

ARTICLE TEMPLATE

Interlocking Directorates Network in Turkey: Lack of Cohesiveness

Alper Duman^a, Mehmet Gencer^b

^aIzmir University of Economics, Sakarya Cad. No 156 İzmir, Turkey; ^bIzmir University of Economics, Sakarya Cad. No 156 İzmir, Turkey

ARTICLE HISTORY

Compiled April 23, 2022

ABSTRACT

This paper has two objectives. One, for the first time, we construct a interlocking directors network with more than 2000 firms in Turkey and analyze its firm projection network. Second, we use Tüsiad membership of firms in the giant component in order to question the cohesiveness of the members of Tüsiad.

KEYWORDS

interlocking directorates network , Turkey, Business Association

1. Introduction

Turkey has become one of the emerging economies that attracts global attention in the last decade. The GDP per capita in PPP (Purchasing Power Parity) terms increased from around 5000 \$ in 1998 to around 18000 \$ in 2014. Mergers and acquisitions as well as foreign direct investment flows have dramatically gone up. In 2015 the total number of mergers and acquisitions deals reached 265 . Annual foreign direct investment inflows have risen to % 2 of the GDP. The capital and credit markets have faced a major transformation.

According to OECD and World Bank ,Turkey has become an example for other developing countries. The overall success of the Turkish economy is largely attributed to the dynamic private sector of the country. In a short-period from 1990s onwards, some of the Turkish corporations have become global competitors. Corporations have become aware of the significance of sound corporate governance principles.

Corporate governance structures can enhance the economic performances of corporations and influence the institutional settings in which the corporations thrive or struggle. Corporate board networks play central roles in corporate governance structures.

Ownership is crucial as owners pick and appoint board members. Board members in turn provide connections among different corporations if they hold positions in more than one board. The social networks formed up due to these connections constrain and affect the corporate governance structures. Overall economic performances of the corporations and the countries are influenced by the corporate governance systems.

CONTACT Alper Duman. Email: alper.duman@ieu.edu.tr, Mehmet Gencer. Email: mehmet.gencer@ieu.edu.tr

The early literature on corporate governance structures has been based on two different frameworks, that of law and politics. According to the first framework, legal origins of the countries (Anglo-Saxon or French) determine the corporate governance structures (La Porta et.al. 1998) . Financial development as a result of and coupled with the legal origins determine the corporate governance structures in each country. The framework based on politics on the other hand argues that social democratic countries with a social accord among workers and owners have different corporate governance structures than the liberal countries (Roe 2004).

The board of directors is the main unit for corporate governance Adams, Hermalin, and Weisbach (2010). Interlocking directors are the board members holding seats in at least two different boards. There are various studies on why interlocking directorships emerge and reproduce its structure.

Social network analysis offers a unique framework and a methodology over a very central issue that these frameworks could not handle . The main issue is how the corporate governance structures are coordinated when the ownership is distributed as in the firms listed in stock markets and ownership and management is separated. Social network topologies with high clustering and low average path lengths enable such a coordination.

The literature on the intersection of social networks and corporate governance underlines the fact that network configurations and topologies are closely related to the effectiveness of corporate board networks in affecting corporate governance structures. Coordination is achieved, information is diffused and robustness to shocks is maintained through “small network” nature of such networks Kogut (2012).

The literature on corporate board networks uncovers that low average path length and high clustering coefficients of small world networks are typical topological characteristics of corporate board networks. A common factor that leads to higher clustering coefficient in corporate board networks is the existence of business groups in which corporations have cross-share holdings or form pyramids of ownership. Naturally, interlocking directors sit in multiple boards of the business groups firms.

Most of the studies focus on interlocking directorship networks in developed countries

Davis and Robbins (2005), Heemskerk and Schnyder 2008, Heemskerk and Schnyder (2008). Sankar, Asokan, and Kumar (2015) and some chapters in Kogut (2012) are exceptions.

One study Brookfield et al. (2012) authors pursue a similar question as we do. They compare the interlocking directorship networks of Brazil, Chile, Israel, South Korea and Taiwan. All of these countries are dominated by business groups as in Turkey. They find that by early 2000s compared to mid 1990s, Brazil, Chile and Taiwan became more of a small world. But Israel and South Korea moved in the opposite direction, as their networks had become more fragmented.

Turkey is also interesting case as it is characterized by a mixed system of bank and market based credit system and “insider” corporate governance regime. Dominant diversified business groups own and control major banks and state managed corporations still play decisive roles in the economy Colpan, Hikino, and Lincoln (2010).

We have three main goals in this paper. First, we document the evolution of interlocking directors networks in Turkey for the years 2002, 2007 and 2013. Second, we characterise basic motifs in the interlocking directors networks and compare the configurations across years. Third, we identify the firms persistently stay in the giant component for the three time periods as well documenting the high turnover of firms in the giant components.

2. Interlocking Director Networks in Turkey

After 1980s, Turkey has gone through a full fledged economic liberalization process in which early on import substitution was dropped in favour of export promotion and financial liberalization was initiated. In 1985, İstanbul Stock Exchange Market was established (later in 2015, renamed as BIST). In 1989, capital account liberalization was carried out. The corporate sector in Turkey has been transformed fundamentally Altug and Filiztekin (2006).

The number of listed firms increased from 100 in 1990 to 435 in 2013. Stock market capitalization had risen from only % 5 of GDP in 1990 to about % 30 in 2013. The annual volume of transactions in the stock market reached % 80 percent of GDP.

In 1990s, but more particularly in 2000s privatization has become one of the pillars of economic reform package. Till 2015, 60 billion dollars worth of public corporations and assets have been transferred to private sector. Some of the corporations we analyse belong to these privatized group.

Mergers and Acquisitions activities as well as Foreign Direct Investment have increased record levels in the last decade. In late 2000s, Turkish corporations have undertaken outward FDI in considerable levels. The average annual FDI inflow in 2000s was 12 billion \$, an amount 10 times of the annual average in 1990s. In conjunction with globalization process, liberalization of Turkish economy has brought corporate governance to the focal point for both the economic policy makers and for the major actors of the corporate world in Turkey. In 2006, Turkey indicated its willingness to adapt the OECD Benchmark Principles for Corporate Governance officially. In 2013, a decree for the appointment of independent directors on corporate boards was issued.

Network analysis is the analytical framework in which network theory is used to study both the configuration and the interactions among agents.

A network is bipartite if its nodes can be partitioned into two sets such that all edges are between the nodes in partitioned sets and there are no links between nodes within each set. There are three networks we can construct given our data set. First consider the network where a node can represent a firm or an individual. An edge (or a link) in this graph connects an individual to a firm, indicating that the individual either has a seat on the board of directors of the firm or is the general manager of the firm.

Note that this setting allows only links between individuals and firms, but not between individuals, or between firms. It is of course possible that an individual can have seats in different firms, thus have multiple links. The raw data, which consists of firms and board members of these firms, will lead to a bipartite network in which nodes are partitioned according to whether they are individuals or firms.

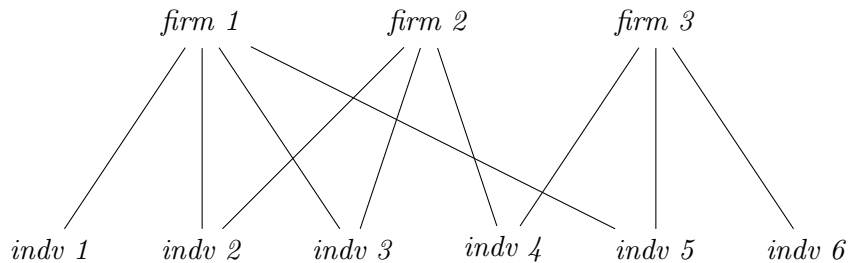


Figure 1. Bipartite Graph

Degree distributions of nodes in this setting have specific meanings. The degree of

a firm is the size of the board of directors of the firm. If the node is an individual, its degree represents the number of boards she/he is in. Following the literature we can construct two related networks from the bipartite network we defined. In the firm network nodes represent only firms, and an edge between two nodes exists only if there is at least one common member in board of directors. A subset of firms that have links in this manner is referred as interlocked. In the board of directors network nodes represent individuals, and a link between two nodes exists only if both of the individuals sit on the board of directors of at least one firm.

The firm network and the board of directors network are one-mode projections of the bipartite network. The literature notes that studying these networks as independent structures will be wrong, since the degree distribution of the firms (i.e. size of boards) together with the degree distribution of the directors (i.e. number of boards each director is a member) in the bipartite network will directly affect the degree distribution of the one-mode projection directors network (i.e. number of co-directors) and the firm network (i.e. number of interlocked firms).

The data on the firms and the directors is publicly available either in digital or in published form as in *MKK*¹. The main problem with the data is the haphazard nature of the names reported. For instance, Rahmi Koç is reported as “Rahmi M. Koç” as a board member in “Koç Holding A. Ş.”, Rahmi Mustafa Koç” as a board member in “Tüpraş”, “Mustafa Rahmi Koç” as board member in Arçelik and “Mustafa Rahmi Koç” as a member of “Aygaz A. Ş.”. As a vertex in the networks all these names should indicate the same person. Thus standardization and reformatting have been major issues in data management before a thorough network analysis could be carried out. The similar problems arise in terms of the company names with a considerable variation from one year to another.

Extensive care and effort were spent to clean and standardize the data. Consequently, a bipartite network with one set of vertices denoting the firms and the other set denoting the directors (board members) could be obtained for each year. From the bipartite network we obtain projected firm and directors networks. We focus on the firm network in this paper.

2.1. *Firm Networks*

EXPLAIN PROJECTION from BIPARTITE NETWORKS

We have 2083 unique firms and 6683 unique directors.

We begin with the full firm network in which there exist 2083 vertices and 5328 edges among them. The network density is low as expected since firms selectively share board members.

We switch to the analysis of the giant component of the firm network. There are 814 firms in the giant component. Thus, about 40 percent of the firms have connection to each other through direct and indirect edges. There exist 4317 edges. The density of the giant component is much higher.

There are 711 components. Apart from the giant component which has 814 firms, the biggest 4 other components have sizes of 21,18,16 and 14. Indeed, 571 of the components are single firms. The fragmentation is obvious.

¹<http://mkk.esirket.com.tr>

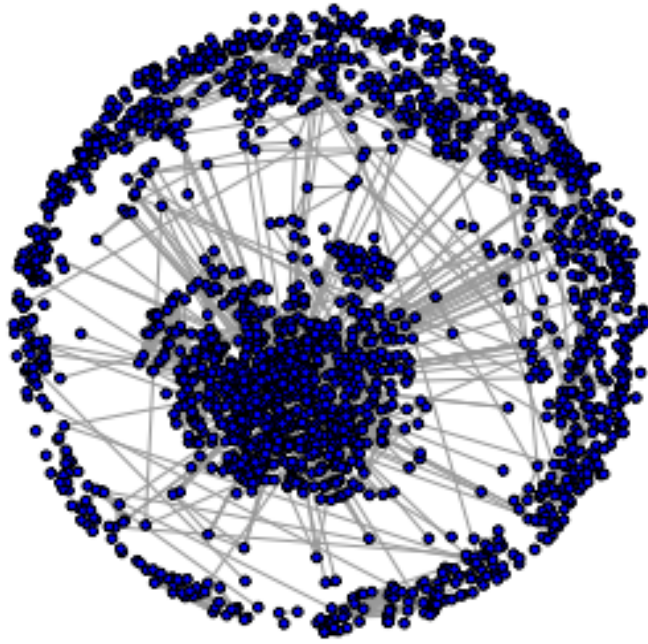


Figure 2. Firm Network via Interlocking Directorates

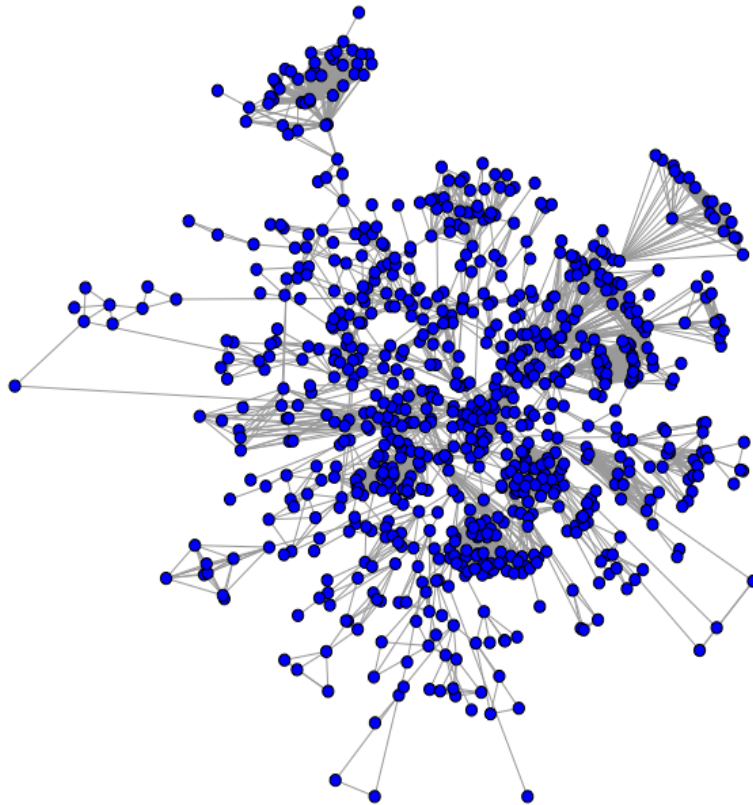


Figure 3. Giant Component of Firm Network

Table 1. Network Measures of Giant Component

	Giant Component
Average Path Length	7.296
Clustering Coefficient	0.778
Distance	25
Maximum Degree	38
Giant Component Ratio	0.39

2.2. Centralities

We first closeness centrality of firms in the giant component.

Table 2. Closeness Centrality

	close
Mercedes-benz Finansman Türk A.ş.	0.056
Cenal Elektrik Üretim A.ş.	0.056
Strateji Faktoring A.ş.	0.067
Ekinoks Televizyon Ve Radyo Yayıncılık A.ş.	0.067
Meta Nikel Kobalt Madencilik Sanayi Ve Ticaret A.ş.	0.067
Oyak Beton Sanayi Ve Ticaret A.ş.	0.070

Mercedes-Benz is a Tüsiad firm.

Next we focus on betweenness centrality

Table 3. Betweenness Centrality

	bet
Özerden Plastik Sanayi Ve Ticaret A.ş.	96,742.750
Bisas Tekstil Sanayi Ve Ticaret A.ş.	70,997.070
Bim Birlesik Magazalar A.ş.	52,389.560
Fx Medya Hizmetleri A.ş.	47,701.200
Dogus Otomotiv Servis Ve Ticaret A.ş.	46,903.240
Polibak Plastik Film Sanayi Ve Ticaret A.ş.	43,940.400

The striking firm is BİM. BİM has the third highest betweenness centrality measure.

Lastly we check the page rank centrality.

3. Cohesiveness of Tüsiad

The number of Tüsiad firms in overall firm network is 400. However, 43% of Tüsiad firms have no common directors with any other firms. They stand alone.

The number of firms affiliated with Tüsiad in the giant component is 175. These firms constitute 21.5 percent of the giant component. The number of foreign firms is 171. Thus, a further 20 percent of the giant component is foreign.

We locate Tüsiad firm in the overall firm network.

Table 4. Page Rank Centrality

	pageRank
Ufuk Yatirim Yönetim Ve Gayrimenkul A.ş.	0.003
Özerden Plastik Sanayi Ve Ticaret A.ş.	0.003
Polibak Plastik Film Sanayi Ve Ticaret A.ş.	0.003
Emta Kablo Sanayi Ve Ticaret A.ş.	0.003
Mars Lojistik Uluslararası Tasimacılık Depolama Dagitim Ve Ticaret A.ş.	0.003
Kombassan Holding A.ş.	0.003

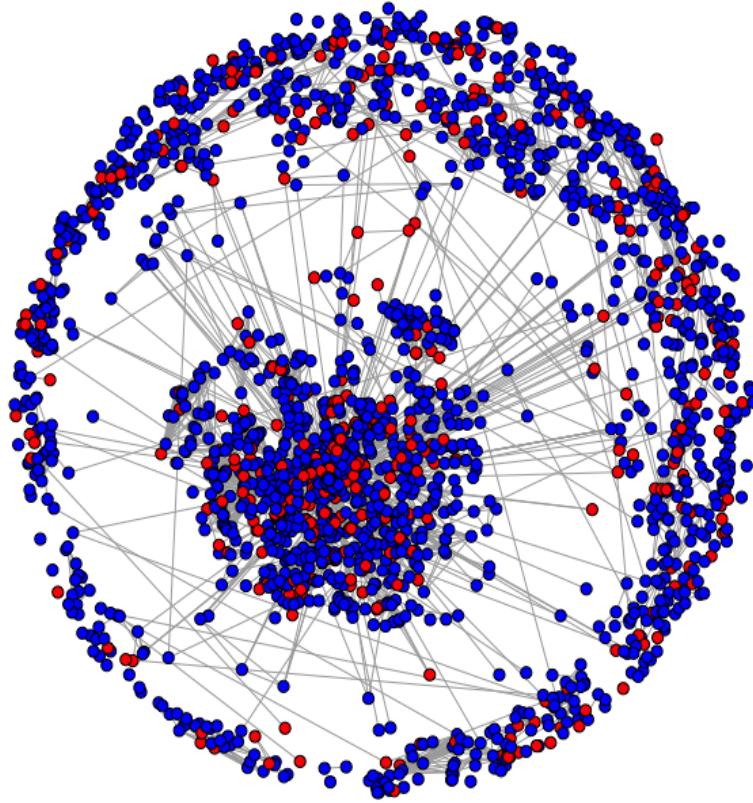


Figure 4. Tüsiad Firms in Overall Firm Network

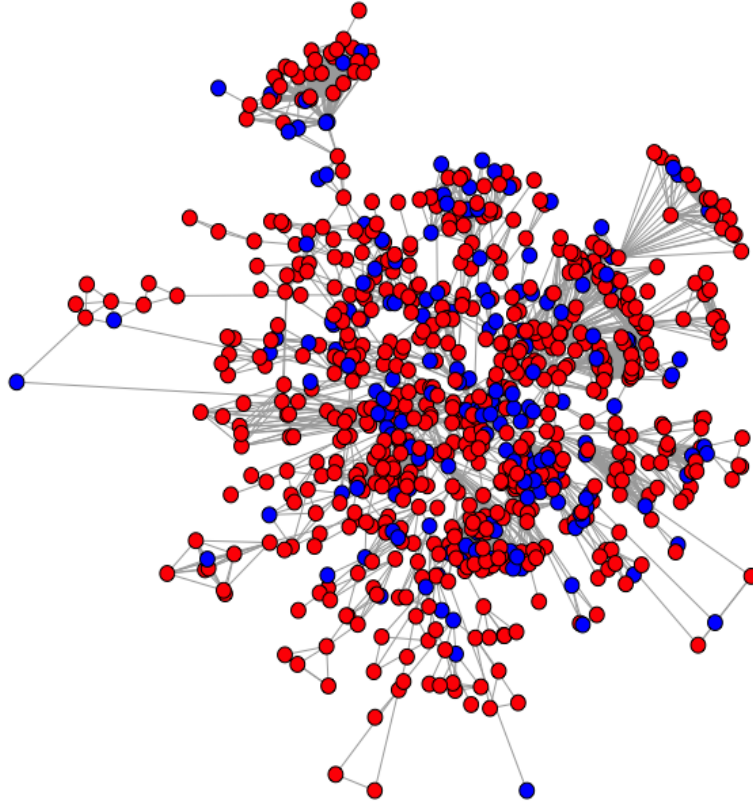


Figure 5. Tüsiad Firms in Giant Component of Firm Network

The fragmented nature of Tüsiad firms is obvious in the overall network. Next we examine the same pattern in the giant component.

The striking pattern visible concerning the Tüsiad firms in the giant component is the lack of cohesiveness. The Tüsiad firms do not constitute a well connected core of firms in the middle of the giant component. They are rather scattered around the network. They are not the dominant backbone that holds the giant component together.

3.1. *Foreign and Tüsiad Firms*

Foreign firms (wholly or partially owned by foreign shareholders) constitute 410 in total. Within the giant component, foreign firms account for 21% of all the firms. Thus, their weight is as high as the Tüsiad firms.

Although foreign firms are also scattered around the giant component, they are closer to Tüsiad firms.

Note that there exist 4317 edges in the giant component. We find the edges among Tüsiad and foreign firms. We find that among Tüsiad firms, there are 242 edges. Between Tüsiad and foreign firms there are 408 edges. Among foreign firms there are 209 edges. The Tüsiad firms, on the other hand, have 1078 links to the non-foreign and non-Tüsiad firms.

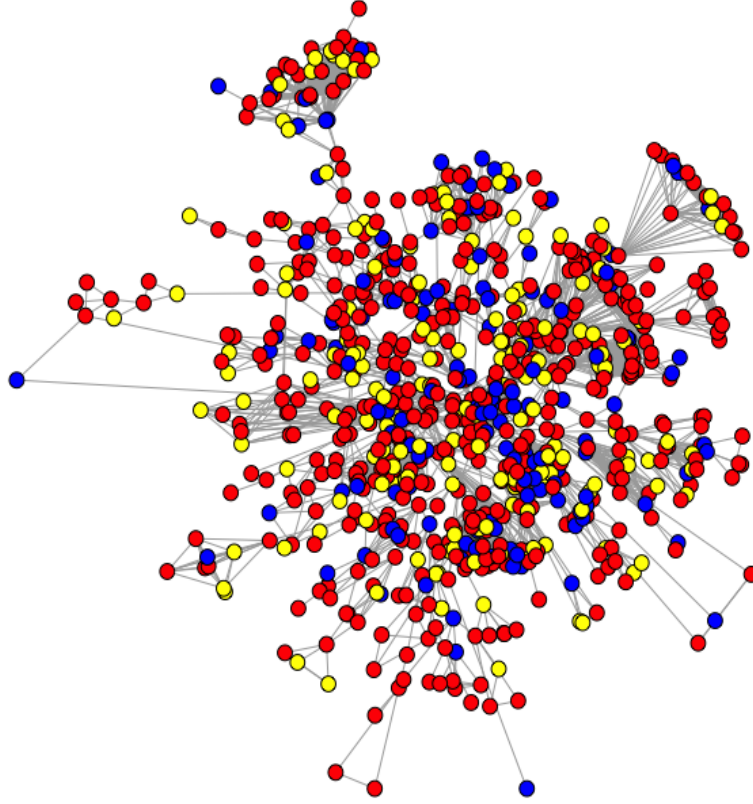


Figure 6. Tüsiad and Foreign Firms in the Giant Component of Firms

Table 5. Configuration of Links in the Giant Component

	Number of Links
withinTusiad	242
TusiadForeign	408
withinForeign	209
AcrossTusiadOthers	1,078

References

- Adams, Renee B., Benjamin E. Hermalin, and Michael S. Weisbach. 2010. "The Role of Boards of Directors in Corporate Governance: A Conceptual Framework and Survey." *Journal of Economic Literature* 48 (1): 58–107. <http://www.aeaweb.org/articles.php?doi=10.1257/jel.48.1.58>.
- Altug, S., and A. Filiztekin. 2006. *The Turkish Economy: The Real Economy, Corporate Governance and Reform*. Routledge studies in Middle Eastern economies. Routledge. <https://books.google.com.tr/books?id=3brMp0eb3bgC>.
- Brookfield, Jon, Sea-Jin Chang, Isreal Drori, Shmuel Ellis, Sergio Lazzani, Jordan Siegel, and Juan Pablo von Bernath Bardina. 2012. *The Small Worlds of Corporate Governance*, Chap. The Small Worlds of Business Groups: Liberalization and Network Dynamics, 77–116. MIT Press. <http://www.jstor.org/stable/j.ctt5vjqx6.7>.
- Colpan, A.M., T. Hikino, and J.R. Lincoln. 2010. *The Oxford Handbook of Business Groups*. Oxford Handbooks in Business and Management. OUP Oxford. <http://books.google.com.tr/books?id=RL2pWCa9Z24C>.
- Davis, Gerald F, and Gregory E Robbins. 2005. "Nothing but net? Networks and status in corporate governance." *The sociology of financial markets* 290–311.
- Heemskerk, Eelke M, and Gerhard Schnyder. 2008. "Small states, international pressures, and interlocking directorates: the cases of Switzerland and the Netherlands." *European Management Review* 5 (1): 41–54.
- Kogut, Bruce, ed. 2012. *The Small Worlds of Corporate Governance*. MIT Press.
- Sankar, C. Prem, K. Asokan, and K. Satheesh Kumar. 2015. "Exploratory social network analysis of affiliation networks of Indian listed companies." *Social Networks* 43: 113–120.