and found that the networks have low density. However, within the giant component, the average path length among agents was very short while the clustering coefficient was considerably high [10].

There is also an ongoing research on how shareholders perceive board interlocks. Rondøy et al. find no significant impact of board interlocks on share price for Norway, Sweden and Denmark [8], while Bøhren and Strømfund a positive effect for Scandinavian companies [9]. Booth and Deli show that the number of outside directorships held by the CEO is negatively correlated with firm growth opportunities measured by Tobin's Q, because the opportunity cost of spending time at another firm is high [3].

Loderer and Peyer examined listed firms in Switzerland and documented that the seat accumulation of board members was negatively related to firm value and also that a larger board size was associated with lower firm value [11]. Perry and Peyer found further evidence that shareholders in Switzerland react negatively when executives, who hold prior directorships, accept additional outside director appointments. They, however, suggest that outside directorships for executives can enhance firm value, when the executive accepts a nomination to the board of a financial firm, the board of a company operating in the same two-digit SIC, or the board of a firm with greater relative growth opportunities [12].

This paper contributes to the corporate governance literature by investigating the nature of interlocking directorates and corporate governance networks in these aspects in the Czech Republic.

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B. One or Two Tier Corporate Governance Systems

There are two basic concepts of corporate governance: the one- and two-tier system. As concerns the legal regulation of the governance structures, there is the approach of the compulsory one-tier system (e.g. USA, UK) or compulsory two-tier system (e.g. Germany, Austria). In addition, some countries leave the decision, whether the company should adopt the one- or two-tier system, to shareholders (e.g. France, Slovenia) [4].

Under the Czech Commercial Code in the Czech Republic, there is a compulsory two-tier management system with the Executive Board and the Supervisory Board. The *Executive Board* governs and represents the company, determines the company's objectives and policies, appoints the company's management and reports to the Supervisory Board and to the shareholders at the Shareholders Meeting. The Executive Board usually consists of company's executive managers.

The *Supervisory Board* is appointed by shareholders and oversees how the Executive Board exercises its range of powers and how the business activity of the company is conducted. One third of the supervisory board members must include employee representatives for joint stock companies having more than 50 employees.

For the purpose of this paper a simplification to corporate governance systems may be introduced for comparing the statistics of one- and two-tier systems. The executive board may be perceived as the executive component of the board of directors, and the supervisory board as its non-executive component. This is, however, a purely facultative step.

II. BASIC TERMINOLOGY

A network (or graph) is a set of items termed *nodes* with connections between them called *edges*. At this level of abstraction graphs can be used to represent a vast range of phenomena. Our attention in this paper is restricted to networks derived from the world of corporate boards. We adopt the following conventions: our nodes will be of two types – either companies or their members. Edges will represent the membership in a board.

Next we define the *connected component* associated with a node: it is that part of the graph consisting of the node itself and all those other nodes that can be reached by paths running along the edges of the graph. A *path* is simply a sequence of nodes with the property that each consecutive pair in the sequence is connected by an edge. Sometimes it is also useful to think of the path as containing not just the nodes but also the sequence of edges linking these nodes.

Data about board members present an immediate problem: how should one draw a graph to represent it? The issue is that one could treat the company as the basic unit of analysis and form a graph whose nodes represent companies and edges represent a shared board membership. But alternatively, one could focus on the people and make a (generally much larger) graph whose nodes represent people and edges represent their shared board memberships. There is no obvious way to choose between these two representations and so most authors simply

analyze both.

The ambiguity about representation, however, arises naturally from the structure of the data: there really are two sorts of social entities here, the people and the boards of companies. The network's edges then represent membership of the former in the latter. The most natural representation of such a network is a graph with two sorts of vertices—one each for companies and people. Edges of such network are connecting people with companies in whose boards they sit. Sometimes, this kind of network is called an *affiliation network*.

Distinguishing the type of the board itself in a two-tier system introduces another challenge. As the affiliation network displays links between companies and members of their boards, the type of the board can be represented by the two sorts of edges. This distinction in the context of network structure is out of scope of this paper and will be used solely for the statistical purpose.

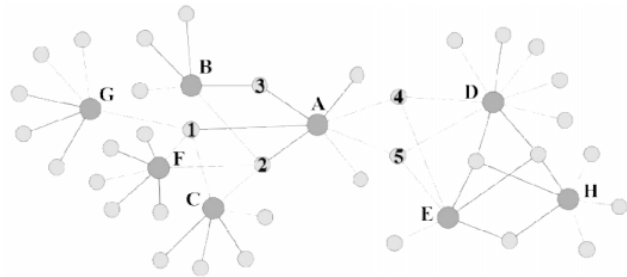


Fig. 1 A sample connected component of the network

A sample connected component of the corporate governance network is shown in Fig. 1. In the network, the two sorts of nodes can be observed: The larger dark nodes represent companies, and the smaller brighter nodes represent individuals. Links between nodes show membership of an individual in either executive (darker lines) or supervisory (lighter lines) board.

The connected component on Fig. 1 consists of eight companies (nodes A, B, C, D, E, F, G, and H) linked together by individuals who share memberships in their boards. Structurally important nodes can be identified intuitively from the graph. Company A is located in the center of the network and bridges two tightly knit groups of companies. It shares three individuals with company B (1, 2, and 3), two individuals with company C (1 and 2) and only a single individual with company G (1).

These connections linking companies together through shared membership are called *interlocks*. As there are twelve unique paths from company A to other companies, we say that company A has 12 interlocks. It is also clear that two companies can be connected by more than one interlock. For example, company A is connected by 12 interlocks to only 6 other companies.

From another point of view, the most important node in the network is individual 1, who is linked to five companies which means that he is a member of five boards (he or she holds one executive board membership and four supervisory board

TABLE I
CORPORATE GOVERNANCE NETWORKS IN THE CZECH REPUBLIC BY INDUSTRY

Industry	Number of corporations	Average size of the executive board	Average size of the supervisory board	Average ratio executive to supervisory	Average number of interlocks	Interlocks within the same industry	Interlocks with financial institutions
Agriculture	292	4.80	3.67	1.39	3.12	118	0
Construction	284	3.20	3.18	1.03	1.51	65	1
Education	8	2.88	3.38	0.92	1.25	0	0
Energy and Utilities	128	4.70	5.44	0.98	5.95	135	1
Financial	86	3.70	4.79	0.89	2.51	50	50
Goods	292	2.96	3.04	0.98	2.49	58	2
Healthcare	113	3.51	4.72	0.87	7.33	118	0
Manufacturing	1 098	3.16	3.10	1.03	2.44	486	3
Mining	27	3.19	3.37	0.94	3.19	4	0
Services	351	3.32	3.26	1.06	2.66	89	1
Technology	102	3.35	3.51	1.02	1.67	21	2
Transportation	125	3.55	3.77	1.03	3.62	56	2
Total	2 906	3.45	3.44	1.05	2.82	1 200	62

Source: author's analysis

memberships). Hence, we say that individual 1 holds five memberships. This notation will be used in our further data analysis.

III. DATA SAMPLE

The data sample included all active joint stock companies in the Czech Republic having more than 50 employees as of September 1, 2012. These criteria were satisfied by 2 906 companies. For these companies all the active members of their both executive and supervisory board were identified and exported into a spreadsheet. More than 20 000 board memberships were identified with 17 699 individuals who were assigned a unique randomly generated ID to be used for further anonymous analysis.

It is a common practice that data sample for an empirical investigation of corporate governance consists of listed companies. There are, however, only 28 listed companies at the Prague Stock Exchange which would not be considered as a representative data sample. Nevertheless, there are no obligations related to corporate governance requested by the Prague Stock Exchange. Hence, it is fully in competence of companies whether they comply with good governance practices and it is at their own discretion to follow the Czech Code of Corporate Governance based on the OECD Principles.

For investigation purpose publicly disclosed information in two local information sources in the Czech Republic were used: Official government website www.justice.cz and database Magnus maintained by ČEKIA (www.cekia.cz).

IV. EMPIRICAL RESULTS

A. Corporate Governance Statistics

The descriptive statistics of corporate governance networks are presented in Table I. The average executive board size is 3.45 and the average supervisory board size is 3.44. While this implies that there are no differences in sizes of the two boards, the break down by industry shows that their ratio varies slightly. Agriculture stands out of the data with the highest average executive board size of 4.8 per company, which results in a higher ratio. On the other hand financial and healthcare companies tend to have larger executive boards than the supervisory boards.

Table II illustrates that there are 17 669 unique individuals occupying 20 016 separate board seats at 2 906 firms. The average combined size of both boards in the Czech Republic is 6.89 members and each member, on average, has 1.13 memberships (including the membership at his or her main company). An individual occupying only one board position is a one-board member. Analogously, a person with two memberships is a two-board member. In the Czech Republic the overwhelming majority of individuals (about 80.8%) have only one membership. About 11.2% hold precisely two positions, implying that a very small fraction of individuals (8%) hold more than two memberships.

The results are directly comparable with calculations computed by Canyon and Muldon on a data set for US, UK and German publicly traded firms in years 2001-2003 [15] that are also shown in Table II.

TABLE II
BOARDS IN THE UNITED STATES, UNITED KINGDOM, GERMANY AND THE CZECH REPUBLIC

	Board seats	Number of unique members	Number of corporations	Average board size	Average number of memberships	One-board member (percent)	Two-board member (percent)
USA	17 277	13 330	1 733	9.97	1.63	80.37%	13.02%
UK	14 552	11 541	2 236	6.51	1.84	84.25%	10.08%
Germany	14 904	12 747	2 354	6.33	1.45	88.33%	8.92%
Czech Republic	20 016	17 669	2 906	6.89	1.13	80.80%	11.18%

Source: data from USA, UK and Germany [15], author's analysis for the Czech Republic

TABLE III
DISTRIBUTION OF BOARD MEMBERSHIPS

Number of memberships held by one individual	Number of executive board memberships		Number of supervisory board memberships		Total number of memberships
	Number of individuals	Number of memberships	Number of individuals	Number of memberships	
1	16 172	7 903	8 269	16 172	16 172
2	1 119	1 240	998	2 238	2 238
3	234	358	344	702	702
4	97	195	193	388	388
5	34	96	74	170	170
6	15	53	37	90	90
7	8	44	12	56	56
8	8	53	11	64	64
9	2	11	7	18	18
10	6	42	18	60	60
12	1	12	0	12	12
13	1	1	12	13	13
15	1	13	2	15	15
18	1	0	18	18	18

Source: author's analysis

B. Interlock Statistics

As can be seen in Table I, the highest average numbers of interlocks per company were in healthcare industry (7.33), and energy and utilities industry (5.95). These numbers are supported by the number of interlocks that are within the same industry. The two industries have even more interlocks than there are companies. This represents a strong interconnectivity within the industry and implies that companies tend to be strongly connected and controlled by a lower number of individuals.

The higher number of interlocks than companies, however, does not mean that all companies in the industry share the same connected component as two companies can be interlocked by more than one individual. Reasoning of this phenomenon was provided earlier in this paper.

On the other hand, interlocks are rather rare for companies in construction, education, and technology sectors, where the control and personal interconnectivity seems to be much more dispersed.

Interlocks with financial companies can be observed only in a few cases, which may be surprising and introduces a structurally important characteristic of the Czech corporate network. This is not consistent with findings of researchers in

TABLE IV
INTERLOCKS AND COMPANY PERFORMANCE

Sales in million CZK	Number of interlocks	Average per company	Return on Sales	Number of interlocks	Average per company
below 100	1 668	2.21	Negative	1 755	2.80
100-250	1 557	2.04	0-1%	2 077	2.84
250-500	1 513	2.26	1-3%	1 063	2.85
500-1 000	1 325	2.46	3-5%	994	2.82
1 000-5 000	1 708	2.75	5-10%	981	2.75
over 5 000	437	2.82	over 10%	1 338	2.82

Source: author's analysis

other countries who claim that the financial firms often play the bridging roles in the corporate governance networks [1], [6], and [7].

While most individuals hold a single board membership, 1 527 hold two or more memberships at the same time. There are 10 people sitting in ten or more positions each. The type of the membership slightly favors the executive board but varies for individuals holding a higher number of positions (see Table III). One of the two busiest individuals holds 13 positions in executive boards and 2 positions in supervisory boards at the same time. Second individual holds 18 memberships in supervisory boards.

The number of interlocks per corporation is unevenly distributed. Table V shows that there are 1 583 companies not interlocked. While the less interlocks per company are more frequent, there are 81 companies with more than 20 interlocks. The maximum number of interlocks per company is 48.

Larger companies tend to have more interlocks (see Table IV). This may be intuitive as larger companies usually have larger boards [14], which increases the probability of interlocks. This may also occur because the directors of the largest corporations are the most successful men available and other corporations would therefore naturally seek their advice and would rather have them on their board than men of less ability. This may also occur, however, because of factors unrelated to managerial ability. The director of a giant corporation undoubtedly has more personal influence with other companies, with potential investors, and with the government than the common man [1].

There is no observable link between the financial

TABLE V
DISTRIBUTION OF INTERLOCKS BY INDUSTRY IN THE CZECH REPUBLIC

Industry	Number of interlocks per corporation							
	0	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	over 30
Agriculture	157	91	16	8	7	6	3	4
Construction	198	63	17	1	3	1	1	0
Education	4	4	0	0	0	0	0	0
Energy and Utilities	30	57	21	8	2	1	3	6
Financial	40	32	12	1	0	0	1	0
Goods	188	69	15	8	1	3	4	4
Healthcare	41	26	5	16	17	3	2	3
Manufacturing	611	349	76	23	15	12	4	8
Mining	14	8	2	1	2	0	0	0
Services	182	115	31	13	3	3	2	2
Technology	65	27	7	2	0	0	0	1
Transportation	53	47	10	6	5	1	3	0
Total	1 583	888	212	87	55	30	23	28

Source: author's analysis

performance of the company (measured by return on sales) and the number of interlocks as its average per company is almost identical for all levels of ROS in Table IV.

V. CONCLUSION

Corporate governance networks have drawn considerable attention in the popular press and are the subject to an extensive research worldwide. This paper represents first exploration into the structure of the corporate governance network and interlocking directorates in the Czech Republic.

Several key findings have been derived from the empirical data. There are 17 669 unique individuals occupying 20 016 separate board seats at 2 906 companies. As directors can be members of more than one board, there are fewer unique directors than board positions. The average executive board size is 3.45 and the average supervisory board size is 3.44. The average combined size of both boards in the Czech Republic is 6.89 members and each member has 1.13 memberships on average.

The highest average numbers of interlocks per company were in healthcare, and energy and utilities industries which represents strong interconnectivity. Interlocks with financial companies are very rare, which may be surprising and introduces a structurally important characteristic of the Czech corporate network. Also no link between the financial performance of the company and the number of its interlocks was found.

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