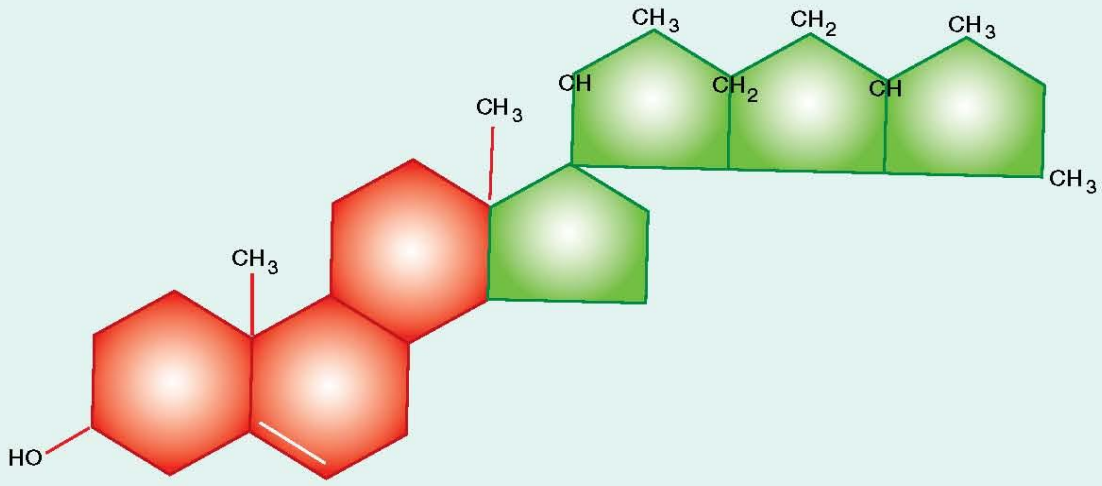
Board Interlocks and Their Impact on Corporate Governance: The Indian Experience

Coping with Corporate Cholesterol



Bala N Balasubramanian, Samir K Barua,
Suresh Bhagavatula and Rejie George

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RESEARCH TEAM AFFILIATIONS:

Prof. "Bala" N Balasubramanian, *Finance & Control*, Founding & Former Chairman, IIMB Centre for Corporate Governance and Citizenship

Prof. Samir K Barua, *Production & Quantitative Management* and *Director*, IIM Ahmedabad

Prof. Suresh Bhagavatula, *NS Raghavan Centre for Entrepreneurial Learning*, IIM Bangalore

Prof. Rejie George, *Corporate Strategy and Policy*, IIM Bangalore

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Abstract

Board interlocks occur when a director of one organization sits on the board of directors of another organization. The causes and consequences of these interlocks have been much debated in the western literature but comparatively little is known about interlocks in Indian corporate boards. Board interlocks are essentially analogous to cholesterol. Both are facts of life. Like good cholesterol, there are aspects of interlocking directorates that are beneficial and there are others that are detrimental to the corporation and its stakeholders and their respective interests.

In this study, we find that board interlocks are quite widespread in India. Taking a (numerically) small but nevertheless (in terms of market capitalization) an important slice of available corporate data, we observed that in 2010, 'highly boarded'[1] directors (defined as those on the board of 5 or more listed NSE companies) who constitute just 6 percent of the overall pool of directors among NSE100 companies are associated with 486 NSE listed companies which account for a whopping 66 percent of the total market capitalization of all NSE listed companies. Interestingly, there appears to be a marked increase in market capitalization of these 'highly boarded' companies, which these 'highly boarded' directors are linked to over the last several years. For instance, for the 3 years from 2001 to 2003, the market capitalization of 'highly boarded' companies ranged between 33 percent to 43 percent; it moved up to peak of 70 percent in 2007 and was at 66 percent in 2010 (the latest year in the study period). The substantive rise in market capitalization of these 'highly boarded' companies has coincided with only a marginal increase (from 5% to 6%) in the proportion of 'highly boarded' directorships.

These trends suggest that despite the well-intentioned regulatory reforms (a) the extent of over-boarding/interlocking among directors has not come down (there is actually a marginal increase) and (b) there appears to be increasing concentration of power among key individuals. Given the general view that concentration of power in a few individuals or entities is not desirable in the larger interests of society, it would appear that the observed trends in the concentration of power among a handful of the country's corporate elite is a matter for substantive public policy concern. Finally, the regression analysis indicates a positive impact on Return on Assets (ROA) for 'highly boarded' directors signifying a negation of the agency centric conceptualization on the role of multiple directors. Instead, connectedness variables (Eigen vector) which proxy for the Resource dependency hypothesis are quite strongly supported. In a nutshell, from public policy perspective, the analysis potentially reflects the 'bad cholesterol' elements of multiple directorships in terms of a tiny segment of 'highly boarded' directors controlling a significant portion of the country's economic prowess, whereas the positive influences on company performance provide some evidence of the 'good cholesterol'.

[1] 'Highly boarded' directors can also be referred to as 'Highly networked' directors. We have chosen to stick to 'Highly boarded' directors and 'Boardedness' as the operational measure as the literature has generally focused on over-boarded directors.

Introduction

Board interlocks and corporate elites are an engaging field of ongoing academic and policy research around the world, especially because of the concentration of economic power in few individuals or entities to the possible detriment of the society at large. With India moving towards a global economic power status and the Indian business sector increasingly growing in importance both in terms of its contribution to the national product and to the country's globalization initiatives, such concentration does portend influential impact on the economic and political scene in the country. This study documents the origins, development and potential impact of these developments and also presents preliminary findings of the nature, extent and implications of the increasing power of the corporate elites over the first decade of the current century.

The paper is organized as follows: Section 1 recapitulates the origins of interlocking directorates over the decades (and centuries!) internationally and in India;[2] Section 2 offers a brief summary of the literature in this field of research; Section 3 deals with the network methodology followed in the analysis and discuss the network analysis; Section 4 describes the composition of the study sample; Section 5 describes the regression analysis, Section 6 summarizes our conclusions and Section 7 proposes a future research agenda in this area.

[2]Some parts of Section 1 and 2 draw upon the earlier work of one of the co-authors and published in *Corporate Governance and Stewardship* (2010), Tata McGraw-Hill

1

A Brief History of Interlocking Directorates

The phenomenon of common directors in different business entities appears to be as old as the advent of the corporate format of organizations itself. For example, such interlocking directorates have been identified in British companies operating in their erstwhile colonies and dominions as early as at the turn of the twentieth century: Using data relating to twelve transnationals (including such iconic names as Barclays Bank, Chartered Bank of India, Australia and China, Hudson Bay Company, and P & O) during 1899–1900 and 1829–1830, researchers have noted 713 interlocks in the later year compared to 333 in the former, in a variety of business segments. Legendary names like Lord Inchcape, Lord Brabourne, the Earl of Lichfield and Sir Thomas Sutherland, figure in these interlocks. The cohesive content of these corporate elites was protected by their common lineage and heritage as landowners, businessmen and professionals, with similar schooling and social ties, often cemented by intra-marriages within the groups (Brayshay, et al, 2005). In the United States, both as a result of integrated ownership and control of all manufacturing and marketing input materials and services under one roof and the evolution of the money trust concept of investment banking owning and controlling vast business empires enabled by the acceptance of the holding corporation principle (Micklethwait and Wooldridge, 2003), board interlocks had developed so strongly apparently to the detriment of free trade and competition in the closing years of the nineteenth century and into the twentieth that they became the subject of serious and successful muckraking[3](Tarbell,1904), scathing criticism (Brandeis,

[3] Eventually leading to the breakup of Standard Oil in to the forerunners of Exxon, Amoco, Mobil and Chevron (Micklethwait and Wooldridge 2003, p. 73)

1913)and regulatory investigation[4] (Pujo, 1912). With the banking systems largely funding corporate development in Germany and Japan, their representatives were a natural choice for board positions of the investee companies, a phenomenon that encouraged similar interlocks in those countries. In socialist-communist ideology countries like the erstwhile Soviet Union, its East-European dependencies and China, party and state functionaries often found themselves on the boards of their state-owned enterprises, thus again leading to significant interlocks.

In India, board interlocking received substantial fillip in the nineteenth and twentieth centuries with the operation of Managing Agencies controlling several entities concurrently and with seats on their respective boards. The largest number of managed companies by a single managing agency (Bird & Co) reportedly, was 40. The 17 largest managing agencies managed in all 350 companies with an aggregate paid up capital of Rs 1140 million, or 25% of the total paid up capital of all companies managed by agencies. Ten of these managing agencies were public companies, the rest were private limited companies. It is interesting also to note that while the British entity Bird & Co topped the list with 40 managed companies in terms of numbers, it was two Indian managing agencies (Tata Industries Ltd and Birla Bros. Ltd) that led the field in terms of aggregate paid up capital of managed companies.[5] Such a conglomeration of corporate entities naturally demanded the involvement of key personnel from the managing agency house on their boards both for reasons of control and of reputational impact on investors and customers and arguably paved the way for the smooth transition and continuation of such practices in the Indian

[4] The Commttee's recommendations eventually led to the Clayton Antitrust Act in 1914 that restricted interlocking directorships when they restrained trade (Micklethwait and Wooldridge 2003, p. 74)

[5] These statistics are from *The Managing Agency System: A Review of Its Working and Prospects of Its Future*, pp. 38–41. As a matter of interest, out of the total of 3944 agencies in active operation, 2522 were unincorporated entities such as partnerships, 1238 were private limited companies, and the remaining 184 were incorporated as public limited companies.

corporate sector long after the managing agencies themselves were abolished in the latter half of the twentieth century (Bala, 2010). The fact that over ninety percent of Indian listed companies by market capitalization are owned and/or controlled by dominant shareholders with at least twenty percent of voting equity further offers a fertile ground for proliferation of interlocked boards.

2

A Select Review of Recent Research

Board interlocks research in recent years could be broadly categorized under three distinct even if interrelated themes: the first and obvious line of study concerns the establishment as a fact the existence and extent of such interlocks; the second line of inquiry seeks to explore the determinants of interlock practices; and the third deals with the implications both for the companies and the society of such interlocks. Following is a brief survey of literature in this field under these three thematic groups.

Board Interlocks in Practice

That board interlocks operate substantively around the world is an established fact. In the US, Gerald Davis and colleagues (2003) studied three sample sets of companies and directors as of 1982, 1990 and 1999, mostly from the Fortune 500 and 1000 companies, using the small world analysis methodology[6] and concluded that "[C]orporate America is overseen by a network of individuals who to a great extent know each other or have acquaintances in common. On average, any two of the 4538 directors of the 516 largest US firms in the largest component in 1999 could be connected by 4.3 links, and any two of the boards are 3.5 degrees distant.."

[6] The *small world* phenomenon was first raised by Kochen and Pool during the nineteen sixties and seventies, and was framed as an empirical research question in 1967 by Stanley Milligram, the social psychologist. Effectively, the question is: given a set of people, what is the probability that each member is connected to another member via the various links? This analytical approach is the foundation for several network theories and is used extensively in problems such as networking among a set of directors in a region, or a country, or an industry and so on. See *The Small World Problem*, Psychology Today, 2: pp. 60–67

In continental Europe, the interlock scenario is even more striking. Thus, in 2000 (1990 comparisons in parentheses), the average path length in Germany was 2.9 (2.6), Sweden 3.7 (3.0), Denmark 3.7 (2.5), Norway 1.8 (4.2), Switzerland 4.0 (2.6), and in The Netherlands 3.3 (4.0) (Kogut and Belinky, 2008). In the UK, the path length was about 5.6 in case of 2236 publicly traded companies in 2003 (Conyon and Muldoon, 2006).

In Canada, collectively a small group of 16 directors, constituting less than 1% of the total 1689 directors sitting on boards comprising the S&P/ TSWX Composite Index, sit on 68 Index company boards or 31% of all Index companies, and command a market capitalization of $437 billion representing capitalization of around 51% of all Index companies (Rowley and Fullbrook, 2004). They, however, find that this elite group has transferred good practices from within their companies to each other, so they see it as a contribution to good governance.

Multiple Directorships as a Facilitator of Board Interlocks

Closely associated with the concept of board interlocks is the issue of over-boarded directors, an expression that refers to directors who sit on several boards. Although within increasingly stringent corporate legislation and capital market regulations, besides the escalating competitive pressures flowing from rapid globalization of business, the demands on directors' time and attention especially in larger corporations is indeed significant, the phenomenon of multiple directorships especially within the world of corporate elites continues to flourish, in the process encouraging board interlocks. Very few countries with developed capital markets and corporate sectors have chosen to mandate any broad-brush ceiling on company directorships. Thus, for example, neither the 1992 Cadbury Committee nor its successors, the 1998 Hampel Committee

and the 2003 Higgs Committee in the UK, thought it fit to lay down ceiling numbers for individual directorships. Instead, the UK Combined Code, 2008, highlights the need for company boards to stipulate the expected time commitment for board service, and for the new non-executive directors to undertake their time availability to meet what is expected of them. In case of full time directors however, the code does prescribe that the board should not agree to their taking on more than one non-executive directorship in a FTSE 100 company, or the chairmanship of such a company. As noted earlier, the UK system operates on a "comply or explain" principle and therefore there is scope for companies to deviate from these guidelines so long as they explain in their annual reports to shareholders the reasons for such non-compliance. In the US, the Council of Institutional Investors recommends that companies should establish and publish guidelines specifying how many other boards their directors may serve, and that those who attend less than 75% of board and committee meetings for two consecutive years (without compelling and stated reasons) should not be re-nominated. It is noteworthy that these non-binding principles also stipulate that "excused absences (that is, where leave of absence had been sought and granted) should not be categorized as attendance." Executive directors may not serve on more than two other boards, while an incumbent CEO may serve only on one other board if, and only if, the CEO's own company is in the top half of its peer group. Overall, no person may serve on more than five for-profit boards. Such salutary counsel should, even while promoting improved attention by directors to a limited number of company boards, possibly contribute to a movement, however limited, away from avoidable board interlocks.

The Confederation of Indian Industry's 1998 (non-binding) *Desirable Code* had suggested a ceiling of ten listed companies (meaning thereby, that a person could be a member of more

companies so long they were not listed and the statutory ceiling [then twenty] was not exceeded). There are no specific restrictions imposed through the listing agreements either, so the decision is entirely left to the judgment of the company and the individual. Corporate legislation in India however, prescribes a ceiling of fifteen companies of which an individual could be a director. In practice, thanks to several permitted exclusions, this number can be significantly exceeded.[7]

Although multiple directorships is a topic that attracts popular attention both internationally and in India, leading to calls for mandated ceilings on such numbers, it should be mentioned that the gravity of the issue is limited only to a small proportion of directors in their respective countries. Thus, in India, in the case of 500 large companies listed on the Bombay Stock Exchange (as reported in company annual reports for the year 2002–03), directors holding more than 10 directorships constituted less than 10% of the 17,115 directorships held by a total of 3891 directors of the sample companies (Sarkar and Sarkar, 2008). At lower cut-off levels of more than 5 and 3 directorships, these numbers were 29% and 44%, respectively. By developed country standards these are indeed remarkably high. For example, in Australia, among the top 200 ASX-listed companies in 2003, those with more than 5 and 3 directorships constituted respectively 5.85% and 23.35% of their total 1973 directorships across all listed companies (Kiel and Nicholson, 2005). In the US, a study of 478 S&P companies filing proxy reports up to 31 May 2007, supplemented by online responses from 119 corporate secretaries in the first half of

[7] Section 275 of the Companies Act, 1956, as amended up to 30 June 2006, limits individual directorships to fifteen companies; Section 278 (1) excludes from the computation of fifteen companies, directorships in private companies that are neither subsidiaries nor holding companies of public companies, any unlimited company, and any company where the individual serves as alternate director to another specified individual on that board. An alternate director is qualified to act in place of the substantive director during his or her absence or incapacity. An individual could in addition also be occupying a position equivalent to a director in case of a company, in any number of organisations and bodies corporate or otherwise such as Trusts etc. which do not fall under the purview of the definition of a company under the Act, without being in violation of the fifteen company limit on company directorships!. The Companies Bill, 2009 under parliamentary scrutiny does, however, substantially restricts such exemptions

2007, found that 58% of the sample companies had restrictions on their CEOs serving on outside boards. 7% did not allow any, 13% allowed one outside board, 21%, 14% and 3% respectively permitted two, three and four outside boards. Companies seemed to be less severe on other senior full time executive directors, with 67% of the sample companies not having any restrictions at all. The study did not cover the outside directorships of non-executive directors. In the UK, the trend appeared to be towards lower engagement in outside board activity by non-executive board chairs (89% of whom were non-executive during the period), down to 58% from the 73% in the previous year. CEOs of the sample companies serving on outside quoted companies had however gone up to 47% from the previous year's 43%.

Geo-Cultural Dimensions

Internationalization of business also leads to a greater measure of cross-country board interlocks both for control purposes (especially in case of transnational subsidiaries and affiliates) and for favorably managing external dependencies. With growing globalisation of businesses and markets, cross-country interlocks do appear to be on the rise. Kentor and Jang (2004) conclude from a study of interlocks of the Fortune Global 500 in 1983 and 1998, that "First, there has indeed been a significant increase in the number of global linkages among the boards of directors of the world's largest corporations over the past two decades. Second, the growth in international linkages has outpaced the expansion of domestic ties. Third, the geographical distribution and intensification of these ties do not reflect the global distribution of corporate headquarters." They also distinguish their findings from those of Carroll and Fennema (2002) who studied samples of 176 leading international corporations in 1976 and in 1996 and found that across the two decades, "[Ties] among the world's largest corporations continued for the most part to respect

national borders; …there has been no massive shift in corporate interlocking, from a predominantly national to a predominantly transnational pattern. …[T]ransnational network is a kind of superstructure that rests upon rather resilient national bases. There has been a loosening of the international network, which …reflects the tendency toward exit-based rather than voice-based corporate governance." As Kentor and Jang's study had a significantly larger sample and covered a later time period (by two years at the end-line) their conclusions may be more reflective of the actual developments in this field. However, given the furious pace at which global corporate relations are taking shape and with several developing countries substantially enhancing their footprints in other parts of the world, the jury is probably still out on this critical issue.

Why Do Boards Interlock?

In the context of American corporations, "The institution of the interlocking directorate has continued to exist since the early days of corporate capitalism. This is of some interest in itself, because it is doubtful that it would have survived without serving some material purpose. The critical question is what purpose (or purposes) does it serve" (Dooley, 1969). Also, from an organizational theory perspective, such interlocks do not appear to be casual coincidences either. Neither are they "random or independent factors but … rational organizational responses to the conditions of the external environment." (Pfeffer, 1972).He postulated:

> "Business organizations (and other organizations, too) use their boards of directors as vehicles through which they co-opt, or partially absorb, important external organizations with which they are interdependent. The strategy of co-optation involves exchanging some degree of control and privacy of information for continued support from the external organization. Co-optation, as a tactic, is likely to be utilized when total absorption is (1) legally proscribed, (2) impossible due to resource constraints, or (3) when partial inclusion is sufficient to solve the organization's problems of dealing with the external organization."

Mintzberg (1983) has also approvingly referred to this co-optation strategy in his enumeration of the service roles of boards, gaining power over external organizations through the vehicle of board seats:

> "The organization may try to diffuse the power of an important external influencer by providing that person the status of a seat on the board. … The external influencer can content himself with the status instead of a serious say in decision-making. Or else, the organization may try to elicit the support of an influential individual who might otherwise ignore it, as when a private hospital or university offers a board seat to a wealthy potential donor. .. ."

Overall, interlocks appear to be triggered when external interdependencies of an organization are large and substantial, and concomitantly, total absorption of such external entities are neither feasible nor permitted, or even necessary. Competition and anti-trust legislation in countries may militate against such total absorption; resource constraints may rule out complete acquisition of such external entities. A further factor that appears to favor interlocks is the potential enhancement in organizational reputation through such celebrity associations.

In this view of the matter, justification of board interlocks may be seen as evidence of the Resource Dependence approach (Pfeffer and Salancik, 1978) that postulates firms exerting control over their environment by co-opting the resources needed to survive and grow. The most direct method for controlling dependence is to control the source of that dependence. One is not always in a position to achieve control over dependence through acquisition and ownership, however. However, linkages could be forged except where they are proscribed. Four categories of benefits that companies look for in such linkages are:

- First, information exchange about the activities of that organisation, which may impinge on or affect the focal organisation. For example, interlocking directors among competitors may provide each with information about the other's costs and pricing and market strategy plans..

- Second, opening up a communication channel between organisations to convey information. For example, a banker on a board, learning of its requirements, may convey a funding business opportunity to his bank.
- Third, a support commitment from important elements of the environment. For example, a co-opted board member, exposed to the perspectives of the company, tends to align his views and communications accordingly.
- Fourth, association of prestigious co-opted directors legitimises the company and adds to its reputational value.

In this approach, company boards would prefer to co-opt individuals who can provide them with necessary linkages to the external environment necessary to subserve their objectives. A related cooptation initiative would be to induct people whose presence on the board would help to blunt to some extent any opposition they may have while being outside the board. Thus, "When an organization appoints an individual to a board, it expects the individual will come to support the organization, will concern himself with its problems, will favorably present it to others, and will try to aid it. … A board member is publicly identified with the organization, and thus may be expected to accept some responsibility for its actions. … [T]he feeling of participating in setting organizational policy makes the individual both more identified with, and more committed to, that policy." (Pfeffer and Salancik, 1978)

This category would include persons with name and fame in their chosen field of activity and those who have networking connections with external organizations, or authorities who have the power and potential to help or hinder the corporation in achieving its goals, and opinion makers who adopt apparently adversarial positions. Interlocking boards in such circumstances aligns people with access to resources the company is dependent upon with the interests of the firm. Traditional and cultural influences also bear upon director clustering. Nayak and Maclean (2007)

point out that the rich history of India's business elite and its cultural substrata that underlie societies goes very deep; change at this deeper, sedimentary level is slow but, the "strength of cultural reproduction, inducing continuity whilst not preventing change," is indeed striking. Thus, in India, during the colonial phase there was a corporate elite comprising of British managing agency personnel who sat on the boards of their managed companies. Indian businessmen were tied together by bonds of community and religion, creating their own set of business elites and helping each other. When the British managing agencies needed local knowledge and contacts, resources that were external to their organizations, they gradually inducted some of the Marwari businessmen following the co-optation route discussed earlier. Nationalism and the struggle for political freedom during the nineteenth and twentieth century were other binding factors that helped to create Indian business elites who sat on each other's boards. The process has continued since then and has been further strengthened with the rapid industrialization and globalization of the Indian business environment in recent decades.

What Do Board Interlocks Mean to the Companies and the Society?

Over time, board interlocks have acquired a notorious reputation that they are inherently bad and hence undesirable; probably, this is so in a vast majority of such linkages as empirically and anecdotally documented. On the flip side, it is also possible that such inter-connections when exploited on ethical lines may contribute to the wellbeing of society and the respective corporations and their stakeholders including the stockholders. While this potential will be further explored in later sections of this paper especially in the context of empirical evidence that will be presented, what follows is a brief consideration of earlier work on this aspect of board interlocks.

Berle and Means (1932) expressed the view that they such interlocks were generally to the advantage of the corporations concerned and were not only acceptable but also desirable, so long as the directors made full disclosure of their position in situations of interest conflicts. They wrote:

> "Where a single individual finds himself a director of two companies whose policies conflict, he may have some difficult choices to make. In strict ethics the business community regards it his duty to solve the situation according to the best business sense he may have. A still nicer feeling on the subject might lead him to resign from one of the two directorates. But the latter alternative may not be to the best interest of either of his corporations, since the very existence of a conflicting interest on the board of a competing or adversary company may supply a channel of communication by which the difficulty can ultimately be solved to the best advantage of both."

Berle and Means' approach was quite appropriate in the context of corporate imperatives to enlist the support of external agencies that were capable of influencing their survival and growth. As they pointed out:

> " …[T]he charge that directors are interested on both sides of the transaction is entirely loosely made in the financial community. A director, especially if he is an important man financially, will have a dozen or more interests all going at once. In many cases the action taken by him in one corporation is necessarily more or less adverse to the interests of other corporations in which he may be interested. [C]orporations expect to transact business with each other or in the same field, to their mutual advantage; and the very duality of interest of the director is thus turned to the advantage of both."

Leaving aside the practical benefits to corporations and especially to their directors and management, such interlocks potentially are injurious to the absentee shareholders and in a wider sense to all stakeholders of the corporation. Besides, they lead to monopolistic tendencies militating against competition and other public policy interests. This was indeed the position that Louis Brandeis advocated; that interlocking directorates were inherently bad for society, since

amongst other things, they tended to cartelize and contain competition to the disadvantage of the consumers. Among the earliest and most scathing among the critics of such interlocks in the US, Brandeis portrayed board interlocks as follows:

> "The practice of interlocking directorates is the root of many evils. It offends laws human and divine. Applied to rival corporations, it tends to the suppression of competition and to violation of the Sherman law. Applied to corporations which deal with each other, it tends to disloyalty and to violation of the fundamental law that no man can serve two masters. In either event it leads to inefficiency; for it removes incentive and destroys soundness of judgement. It is undemocratic, for it rejects the platform: 'A fair field and no favors,' substituting the pull of privilege for the push of manhood. It is the most potent instrument of the Money Trust. Break the control so exercised by the investment bankers over railroads, public service and industrial corporations, over banks, life insurance and trust companies, and a long step will have been taken toward attainment of the New Freedom."[8]

It is indeed interesting to note that the wisdom of such an approach has never been in much doubt. Even those who were actually in positions of such interlocks, multiple directorships and potential interest conflict, always found some ways of reluctantly rationalising the practice. [9]

Nearly a century later, expressions of similar concurrence in principle but concerns in practice, can still be heard in corporate corridors, among directors who are hard pressed for time. As we have noted earlier, there are good theoretical and practical grounds on which corporations tend to engage in such interlocks and multiple directorships, but there are equally weighty considerations of public policy and private fiduciary responsibilities that need to be addressed.

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[8] *Chapter III: Interlocking Directorates*, in *Other People's Money*, Brandeis, Louis D (1913), Harpers' Weekly, 13 December2004, Law Library, Brandeis School of Law, Louisville

[9] For an illuminating exchange of views between Louis Brandeis and Thomas Lamont, then a partner of J P Morgan and a key target of attack, see *Brandeis and Lamont on Finance Capitalism*, Abrahams, Paul P (1973), Business History Review, Spring, pp. 72–94

The Clayton Act of 1914 in the US prohibited interlocking directorates among competing corporations, but not otherwise. It is noteworthy that the comprehensive legislation on Competition Law in India has not yet addressed the issue of board interlocks as a potential threat to fair competition.

3

Methodology of Network Analysis

Humans intuitively understand that certain actors are more powerful and influential than others because of the networks they are embedded in. However the first sociogram or a picture that depicted networks was drawn by Moreno. In early, 1930s, he depicted relationships of individuals by drawing nodes to represent individuals and lines to represent relationships. He used these diagrams to study structural properties of groups. Over years, network analysis has become to be known as a disciplined enquiry into patterns of social relationships between and among actors. Freeman (2004, pg 10) defines social network analysis as a method of social research that displays four features:

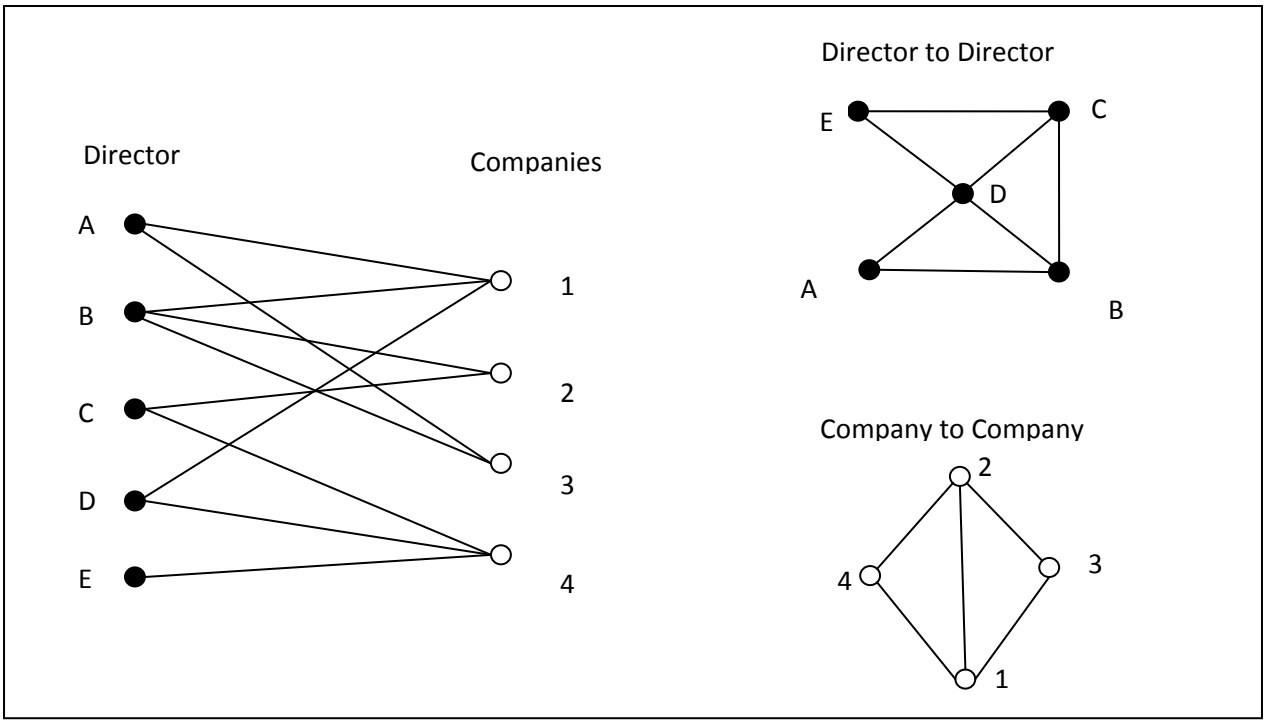
- a structural intuition, which recognizes the importance of ties that link social actors;
- systematic relational data, which can help generate reports of patterned social interactions (ibid. pg 16);
- graphic images that depict the patterned social interactions
- mathematical or computational models to clarity the concepts and spell out the consequences (pg. 25)

Accordingly, this study uses network analysis to analyze board interlocks in the chosen sample companies and directors. Following is a brief introduction to the network methodologies used here.

Relational data between various actors is usually one mode in nature, which are straightforward actor to actor networks. However, sometimes actors are affiliated to one another through

common events they participate in or attend. Networks arising from individuals or entities interacting with each other while being engaged in a single forum (such as a board of directors or even assembly of companies such as an industry association) are referred to as 'category membership networks' or 'two mode networks'. Wasserman and Faust (1994, p. 291) describe "affiliation networks are two mode networks consisting of set of actors and set of events…and the connections among members of one of the modes are based on the linkages established through the second mode". In line with the most popular method of analysis of two mode networks, we separated them into single mode networks before they can be analyzed. This method was introduced by Brieger in his paper The Duality of Person and Group (1974). Most two mode networks are collected from archival data (Valente, 2010). The original data is in a tabular form in which rows are individuals and columns are organizations they are part of. As Valente (pg 48) explains that the "table is a matrix, which can then be transposed and post-multiplied to yield an individuals-by-individuals matrix representing the number of joint memberships. The transposed matrix can be pre-multiplied (placed first) to yield an organization-by-organization matrix."

Figure 1 depicts a classic affiliation network where Directors are occupying board position in companies. For instance, directors A and B are on the board of companies 1 and 3 but B is also on the board of 2, which he shares with C. Hence, B is connected to A and C. D on the other hand is on the boards of 1 and 4. D is connected to A and B through the company 1 and to C and E through the company 4. This figure can be separated into a two one mode networks - one which depicts the network of Directors and another that depicts the network of the Companies.



The two mode network data of directors and companies was separated was done using Ucinet 6.0 software (Borgatti, et al. 1999).

In our study, data on directors from 2001 to 2010 has been analysed using the above mentioned process. Since, graphical representation of the entire network requires larger paper sizes, networks of 'highly boarded director' (individual on more than 5 boards) are shown in this manuscript. Additionally, instead of showing data from all the years, networks of four years which sufficiently captures the evolution of the networks are given in Exhibits 5 to 12. Specifically, networks for the years 2001, 2005, 2008 and 2009 are shown. The size of the node indicates the basic network measure of degree centrality. This is a simple measure that indicates the number of connections to and from each node. The networks are dense and are well connected to one another. Complete details of the network charts for all years from 2001 to 2010 are included separately in the appendix to this report.

4

Description of the Study Sample

The sample consists of the NSE100 companies from 2000 to 2010. In certain cases a few observations were missing and as a result the final sample came down to 967 firm-year observations for the 10 year period. The process of sample construction is discussed below.

Sample construction:

The data for the study was collated from multiple sources. These include

- National Stock Exchange (http://www.nseindia.com)
- CMIE, Prowess
- Annual Reports from Insight (http://insight.religaretechnova.com/Insight/index.asp)
- Director's database, Prime and BSE (http://www.directorsdatabase.com) and
- Individual company reports

CMIE's Prowess was the primary data source. We extracted firm level information from 2001 to 2010on various characteristics such as financial and performance variables, information relating to ownership groups, composition of boards of directors, industry classification, etc.

The following were the steps in arriving at the final sample.

1. The current list of NSE 100 companies was obtained by combining CNX Nifty Junior and S&P CNX Nifty companies. The data was obtained from two NSE websites(http://www.nseindia.com/content/indices/ind_nifty.htmand ; http://www.nseindia.com/content/indices/ind_jrnifty.htm),

2. To trace back the list of companies in earlier years of the NSE 100, we looked at the information pertaining to the details of the past changes to S&P CNX Nifty and the junior nifty constituents. This provided information regarding the date of inclusion[10]. In respect of this derived NSE 100 list of companies, the CMIE – Prowess database was queried to get the Directors list. Missing data was obtained manually by sifting through copies of company's annual reports. A great deal of cleaning up was necessary to overcome problems associated with First Names, Last Names, Middle Names, and so on. In many cases, initials of the directors were given in Prowess instead of their full names which involved telephone calls to company head offices or cross-checking with relevant web sites Prime Database.

3. After this cleaning CMIE-Prowess database was queried to get data on multiple directorships if any in other companies outside of NSE 100..This provided multiple directorships held by NSE 100 directors in all other listed NSE companies.

4. Finally, after the relevant data regarding the companies listed in NSE and the multiple directors were obtained, we constructed the four key explanatory variables used in the regression analysis (i.e. Boardedness, Degree, Betweeness and Eigen vector)[11]. In addition, we collected the corresponding data relating to performance variables (ROA

[10] To get the names of the companies and number that were listed on NSE as per the referenced dates ,we accessed the NSE website to get the trading information of securities such as Equity shares, Indian Depository Receipts (IDRs), Preference Shares, Debt Instruments, Warrants, Close Ended MF Schemes (Listed), Securities available for trading in IL series, Securities available for trading in ETF, Changes in Company Names, Changes in Symbols, Listed companies suspended from trading for non-compliance, List of companies delisted, Companies not submitted Corporate Governance Report, List of Companies - Clause 40A, List of top 100 common companies for Common Filing, Data on Shareholding Pattern, Legend for series of different securities etc. Based on the securities information collected we checked the details of companies collected. By doing this, we segregated the companies that were listed on NSE and delisted as per the referenced date.

[11] Detailed of thee are provided in Appendix 1

and Q-Ratio), and other variables such as ownership structure, size, age, leverage and indicator variables for industry and year. The details of these variables are provided in the appendix 1

Data descriptives:

Panel A provides the characteristics of NSE 100 companies in the sample over the study time frame of 2001 to 2010:

- Total number of directors increased from 888 to 1104.
- Total number of director positions (seats) increased from 1415 to 2037.
- The total number of multiple directors increased from 242 to 414 and the proportion of multiple directorships has increased from 27% to 38%.
- The cumulation ratio (no of director seats by number of directors) increased from 1.59 to 1.85.

We termed directors who are in the board of 5 and more companies as 'highly boarded directors' (HBD). As is evident from Table 1 have increased from 40 in 2001 to 71 in 2010.

The table also gives information on multiplicity and distance. Multiplicity indicates the number of common directors any two companies share. While the most of the companies only share one director, those companies that share 2 directors have increased. The Distance dimension indicates the number of directors who can be reached within, 1, 2 or more than 2 degrees of separation. The overall numbers indicate that most NSE directors are on the periphery without connections to others directors and require more than two degree to reach them.

Panel B provides the industry categorization of the highly boarded directors (HBD).

We also collected the details pertaining to the link between the highly boarded directors and market cap. This data is given in Panel C. The most striking aspect of Panel C is the increase in the number of highly boarded directors from just 40 in 2001 to 71 in 2010. These highly boarded directors form just a tiny fraction of the total number of directors. The average over the study timeframe of ten years is around 6 percent. However, they exercise enormous influence on the Indian corporate economy. This can be gauged from both the number and growth of highly boarded companies which these associated directors are involved in, from just 167 in 2001 to 486 in 2010. The growth of market capitalization of these highly boarded companies has also been significant as a percentage of the total market capitalization of the NSE. It has risen from 43 percent in 2001 to 66 percent in 2010. The fact that 6% of the directors control 66% of the total market cap of all NSE listed companies is truly remarkable. This trend can be noticed pictorially in Exhibits 1 to 4.

5

Regression Analysis

Panel D and E depict the descriptive statistics and the correlation matrix. In certain instances as can be seen from Panel D, the sample size dropped down from 967 for the ownership variables, performance measures and other controls owing to missing data. The ownership variables reflect shareholding percentages. In panel E, the significant correlations are indicated by asterisks. It is particularly striking to see the high degree of positive correlation between the key explanatory variables

Our primary theoretical lenses for examining director interlocks are Agency theory (Jensen and Meckling, 1976) and Resource dependence hypothesis (Peffer and Salanzick, 1978). The specific predictions of the interlock variables from the perspective of agency and resource-based theory are indicated below after the basic regression specification utilized for the analysis is introduced.

The basic regression specification, which is employed for the analysis, is as follows:

$$Performance_{i,t} = \alpha + \lambda Boardedness_{i,t} + \sum_k \xi\, Connectedness + \sum_l \varphi\, Controls_{i,t} + \varepsilon_{i,t.}$$

Boardedness proxies for Agency implications associated firm performance while Connectedness (as defined through its three dimensions: Degree, Betweeness and Eigen vector) proxies for the Resource dependence hypothesis

Our predictions associated with both agency and the resource dependence hypotheses are the following:

Agency hypothesis: $\lambda < 0$

Resource Dependence hypothesis $\xi > 0$

As the data is in the form of panel data, the regression models are estimated using Random Effects GLS Estimation and Fixed Effects Estimation methods.

Tables (1) to (4) represent the full sample analysis. Tables (1) and (2) represent the fixed effects and random effects models for ROA. Model (2) indicates that boardedness is positive and significant. Model (5) indicates that Eigen vector is positive and significant. Model (6) has all the connectedness variables introduced together. Once again, Eigen vector remains positive and significant. Model (7) represents the global model with all connectedness and bordededness variables introduced simultaneously. Eigen vector continues to be positive and significant indicating that Eigen vector represents our strongest result. This result remains consistent across Tables (1) and (2) (i.e. both fixed and random effects estimations).

These results indicate that boardedness which proxies for the agency hypothesis on the monitoring implications associated with being on the board of several boards is not supported (i.e. the boardedness coefficient is positive and significant instead of a negative and significant coefficient as hypothesized).However, while Degree and Betweeness are not significant, Eigen vector is consistently positive and significant indicating that the resource dependence hypothesis is supported.

Interestingly, all regression models in Tables (3) and (4) wherein Tobin's-Q ratio is the performance measure is insignificant. Apparently (and counter-intuitively), market based measures do not seem to be picking up the effects associated with boardedness and connectedness variables.

Tables (5) to (20) depict the variables sub-sample analysis. These include sub-sample analysis for Indian Promoters, Foreign Promoters, and Government Promoters. The purpose of this analysis to discern the impact of various connectedness variables and boardedness variables among the main ownership categories. The sub-sample analysis broadly depicts the following results.

- Among Indian Promoters, boardedness represents the most consistent set of results across Tables (5) to (8). The strong positive and significant effects of the boardedness variables among the Indian promoters sub-sample once again is a negation of the agency hypothesis on the increasing costs associated with monitoring as the number of multiple directorships increases.

- Tables (9) to (12) represent the sub-sample analysis for foreign promoters. The most consistent result for this sample is the negative effect of betweeness in Tables (8) and (9) (wherein the performance measure is ROA).However, the magnitudes associated with these coefficients are very negligible and consequently the effect sizes are miniscule.

- Tables (13) to (16) depicts the results of the government promoters. However, since the sub-sample sizes are small (98 firm year observations), we hesitate to make any inferences from this sub-sample.

- The final set of tables from (17) to (20) depict the results of the manufacturing only sub-sample. Given the concerns associated with using performance measures such as ROA in services and non-financial services, we wanted to confirm the robustness of the results

with a sample of manufacturing only firms. The results remain broadly consistent with the full sample results depicted in tables (1) to (4).

The regression base models were tested for multi-collinearity effects with Variance Inflection Factor (VIF) tests. The VIF levels were found to be within tolerance limits. In addition, alternative model specifications for the sub-sample results also yielded a consistent set of results.

Finally, we conducted the regression analysis using Return on Equity (RoE) as the performance measure[12]. The full sample results are depicted in Appendix 3. As with the earlier results we depict both fixed and random effects regression results. Panel A depicts the fixed effects models. Once again, consistent with the ROA results, Boardedness and Eigen vector are positive and significant. The ROE regressions also pick up a significant positive effect for Betweeness but the magnitude of the coefficient is very small. Model (6) which introduces all the connectedness variables together remains consistent (i.e. Eigen vector continues to remain positive and significant in line with the ROA regressions). However, Model (7) does not pick the significance of the Eigen vector. This could potentially be on account of the high correlation levels between the different key measures. Panel B, repeats the exercise with Random effects models, once again, Boardedness and Eigen vector continue to be positive and significant. However, the random effects models pick up significance for Betweeness and Degree as well but the magnitudes are small. Models (6) and (7) display similar characteristics as in Panel A. Overall, the ROE results display a degree of conformity with the ROA results, with Boardedness and Eigen vector being the most consistent set of results.

[12] We thank the workshop participants at IIM Bangalore, wherein the initial findings of this study were presented for suggesting this line of enquiry.

6

Conclusions

This exploratory research attempts to identify patterns among interlocks of directors and to examine their linkage with market capitalization and performance. A key finding, which emerges, is that a small proportion of 'highly boarded' directors control a significant portion of the market capitalization of the NSE. While this raises concerns on the efficacy of the recently introduced corporate governance norms, which are aimed at increasing the diversity in the director pool, the regression analysis depicts that there is a positive impact of boardedness and connectedness (as proxied by Eigen vector) on ROA. In a nutshell, from public policy perspective, the analysis potentially reflects the 'bad cholesterol' elements of multiple directorships in terms of a tiny segment of 'highly boarded' directors controlling a significant portion of the country's economic prowess, whereas the positive influences on company performance provide some evidence of the 'good cholesterol'.

The key findings of this study can now be summarized:

1. Interlocking boards of directors is a predominant feature of the Indian corporate sector. A small group of highly boarded directors (defined as those sitting on 5 or more boards) constituting about 6% of the overall director population relatable to the NSE 100 companies during 2001 – 2010, control some 66% of the total market capitalization of all NSE listed companies as of 2010.

2. Contrary to the generally held view that multiple directorships tend to militate against quality time and attention being provided to the companies, this factor turned out to be positive in relation to the performance of the companies. In other words, the agency hypothesis on the monitoring implications associated with being on the board of several boards is not supported. It appears that the benefits of multiple directorships reflected in transferring best practices and processes among companies, a postulate of the resource dependence theory, takes precedence over any countervailing disadvantages of such multiple directorships.
3. Market based measures do not seem to be influenced by the effects associated with high Boardedness and Connectedness of directors.

The implications for public policy are indeed quite significant (Mizruchi 2004, Adams and Brock, 1986). Concentration of economic power in the hands of a limited few (as represented by 66% of market capitalization being controlled by 6% of the director population) would indeed be a source of concern. Adam Smith (1980, p. 359) admonished the state to be cautious while considering legislative proposals emanating from the business sector with great circumspection and even suspicion since they came from "an order of men, whose interest is never exactly the same with that of the public.." Reviewing the situation in the US, Bassiry and Jones (2004) demonstrated how the "incredible concentration of economic resources translates, however imperfectly, into political power and undermines the democratic process." It is also worthwhile recalling the concerns expressed by Berle and Means (1932) who noted:

> "The rise of the modern corporation has brought a concentration of economic power which can compete on equal terms with the modern state . . . Where its own interests are concerned, it even attempts to dominate the state. The future

> may see the economic organism, now typified by the corporation, not only on an equal plane with the state, but possibly even superseding it as the dominant form of social organization."

While on this, it may be noted that an even a minor change in the qualifying directorships (5 in this study) would significantly and disproportionately alter the concentration of economic power.

The second important public policy implication will be on the nature of regulatory regimes. For example, when listed companies were mandated to have a higher percentage of non-aligned or independent directors on their boards (Clause 49), the assumption was that there would be a widening of such independent directors pool. This study shows on the other hand, such a mandate has tended to increase multiple directorships and concentration of economic power since in a number of cases, such additional independent director vacancies have been filled by incumbent independent directors, as revealed by the increase in the highly boarded directors population (for example, 40 (2001) to 71 (2010) directors with 5 or more directorships).

Of course, one could always ask "so what?" – what if high beardedness increased so long as it produced more effective contribution to furthering economic growth, what if an increasingly smaller number of individuals were to control a progressively larger proportion of economic wealth so long as such additional wealth was indeed being created within mandated legitimate means, and so on. Unfortunately, the lessons from history do not support a theory of beneficial dictatorships: irrespective of how attractive they may have been to begin with, absolute power does indeed corrupt absolutely. Such powerful groups tend to first influence and then to dictate public policy measures to further their own interests which may not coincide with the interests of large segments of the country's citizenry. Experience and wisdom therefore suggest that such

tendencies towards such concentration of power need to be discouraged and preempted at the earliest

7

The Research Road Ahead

Board interlock studies have traditionally been limited to corporate entities; even then research has been hindered by lack of credible data availability. But with the growing size and power of corporations and their elite directors, the interface between and among corporations, government and the society is increasingly strident. The free movement from business to government and government to business (Hank Paulson, to cite just one recent example, who moved from Goldman Sachs to Treasury Secretary in US), and the equally free communion among businessmen, politicians and other socialites in general, offer enormous opportunities for building personal relationships that can turn out to be useful resources. To be holistic, then, such interlock studies should go beyond corporations alone and encompass connections between and among individuals, entities (including cooperatives, partnerships, trusts, not for profits, sports bodies, and so on), political parties and the bureaucracy, not to omit instruments and institutions of government such as parliament and state assemblies. A person's resourcefulness (what he or she brought to the table) would thus be determined by his or her networks not only among other corporates but also the in the wider canvas of the polity. Undoubtedly, obtaining credible data that would stand rigorous academic scrutiny would pose a major problem but given its overriding importance and value, researchers may have to find appropriate solutions to get such data.

On a more limited if less ambitious plane, further research could be directed in the following directions:

- Institutionalizing credible data collection and dissemination on a dynamic and continuing basis on board and director related statistics to facilitate ongoing study, which would assist both corporations and policymakers. The Ministry of Corporate Affairs which is the nodal agency for corporate statistics may be best suited to make this possible
- A weighted boarding index could be developed to reflect the weightage of companies based not only on the simple number of directors with multiple directorships but also the value of such directorships based on the size, importance, distance, company centrality and so on. Research could then focus on corporate performance in relation to its weighted boarding index, which might provide useful insights and guidance in board constitution
- The analysis of the current data could be refined further by exploring lagged specifications and by using spline regressions to assess the implications of the Boardedness and Connectedness variables at different levels. The present study confined the analysis to NSE100 companies and directors of these companies occupying board positions on other NSE companies. Future work should extend this analysis to all NSE/BSE listed companies and explore if the findings attributable to the NSE100 set is applicable to other listed companies beyond the NSE100 as well.
- Finally, an interesting line of enquiry, which could be potentially probed, is the impact of the phased adoption of Clause 49 (see Appendix 2) and its implications on director interlocks both within the NSE100 sample and beyond.

Panel A: Descriptive statistics of overall network of NSE100 for all directors

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Number of Directors (A)	888	909	986	1129	1080	1056	1081	1071	1109	1104
Total Number of Director Seats (B)	1415	1451	1611	1819	1798	1781	1960	1947	1914	2037
Total Number of Multiple Directors (C)	242	253	294	326	337	329	378	382	369	414
Proportion of Multiple Directors(D)	0.27	0.28	0.30	0.29	0.31	0.31	0.35	0.36	0.33	0.38
Cumulation Ratio (E)	1.59	1.60	1.63	1.61	1.66	1.69	1.81	1.82	1.73	1.85
Number of Director Seats held by a multiple director										
2	121	153	148	164	180	160	168	189	201	204
3	55	43	64	73	59	74	88	79	69	87
4	26	33	31	39	38	33	50	45	37	52
5	17	12	27	22	30	26	31	25	23	29
>5	23	24	24	28	30	36	41	44	39	42

A. Total number of directors: Count of number of all directors in the NSE 100

B. Total number of director seats: Count of all directors including the number of multiple directorships each director holds in NSE 100

C. Total number of multiple directorships: Count of total number of directors with multiple directorships in NSE 100

D. Proportion of multiple directorships: Total number of multiple directorships (C)/Total number of directors (A)

E. Cumulation ratio: Total number of director seats(B)/Total number of directors(A)

Panel A: Descriptive statistics of overall network of NSE100 for all directors (Contd.)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Multiplicity (F)										
1	91.70%	92.23%	91.76%	92.34%	91.28%	91.24%	88.22%	88.20%	89.22%	86.53%
2	6.36%	6.55%	7.12%	6.25%	7.06%	7.35%	9.77%	10.29%	9.57%	11.28%
3	1.70%	0.89%	0.81%	0.97%	1.28%	1.15%	1.84%	1.26%	1.03%	1.54%
4	0.23%	0.33%	0.31%	0.44%	0.37%	0.27%	0.17%	0.17%	0.09%	0.65%
5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.09%	0.00%
Distance (G)										
1	1.8%	1.7%	1.8%	1.7%	1.7%	1.7%	1.6%	1.5%	1.5%	1.8%
2	8.7%	8.3%	7.6%	7.9%	7.5%	8.0%	8.5%	8.0%	8.1%	7.6%
More than 2	89.5%	90.0%	90.6%	90.4%	90.8	90.3%	89.9%	89.5%	89.4%	89.6%
No. of NSE100 Companies (available data)	91	93	96	99	98	95	96	98	97	99
No. of NSE Companies	775	745	703	796	737	792	1018	1204	1205	1277

F. Multiplicity: The number of separate contacts, which make up the relationship and are a measure of the intensity of the relationship. Operationally, it is the number of interlocking directors that any two firms have.

G. The Distance: It is a measure of the closeness between any two members of the network. Operationally, it is the shortest path that a firm could reach another firm

.

Panel B: Industry categorization of highly boarded directors

Year	Manufacturing	Financial Services	Other Services
2001	129	18	20
2002	131	11	17
2003	152	13	28
2004	158	18	27
2005	178	19	37
2006	171	28	33
2007	199	24	46
2008	205	30	53
2009	176	30	45
2010	216	36	35

Panel C: Highly boarded directors and the market capitalization of highly boarded companies (i.e. the companies to which the highly boarded directors are linked)

Year	Highly boarded Directors	Total Directors (of NSE100 Cos)	Highly boarded Cos	Total Cos (of NSE100 Directors Linked)	Highly boarded Cos (%)	Highly boarded Directors (%)	Market Cap of Highly boarded Cos	Market Cap Of Total NSE Listed Cos	Market Cap Of Highly boarded Cos(% of all NSE listed Cos)
2001	40	888	167	315	53%	5%	264546.61	611640.49	43%
2002	36	909	159	324	49%	4%	237011.31	708688.35	33%
2003	51	986	192	371	52%	5%	247938.29	706727.46	35%
2004	50	1129	203	380	53%	4%	613208.97	1301937.53	47%
2005	60	1080	234	398	59%	6%	1009224.31	1752545.01	58%
2006	62	1056	234	398	59%	6%	1959535.29	2983980.12	66%
2007	72	1081	269	465	58%	7%	2466025.27	3504254.08	70%
2008	69	1071	288	489	59%	6%	3432160.38	5021182.63	68%
2009	62	1109	251	433	58%	6%	1634687.29	2907299.80	56%
2010	71	1104	284	486	58%	6%	3974125.12	6026483.70	66%

Exhibit 1: Linkages of highly boarded directors, highly boarded companies and market cap in 2001

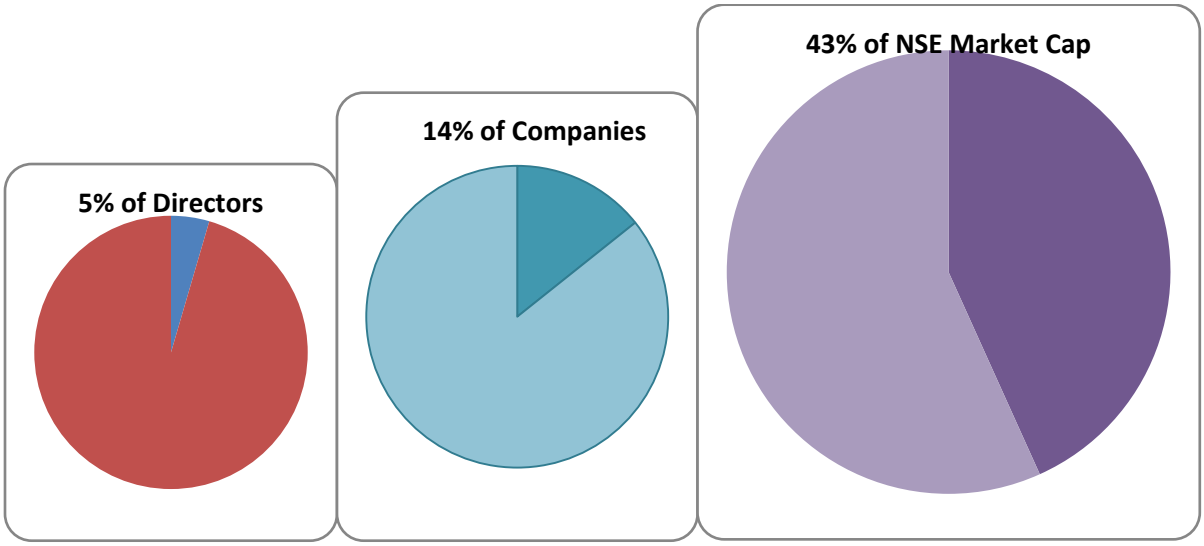


Exhibit 2: Linkages of highly boarded directors, highly boarded companies and market cap in 2005

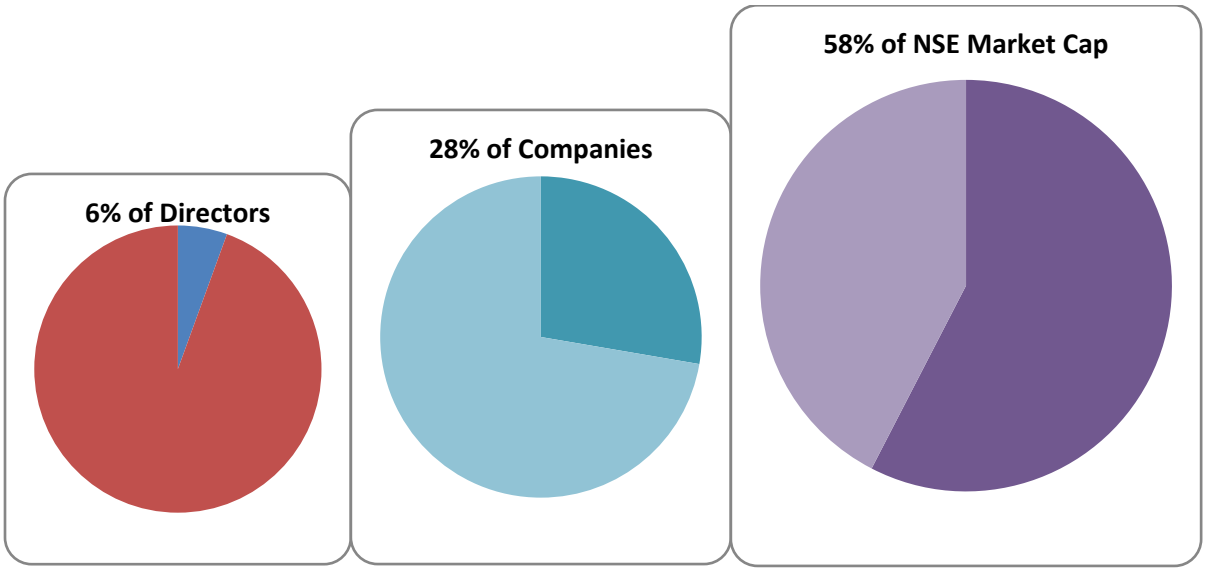


Exhibit 3: Linkages of highly boarded directors, highly boarded companies and market cap in 2008

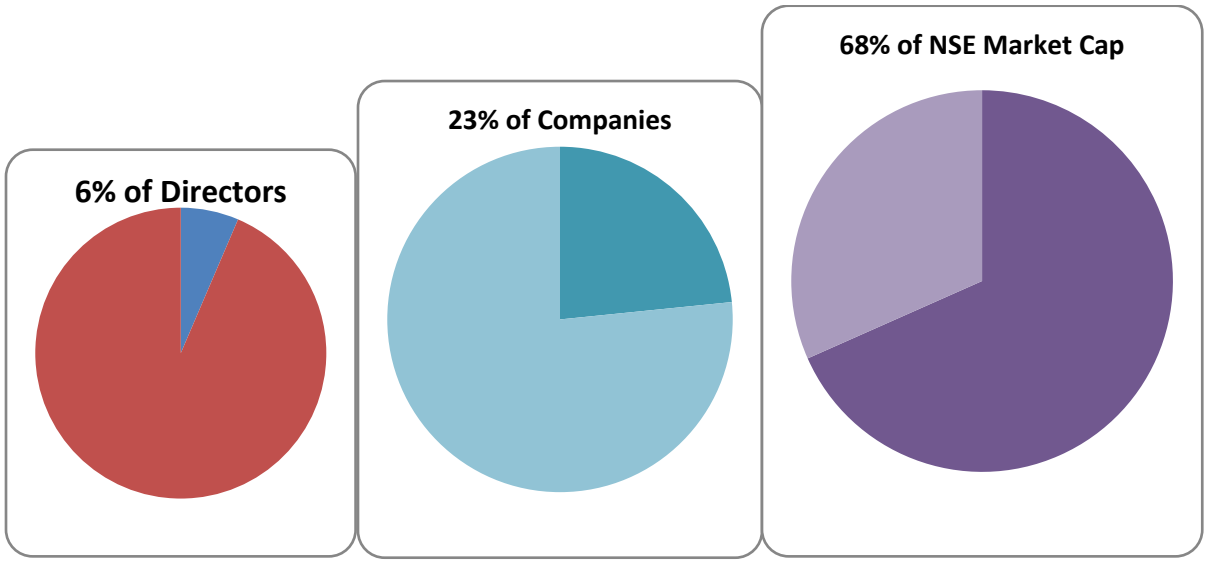


Exhibit 4: Linkages of highly boarded directors, highly boarded companies and market cap in 2009

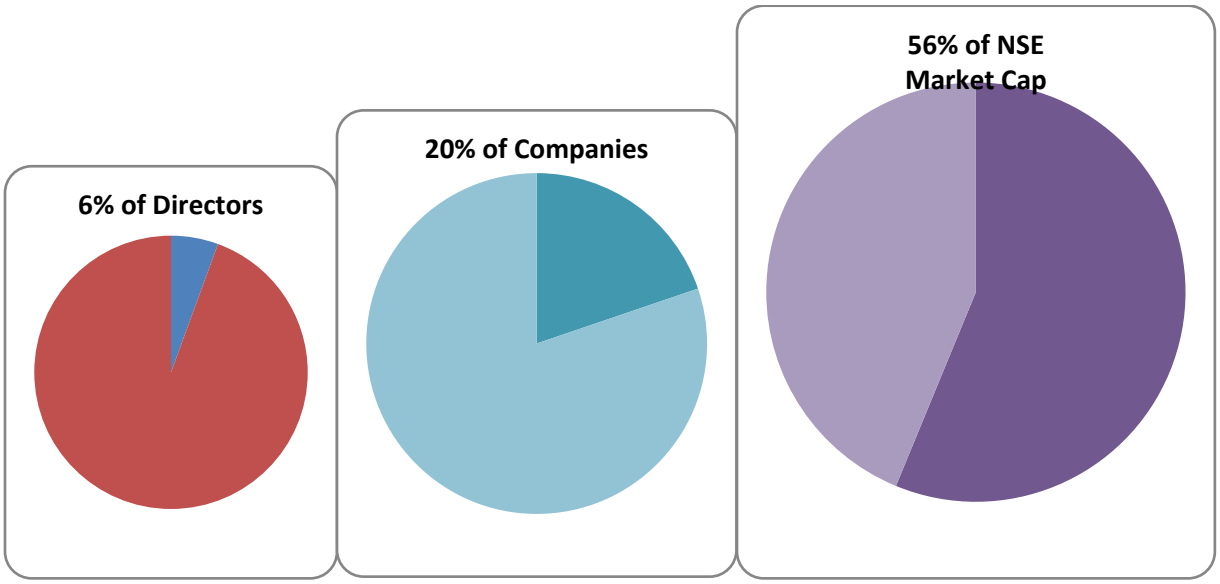


Exhibit 5: Highly boarded Director to director degree centrality [2001 data]

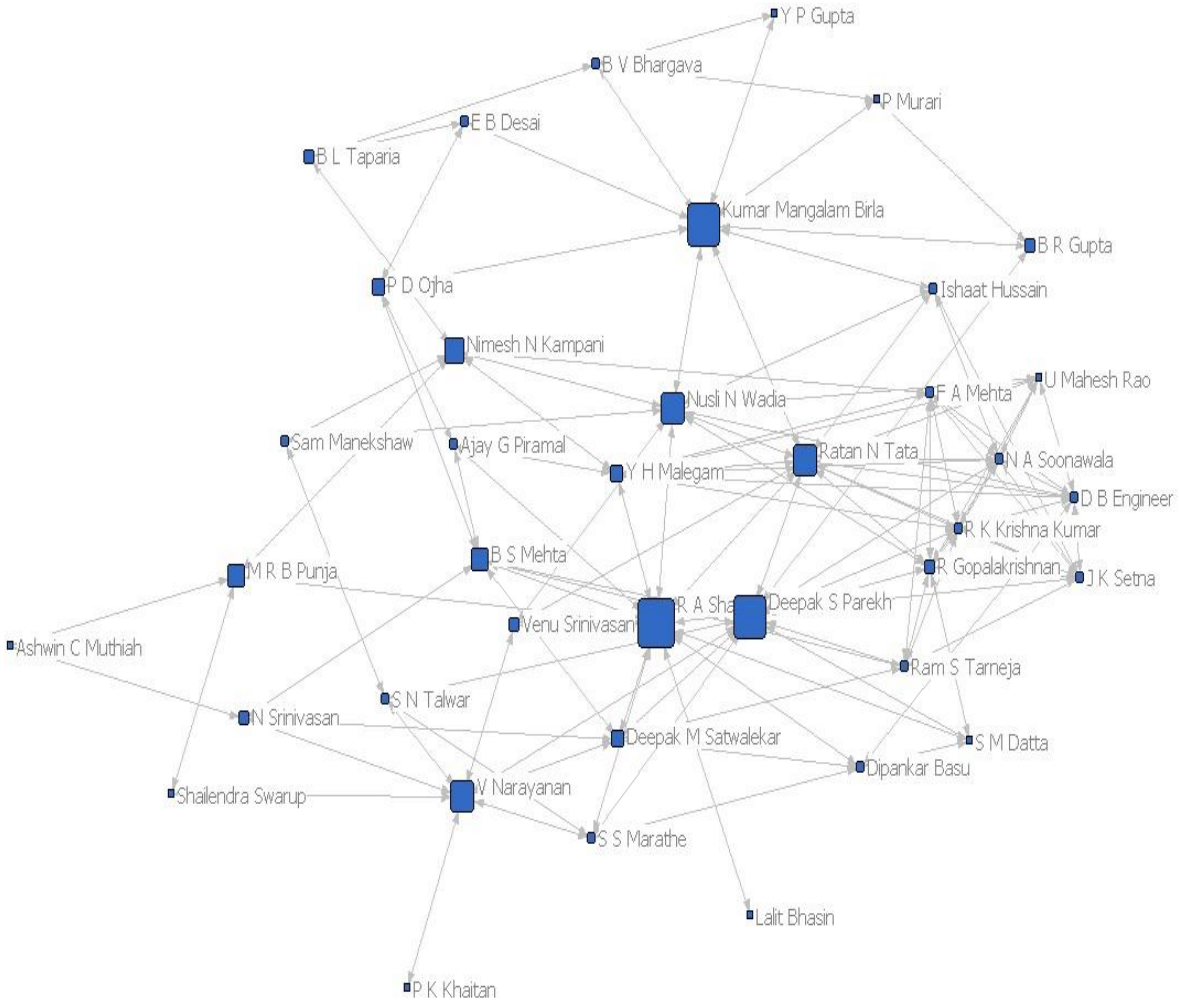


Exhibit 6: Highly boarded company to NSE100 company degree centrality [2001 data]

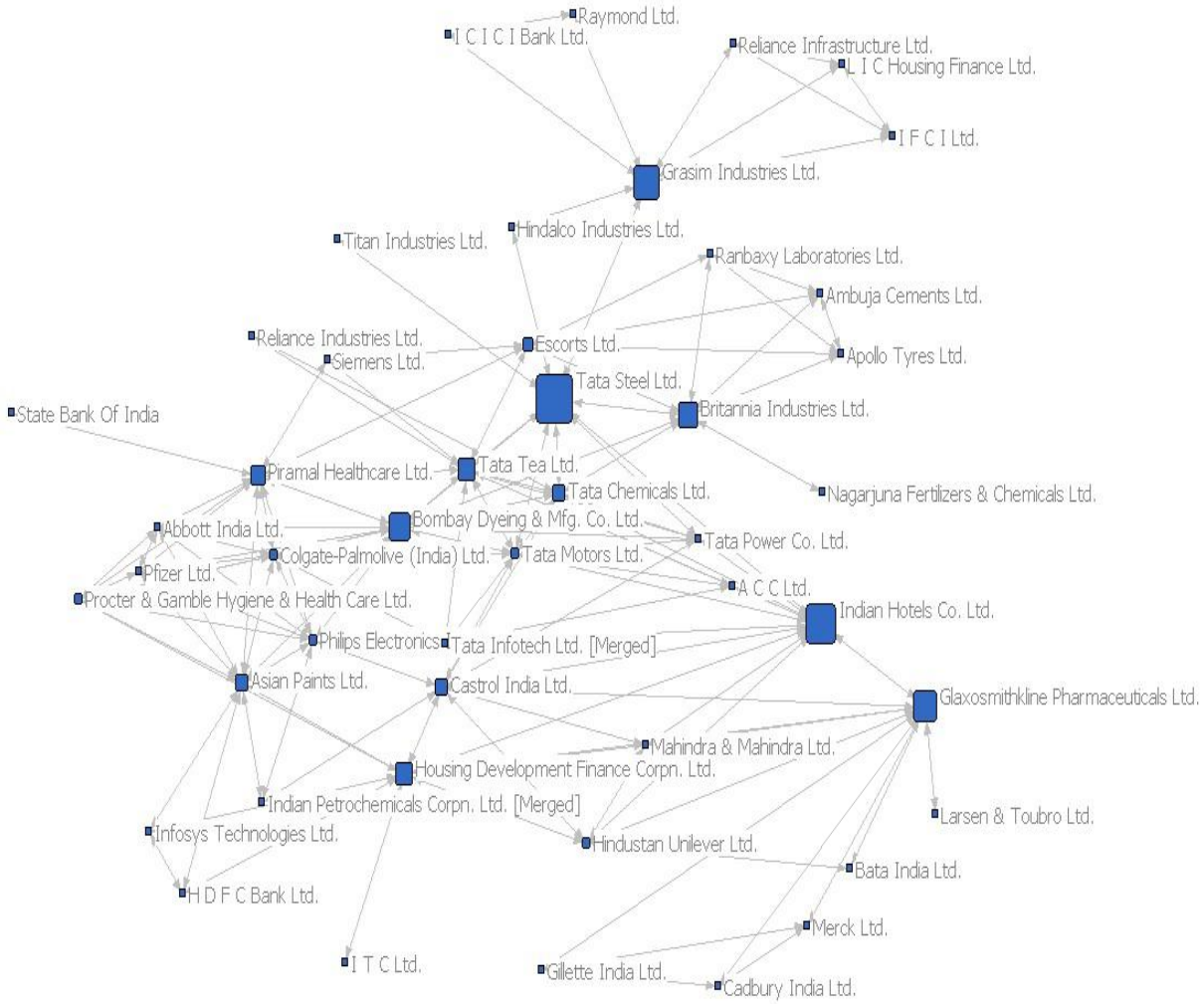


Exhibit 7: Highly boarded Director to director degree centrality [2005 data]

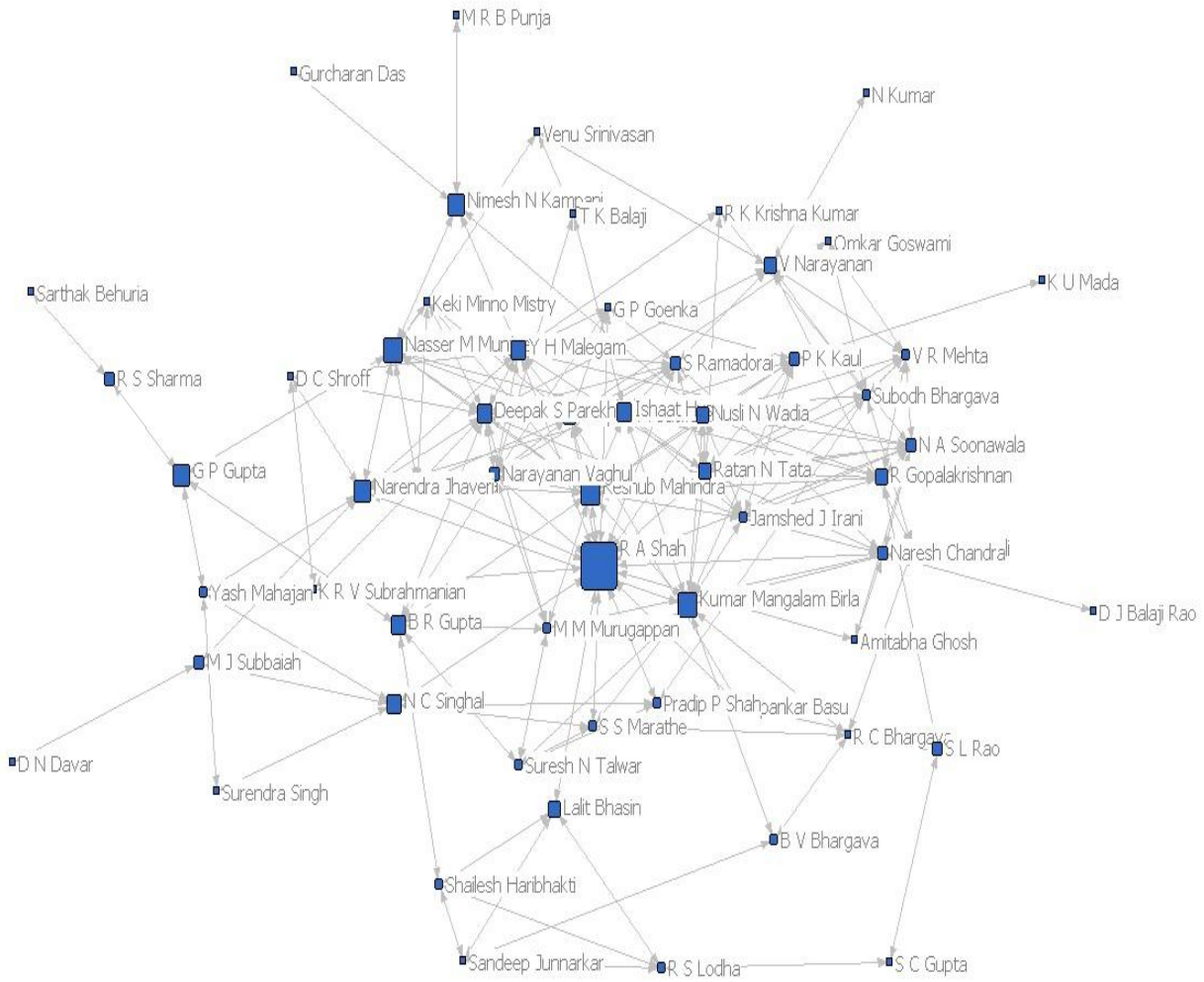


Exhibit 8: Highly boarded company to NSE100 company degree centrality [2005 data]

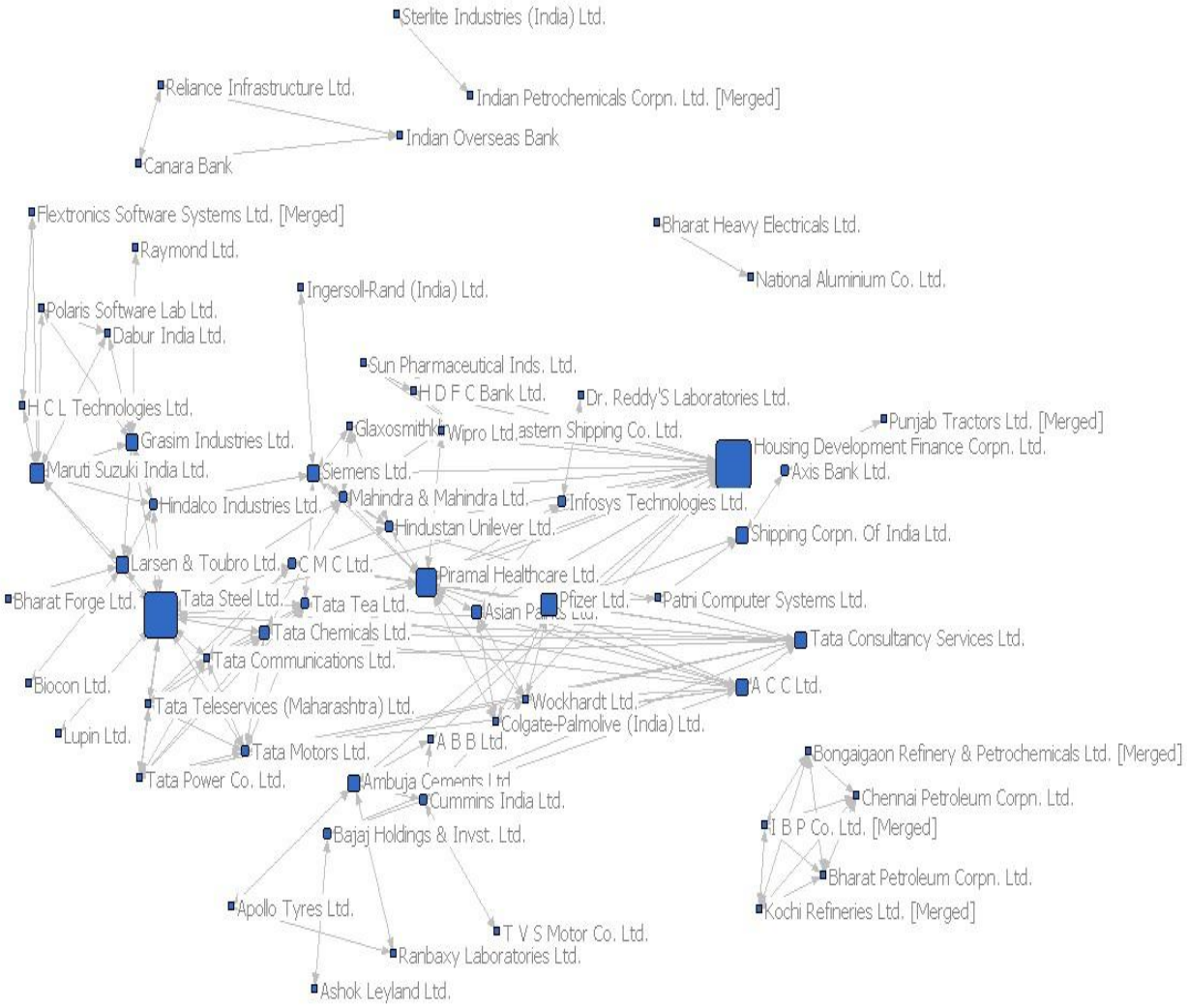


Exhibit 9: Highly boarded Director to director degree centrality [2008 data]

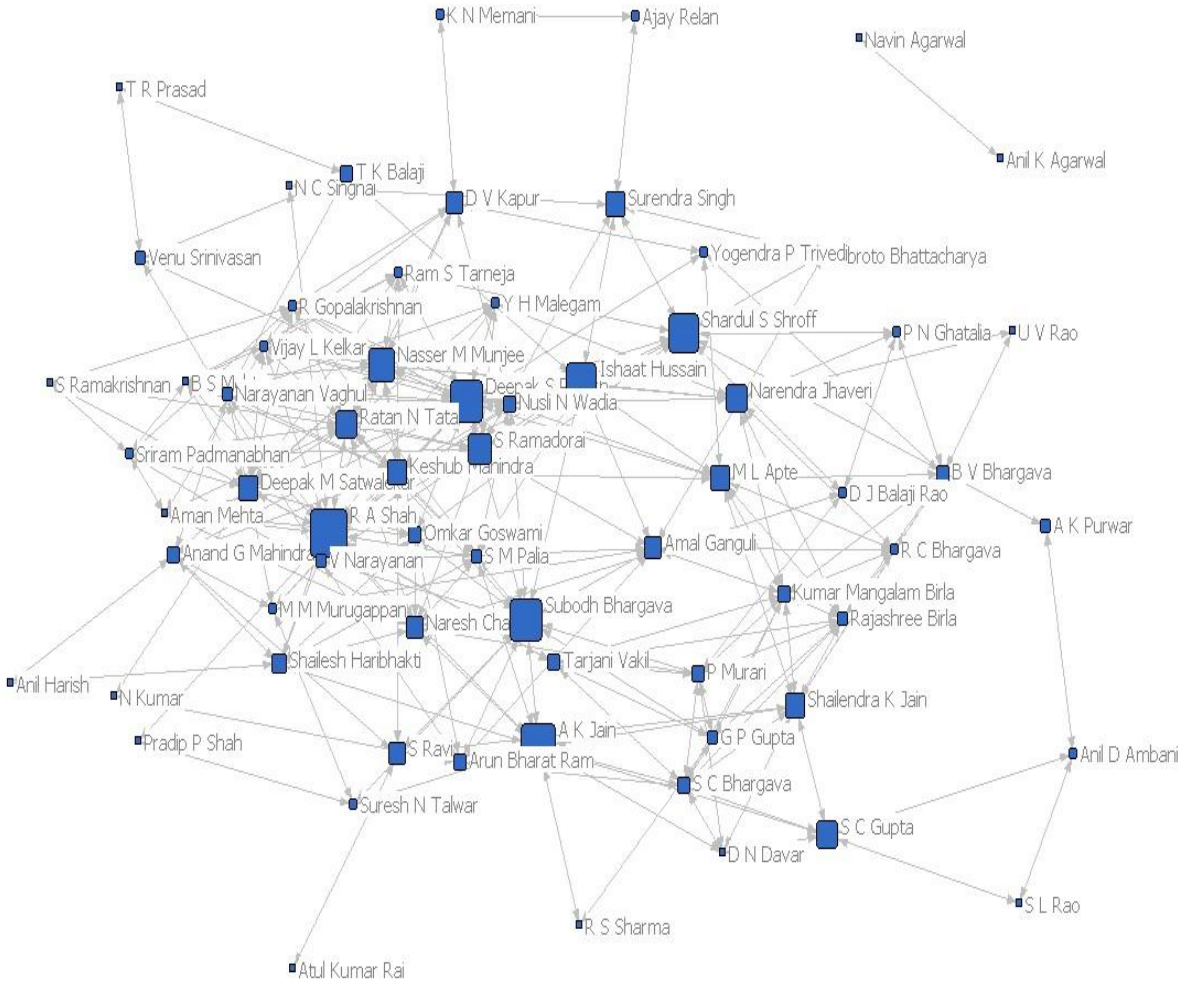


Exhibit 10: Highly boarded company to NSE100 company degree centrality [2008 data]

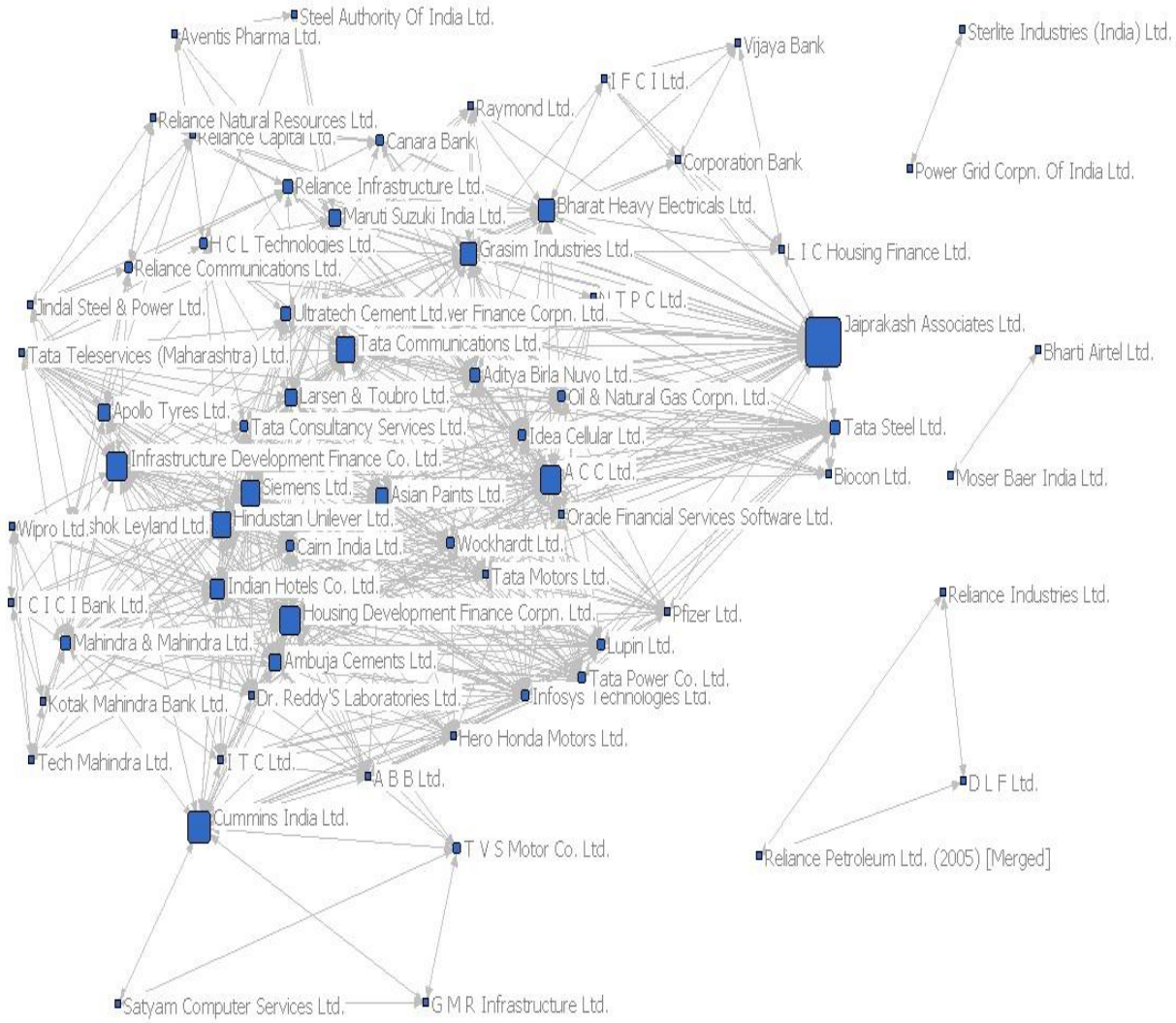


Exhibit 11: Highly boarded Director to director degree centrality [2009 data]

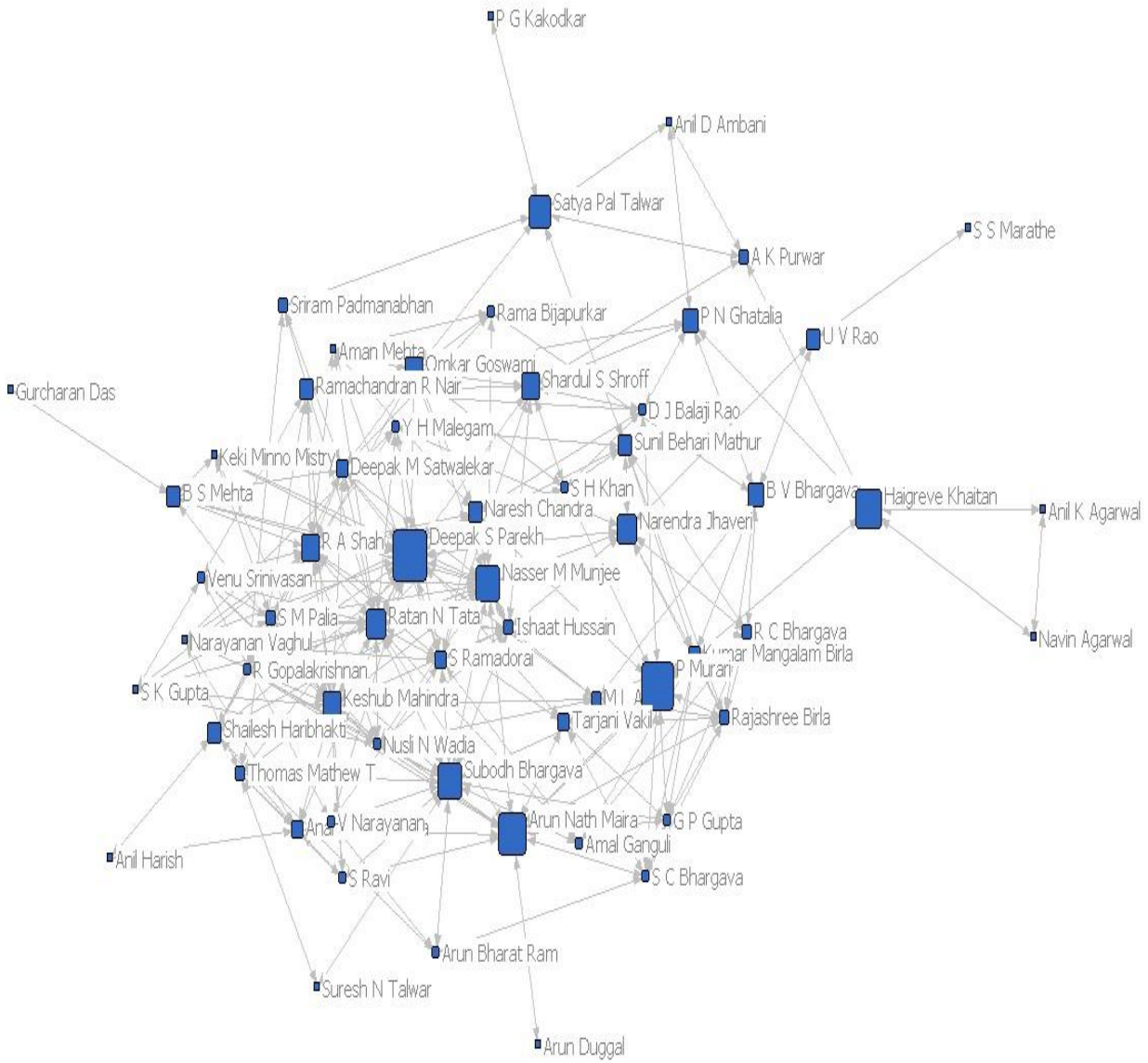
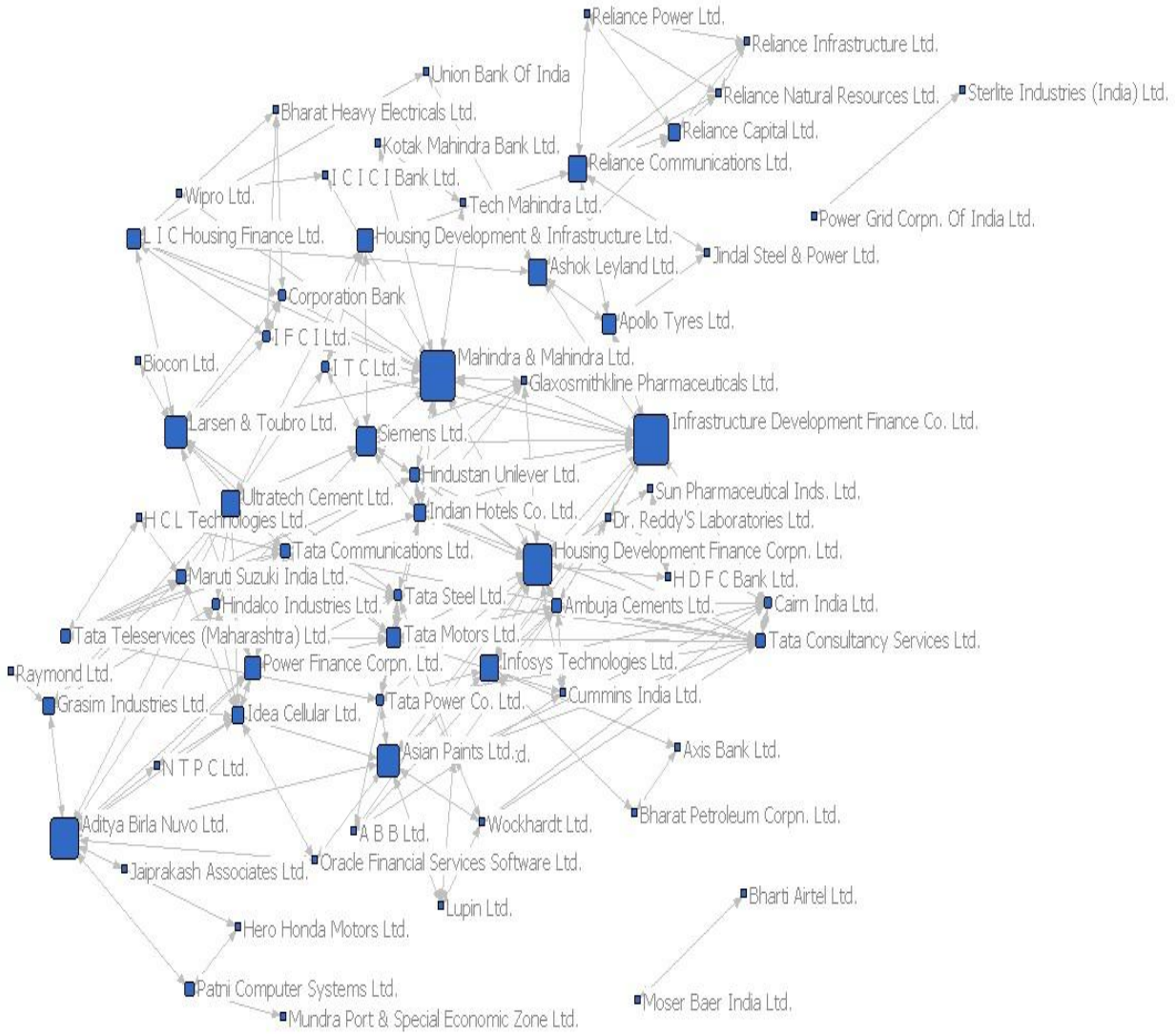


Exhibit 12: Highly boarded company to NSE100 company degree centrality [2009 data]



Panel D: Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Boardedness	967	2.2113	0.9409	1	6.75
Degree	966	18.8248	7.2208	0	43.25
Betweeness	967	2876.938	2415.954	0	13268.04
Eigenvector	967	0.0215	0.0312	0	0.203
Government promoters	951	6.0563	19.3138	0	89.78
Indian promoters	951	29.5586	27.4154	0	88.58
Foreign promoters	951	10.9927	21.1822	0	91.47
Foreign Financial Institutions	951	13.486	11.2513	0	68.85
Indian Financial Institutions	951	14.4818	10.7133	0.07	72.61
Financial Leverage	963	0.8059	0.4423	0.2353	3.3413
Age of Enterprise	967	42.9742	26.9495	2	123
Size	956	22719.38	42279.33	250.24	265051.7
ROA	956	0.0843	0.0694	-0.0397	0.2521
Tobins-Q Ratio	959	2.4502	1.4274	0.7627	7.5502

Panel E: Correlation Matrix

Significant correlations are depicted by * for p<0.10, ** for p<0.05, *** for p<0.01

	Degree	Betweeness	Eigenvector	Busyness	Tobins_Q	Government Promoters	Indian Promoters	Foreign Promoters	FII	Indian Institutions	Incorporation Year	Leverage	Size	ROA
Degree	1													
Betweeness	0.6829***	1												
Eigenvector	0.7263***	0.6059***	1											
Boardedness	0.7293***	0.7967***	0.7799***	1										
Tobins_Q	-0.0478	0.0091	-0.0232	0.0313	1									
Government Promoters	0.0235	-0.0844***	-0.154***	-0.1831***	-0.1088***	1								
Indian Promoters	-0.1088***	-0.1349***	-0.0375	-0.0313	-0.0031	-0.3275***	1							
Foreign Promoters	-0.0894***	0.0005	-0.0385	-0.0067	0.2399***	-0.1615***	-0.4529***	1						
FII	0.1544***	0.1207***	0.0379	0.1022***	0.2025***	-0.0887***	-0.1483***	-0.2082***	1					
Indian Institutions	0.227***	0.2357***	0.1982***	0.1827***	-0.2062***	-0.0765**	-0.4064***	-0.0601***	-0.0089	1				
Incorporation Year	-0.1508***	-0.0898***	-0.1769***	-0.0633**	0.147***	-0.1271***	0.2164***	-0.0573*	0.1777***	-0.321***	1			
Leverage	0.0291	-0.0739**	-0.0814**	-0.132***	-0.0558*	0.2454***	0.0317	-0.2216***	0.1333***	-0.0537*	-0.0832***	1		
Size	0.0969***	-0.0204	-0.1016***	-0.1025***	-0.146***	0.5067***	-0.1364***	-0.2208***	0.1608***	-0.0455	-0.1846***	0.4949***	1	
ROA	0.0082	0.0428	0.0639**	0.081**	0.5927***	-0.1294***	-0.0265	0.2611***	0.0386	-0.1052***	0.0768**	-0.4822***	-0.3294***	1

Table 1: Director Interlocks and ROA (Fixed Effects Models)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0004*** (0.0017)	0.0004*** (0.0017)	0.0004*** (0.0017)	0.0004*** (0.0017)	0.0004*** (0.0017)	0.0004*** (0.0017)	0.0004*** (0.0017)
Foreign promoters	0.0006*** (0.0022)	0.0006*** (0.0022)	0.0006*** (0.0022)	0.0006*** (0.0022)	0.0006*** (0.0022)	0.0006*** (0.0022)	0.0006*** (0.0022)
Government promoters	0.0004* (0.0020)	0.0004* (0.0020)	0.0004* (0.0020)	0.0004* (0.0020)	0.0004* (0.0020)	0.0004* (0.0020)	0.0004* (0.0021)
Indian Financial Institutions	0.0001 (0.0004)	0.0001 (0.0004)	0.0001 (0.0004)	0.0001 (0.0004)	0.0001 (0.0004)	0.0001 (0.0004)	0.0010 (0.0028)
Foreign Financial Institutions	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	-0.0014* (0.0007)	-0.0014* (0.0007)	-0.0014* (0.0007)	-0.0014* (0.0007)	-0.0014* (0.0007)	-0.0014* (0.0007)	-0.0013 (0.0009)
Leverage	-0.0322*** (0.0061)	-0.0322*** (0.0061)	-0.0322*** (0.0061)	-0.0322*** (0.0061)	-0.0322*** (0.0061)	-0.0322*** (0.0061)	-0.0322*** (0.0061)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.0756*** (0.0034)**					0.0066 (0.0046)
Degree			0.0003 (0.0004)			-0.0003 (0.0004)	-0.0003 (0.0004)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					**0.2934*** (0.9959)**	**0.3390*** (0.1167)**	**0.3390*** (0.1167)**
R squared	0.1101	0.1158	0.1108	0.1101	0.1202	0.1207	0.1232
F-statistic	5.52***	5.51***	5.24***	5.21***	5.75***	5.18***	5.04***
Number of firm-year observations	947	947	946	946	946	946	946

Table 2: Director Interlocks and ROA (Random Effects Models)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)
Foreign promoters	0.0008*** (0.0002)	0.0008*** (0.0002)	0.0008*** (0.0002)	0.0008*** (0.0002)	0.0008*** (0.0002)	0.0008*** (0.0002)	0.0008*** (0.0002)
Government promoters	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004** (0.0001)
Indian Financial Institutions	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)
Foreign Financial Institutions	0.0010*** (0.0003)	0.0011*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0011*** (0.0003)
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)
Leverage	-0.0357*** (0.0056)	-0.0351*** (0.0056)	-0.0355*** (0.0056)	-0.0355*** (0.0056)	-0.0355*** (0.0056)	-0.0355*** (0.0056)	-0.0357*** (0.0056)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.0047* (0.0028)**					0.0019 (0.0042)
Degree			0.0003 (0.0004)			-0.0003 (0.0004)	-0.0003 (0.0004)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					**0.2156*** (0.0802)**	**0.2612*** (0.0998)**	**0.2372** (0.1108)**
R squared	0.3642	0.3590	0.3643	0.3648	0.3566	0.3564	0.3547
Chi-Square statistic	183.07***	185.60***	183.84***	183.53***	191.24***	190.79***	192.65***
Number of firm-year observations	947	947	946	947	947	946	946

Table 3: Director Interlocks and Tobin's-Q Ratio (Fixed Effects Models)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q Ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0089** (0.0035)	0.0088** (0.0035)	0.0089** (0.0035)	0.0089** (0.0035)	0.0089** (0.0035)	0.0089** (0.0035)	0.0089** (0.0035)
Foreign promoters	-0.0019 (0.0044)	-0.0019 (0.0042)	-0.0019 (0.0044)	-0.0019 (0.0044)	-0.0021 (0.0044)	-0.0019 (0.0044)	-0.0019 (0.0044)
Government promoters	0.0120*** (0.0042)	0.0120*** (0.0042)	0.0120*** (0.0042)	0.0119*** (0.0042)	0.0119*** (0.0042)	0.0118*** (0.0042)	0.0120*** (0.0042)
Indian Financial Institutions	0.0089 (0.0055)	0.0089 (0.0055)	0.0089 (0.0055)	0.0091* (0.0055)	0.0090 (0.0055)	0.0089 (0.0055)	0.0089 (0.0055)
Foreign Financial Institutions	0.0081 (0.0059)	0.0081 (0.0059)	0.0081 (0.0059)	0.0081 (0.0059)	0.0081 (0.0059)	0.0081 (0.0059)	0.0081 (0.0059)
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	0.0354** (0.0153)	0.0322** (0.0161)	0.0339** (0.0162)	0.0339** (0.0156)	0.0362** (0.0154)	0.0367** (0.0168)	0.0354** (0.0153)
Leverage	0.7016*** (0.1226)	0.7058*** (0.1229)	0.7039*** (0.1230)	0.7016*** (0.1226)	0.7051*** (0.1228)	0.7101*** (0.1233)	0.7016*** (0.1226)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.0432 (0.0689)					-0.0011 (0.0921)
Degree			0.0021 (0.0072)			-0.0034 (0.0090)	-0.0034 (0.0091)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					1.5240 (2.0079)	1.6687 (2.5523)	1.6687 (2.5246)
R squared	0.3836	0.3839	0.3835	0.3841	0.3840	0.3843	0.3843
F-statistic	27.78***	26.24***	26.16***	26.26***	26.26***	23.57***	22.42***
Number of firm-year observations	947	947	946	947	947	946	946

Table 4: Director Interlocks and Tobin's-Q ratio (Random Effects Models)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0061** (0.0029)	0.0060** (0.0029)	0.0061** (0.0029)	0.0062** (0.0029)	0.0061** (0.0029)	0.0062** (0.0029)	0.0063** (0.0029)
Foreign promoters	0.0108*** (0.0036)	0.0108*** (0.0035)	0.0108*** (0.0036)	0.0108*** (0.0036)	0.0108*** (0.0036)	0.0109*** (0.0035)	0.0109*** (0.0035)
Government promoters	0.0083** (0.0035)	0.0084** (0.0035)	0.0082** (0.0035)	0.0083** (0.0035)	0.0083** (0.0035)	0.0083** (0.0035)	0.0083** (0.0035)
Indian Financial Institutions	0.0052 (0.0051)	0.0060 (0.0029)	0.0053 (0.0051)	0.0052 (0.0051)	0.0052 (0.0051)	0.0056 (0.0051)	0.0055 (0.0051)
Foreign Financial Institutions	0.0153*** (0.0052)	0.0153*** (0.0052)	0.0154*** (0.0052)	0.0153*** (0.0052)	0.0153*** (0.0052)	0.0155*** (0.0052)	0.0156*** (0.0052)
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	-0.0024 (0.0032)	-0.0024 (0.0032)	-0.0023 (0.0033)	-0.0027 (0.0032)	-0.0027 (0.0032)	-0.0024 (0.0032)	-0.0024 (0.0032)
Leverage	0.5993*** (0.1148)	0.5993*** (0.1148)	0.5993*** (0.1148)	0.6106*** (0.1153)	0.6008*** (0.1149)	0.6099*** (0.1154)	0.6087*** (0.1155)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.0351 (0.0572)					-0.0084 (0.0857)
Degree			-0.0032 (0.0064)			-0.0126 (0.0085)	-0.0126 (0.0086)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					0.9576 (1.6595)	1.9977 (2.0554)	2.0992 (2.2801)
R squared	0.2366	0.2531	0.2401	0.2367	0.2349	0.2455	0.2465
Chi-Square statistic	472.97***	473.30***	472.44***	474.26***	473.14***	475.89***	474.63***
Number of firm-year observations	947	947	946	947	947	946	946

Table 5: Director Interlocks and ROA (Fixed Effects Models: Indian Promoters sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	-0.0012 (0.0009)	-0.0025** (0.0010)	-0.0016 (0.0010)	-0.0013 (0.0009)	-0.0009 (0.0009)	-0.0009 (0.0011)	-0.0020* (0.0011)
Leverage	-0.0401*** (0.0078)	-0.0381*** (0.0078)	-0.0392*** (0.0079)	-0.0397*** (0.0079)	-0.0393*** (0.0078)	-0.0393*** (0.0079)	-0.0390*** (0.0078)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.0156*** (0.0045)**					**0.0186*** (0.0060)**
Degree			0.0005 (0.0005)			-0.0001 (0.0006)	-0.0004 (0.0006)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					**0.2729** (0.1221)**	**0.2849** (0.1446)**	0.1304 (0.1518)
R squared	0.1116	0.1316	0.1316	0.1121	0.1202	0.1203	0.1366
F-statistic	5.89***	6.47***	5.46***	5.39***	5.83***	4.97***	5.36***
Number of firm-year observations	666	666	665	666	666	665	665

Table 6: Director Interlocks and ROA (Random Effects Models: Indian Promoters sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	-0.0003 (0.0002)	-0.0003** (0.0002)	-0.0003* (0.0002)	-0.0003* (0.0002)	-0.0003** (0.0002)	-0.0003** (0.0002)	-0.0003* (0.0002)
Leverage	-0.0537*** (0.0066)	-0.0513*** (0.0066)	-0.0532*** (0.0066)	-0.0532*** (0.0066)	-0.0529*** (0.0065)	-0.0528*** (0.0066)	-0.0517*** (0.0066)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.0104*** (0.0035)**					**0.0110** (0.0053)**
Degree			**0.0006* (0.0004)**			0.0001 (0.0005)	-0.0001 (0.0005)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					**0.2361*** (0.0923)**	**0.2263* (0.1170)**	0.1077 (0.1302)
R squared	0.2885	0.2687	0.2957	0.2908	0.2858	0.2861	0.2644
Chi-Square statistic	117.76***	127.56***	121.39***	118.82***	125.57***	124.84***	129.25***
Number of firm-year observations	666	666	665	666	666	665	665

Table 7: Director Interlocks and Tobin's-Q Ratio (Fixed Effects Models-Indian Promoters sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q Ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	0.0346* (0.0177)	0.0207 (0.0189)	0.0395** (0.0192)	0.0331* (0.0180)	0.0348* (0.0178)	0.0436** (0.0204)	0.0266 (0.0214)
Leverage	0.8351*** (0.1469)	0.8572*** (0.1469)	0.8246*** (0.1478)	0.8413*** (0.1476)	0.8359*** (0.1471)	0.8302*** (0.1482)	0.8353*** (0.1474)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.1700** **(0.0857)**					**0.2829**** **(0.1137)**
Degree			-0.0063 (0.0087)			-0.0131 (0.0111)	-0.0179 (0.0113)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0001)
Eigen vector					0.2928 (2.2979)	1.7539 (2.7177)	0.5979 (2.8642)
R squared	0.4041	0.4087	0.4045	0.4043	0.4041	0.4058	0.4130
F-statistic	31.44***	29.31***	28.76***	28.79***	28.76***	24.68***	23.68***
Number of firm-year observations	662	662	661	662	662	661	661

Table 8: Director Interlocks and Tobin's-Q ratio (Random Effects Models- Indian Promoters sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000* (0.0000)	0.0000 (0.0000)	0.0000** (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)	0.0000** (0.0000)	0.0000* (0.0000)
Age	-0.0123*** (0.0034)	-0.0131*** (0.0034)	-0.0117*** (0.0034)	-0.0126*** (0.0034)	-0.0127*** (0.0034)	-0.0121*** (0.0034)	-0.0120*** (0.0034)
Leverage	0.5314*** (0.1269)	0.5585*** (0.1275)	0.5212*** (0.1272)	0.5403*** (0.1275)	0.5376*** (0.1271)	0.5334*** (0.1273)	0.5492*** (0.1273)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.1180* (0.0680)**					**0.2005** (0.1023)**
Degree			-0.0079 (0.0075)			**-0.0231** (0.0102)**	**-0.0263** (0.0103)**
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					1.3964 (1.8152)	**3.9519* (2.2659)**	1.8161 (2.5106)
R squared	0.1989	0.1891	0.2035	0.1987	0.1985	0.2122	0.1998
Chi-Square statistic	349.65***	354.45***	349.86***	350.04***	350.34***	355.32***	360.53***
Number of firm-year observations	662	662	661	662	662	661	661

Table 9: Director Interlocks and ROA (Fixed Effects Models-Foreign Promoters Sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	0.0019 (0.0015)	0.0033** (0.0015)	0.0028* (0.0016)	0.0027* (0.0014)	0.0019 (0.0015)	0.0029* (0.0016)	0.0035** (0.0017)
Leverage	-0.0133 (0.0171)	-0.0116 (0.0171)	-0.0176 (0.0176)	-0.0157 (0.0167)	-0.0140 (0.0171)	-0.0158 (0.0171)	-0.0147 (0.0172)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**-0.0172***** **(0.0064)**					-0.0076 (0.0092)
Degree			-0.0009 (0.0008)			-0.0003 (0.0009)	-0.0004 (0.0009)
Betweenness				**-0.0000***** **(0.0000)**		**-0.0000***** **(0.0000)**	**-0.0000**** **(0.0000)**
Eigen vector					-0.1453 (0.2358)	0.2143 (0.2729)	0.3001 (0.2922)
R squared	0.0817	0.1144	0.0875	0.1348	0.0835	0.1371	0.1402
F-statistic	1.59	2.11**	1.56	2.55***	1.49	2.19***	2.09**
Number of firm-year observations	275	275	274	275	275	274	274

Table 10: Director Interlocks and ROA (Random Effects Models-Foreign Promoters Subsample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
Age	0.0003 (0.0003)	0.0004 (0.0004)	0.0003 (0.0003)	0.0005 (0.0004)	0.0003 (0.0003)	0.0004 (0.0004)	0.0004 (0.0004)
Leverage	-0.0388*** (0.0141)	-0.0386*** (0.0141)	-0.0402*** (0.0142)	-0.0393*** (0.0140)	-0.0388*** (0.0141)	-0.0381*** (0.0141)	-0.0378*** (0.0141)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		-0.0080 (0.0055)					-0.0021 (0.0088)
Degree			-0.0002 (0.0007)			-0.0001 (0.0001)	-0.0001 (0.0009)
Betweenness				**-0.0000** (0.0000)**		**-0.0000*** (0.0000)**	**-0.0000*** (0.0000)**
Eigen vector					0.1093 (0.2004)	**0.4338* (0.2528)**	**0.4592* (0.2772)**
R squared	0.1499	0.1134	0.1408	0.0910	0.1646	0.1235	0.1214
Chi-Square statistic	28.94***	30.99***	29.23***	35.22***	29.25***	39.03***	38.89***
Number of firm-year observations	275	275	274	275	275	274	274

Table 11: Director Interlocks and Tobin's-Q Ratio (Fixed Effects Models-Foreign Promoters Sub-sampe)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q Ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	0.0889*** (0.0323)	0.1066*** (0.0339)	0.0842** (0.0358)	0.0929*** (0.0327)	0.0893*** (0.0323)	0.0779** (0.0368)	0.0976** (0.0394)
Leverage	0.4873 (0.3786)	0.5095 (0.3771)	0.5116 (0.3884)	0.4751 (0.3793)	0.4721 (0.3802)	0.5349 (0.3896)	0.5738 (0.3896)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**-0.2399*** **(0.1432)**					-0.2907 (0.2098)
Degree			0.0065 (0.0168)			0.0185 (0.0199)	0.0135 (0.0202)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0001)
Eigen vector					-3.0148 (5.2238)	-4.0221 (6.2161)	-0.7767 (6.6285)
R squared	0.5100	0.5170	0.5110	0.5115	0.5108	0.5145	0.5193
F-statistic	18.35***	17.22***	16.72***	16.84***	16.79***	14.38***	13.61***
Number of firm-year observations	271	271	270	271	271	270	270

Table 12: Director Interlocks and Tobin's-Q ratio (Random Effects Models-Foreign Promoters sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000* (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)
Age	0.0052 (0.0063)	0.0069 (0.0065)	0.0049 (0.0064)	0.0059 (0.0065)	0.0056 (0.0065)	0.0057 (0.0066)	0.0063 (0.0066)
Leverage	0.0409 (0.2885)	0.0320 (0.2888)	0.0481 (0.2917)	0.0369 (0.2895)	0.0309 (0.2904)	0.0549 (0.2933)	0.0658 (0.2923)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		-0.1557 (0.1138)					-0.2563 (0.1916)
Degree			0.0024 (0.0144)			0.0114 (0.0183)	-0.0069 (0.0186)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					-1.6581 (4.1282)	-2.0779 (5.4277)	1.2842 (4.1282)
R squared	0.2434	0.2303	0.2432	0.2360	0.2405	0.2326	0.2343
Chi-Square statistic	202.36***	206.12***	202.11***	203.11***	202.12***	203.04***	206.60***
Number of firm-year observations	271	271	270	271	271	270	270

Table 13: Director Interlocks and ROA (Fixed Effects Models- Government Promoters Sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)
Age	-0.0085* (0.0043)	-0.0085* (0.0043)	-0.0092** (0.0042)	-0.0089** (0.0043)	-0.0085* (0.0043)	-0.0086** (0.0042)	-0.0086** (0.0042)
Leverage	0.0119 (0.0096)	0.0121 (0.0097)	0.0125 (0.0093)	0.0120 (0.0095)	0.0121 (0.0095)	0.0120 (0.0092)	0.0103 (0.0093)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.0021 (0.0117)					-0.0181 (0.0137)
Degree			0.0003 (0.0007)			-0.0004 (0.0008)	-0.0004 (0.0008)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	**0.0000* (0.0000)**
Eigen vector					0.5996 (0.4432)	0.5999 (0.4790)	0.7712 (0.4931)
R squared	0.3460	0.3463	0.3773	0.3684	0.3663	0.4071	0.4260
F-statistic	3.84***	3.36***	3.77***	3.69***	3.66***	3.37***	3.28***
Number of firm-year observations	99	99	98	99	99	98	98

Table 14: Director Interlocks and ROA (Random Effects Models-Government Promoters Sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000* (0.0000)	0.0000* (0.0000)	0.0000** (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
Age	-0.0012*** (0.0004)	-0.0012*** (0.0004)	-0.0012*** (0.0004)	-0.0012*** (0.0004)	-0.0012*** (0.0004)	-0.0012*** (0.0004)	-0.0013*** (0.0004)
Leverage	0.0060 (0.0096)	0.0060 (0.0097)	0.0067 (0.0094)	0.0061 (0.0096)	0.0062 (0.0096)	0.0064 (0.0096)	0.0053 (0.0096)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.0000 (0.0111)					-0.0145 (0.0141)
Degree			0.0002 (0.0007)			-0.0002 (0.0008)	-0.0001 (0.0008)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					0.3057 (0.4450)	0.2689 (0.4950)	0.4615 (0.5519)
R squared	0.2647	0.2642	0.2491	0.2470	0.2447	0.2234	0.2212
Chi-Square statistic	37.63***	37.23***	38.96***	38.18***	37.97***	38.92***	40.43***
Number of firm-year observations	99	99	98	99	99	98	98

Table 15: Director Interlocks and Tobin's-Q Ratio (Fixed Effects Models-Government Promoters Sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q Ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	0.0005 (0.0505)	-0.0022 (0.0504)	-0.0234 (0.0542)	-0.0119 (0.0513)	0.0057 (0.0495)	-0.0062 (0.0550)	-0.0059 (0.0557)
Leverage	0.6937*** (0.1888)	0.7229*** (0.1897)	0.7137*** (0.1903)	0.6965*** (0.1879)	0.7014*** (0.1848)	0.7032*** (0.1886)	0.7056*** (0.1923)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.2726 (0.2294)					0.0252 (0.2853)
Degree			0.0149 (0.0134)			-0.0008 (0.0162)	-0.0008 (0.0163)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0001)
Eigen vector					**16.2074*** **(8.6629)**	15.4235 (9.8306)	15.1822 (10.2923)
R squared	0.3376	0.3539	0.3473	0.3550	0.3766	0.3829	0.3830
F-statistic	4.84***	4.38***	4.18***	4.40***	4.83***	3.65***	3.23***
Number of firm-year observations	95	95	94	95	95	94	94

Table 16: Director Interlocks and Tobin's-Q ratio (Random Effects Models-Government Promoters Sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Size	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Age	-0.0134** (0.0053)	-0.0118** (0.0056)	-0.0132** (0.0053)	-0.0134** (0.0054)	-0.0124** (0.0054)	-0.0123** (0.0054)	-0.0122** (0.0057)
Leverage	0.7608*** (0.1642)	0.7791*** (0.1648)	0.7773*** (0.1657)	0.7589*** (0.1642)	0.7572*** (0.1618)	0.7662*** (0.1661)	0.7682*** (0.1691)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.1998 (0.1835)					0.0208 (0.2528)
Degree			0.0134 (0.0123)			0.0028 (0.0154)	0.0027 (0.0156)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0001)
Eigen vector					**12.7833*** **(7.4627)**	11.0778 (8.6660)	10.7784 (9.4734)
R squared	0.5046	0.4875	0.5047	0.4884	0.4765	0.4777	0.4772
Chi-Square statistic	64.19***	64.84***	64.37***	64.06***	67.41***	65.82***	65.00***
Number of firm-year observations	95	95	94	95	95	94	94

Table 17: Director Interlocks and ROA (Fixed Effects Models-Manufacturing sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0005* (0.0003)	0.0004* (0.0002)	0.0005* (0.0003)	0.0005* (0.0003)	0.0004* (0.0002)	0.0005* (0.0002)	0.0005* (0.0002)
Foreign promoters	0.0005 (0.0004)	0.0005 (0.0004)	0.0005 (0.0004)	0.0005 (0.0004)	0.0004 (0.0003)	0.0004 (0.0004)	0.0004 (0.0004)
Government promoters	0.0006* (0.0003)	0.0006* (0.0003)	0.0006* (0.0003)	0.0006* (0.0003)	0.0005* (0.0003)	0.0005* (0.0003)	0.0006* (0.0003)
Indian Financial Institutions	-0.0008 (0.0004)	-0.0006 (0.0006)	-0.0008 (0.0006)	-0.0008 (0.0006)	-0.0007 (0.0006)	-0.0007 (0.0006)	-0.0005 (0.0006)
Foreign Financial Institutions	0.0014*** (0.0005)	0.0015*** (0.0005)	0.0014*** (0.0005)	0.0014*** (0.0005)	0.0015*** (0.0005)	0.0015*** (0.0005)	0.0015*** (0.0005)
Size	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Age	-0.0019* (0.0011)	-0.0028* (0.0011)	-0.0019* (0.0012)	-0.0017 (0.0011)	-0.0019* (0.0011)	-0.0009 (0.0012)	-0.0019 (0.0012)
Leverage	-0.0415*** (0.0112)	-0.0396*** (0.0111)	-0.0414*** (0.0113)	-0.0418*** (0.0112)	-0.0383*** (0.0111)	-0.0389*** (0.0111)	-0.0377*** (0.0111)
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.0095* (0.0044)**					**0.0149** (0.0061)**
Degree			0.0001 (0.0005)			-0.0008 (0.0007)	-0.0009 (0.0006)
Betweenness				-0.0000 (0.0000)		-0.0000 (0.0000)	**-0.0000** (0.0000)**
Eigen vector					**0.4345*** (0.1377)**	**0.6013*** (0.1624)**	**0.4525*** (0.1728)**
R squared	0.1461	0.1546	0.1458	0.1483	0.1643	0.1737	0.1843
F-statistic	4.90***	4.92***	4.58***	4.68***	5.28***	5.02***	5.12***
Number of firm-year observations	585	585	584	585	585	584	584

Table 18: Director Interlocks and ROA (Random Effects Models-Manufacturing subsample)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROA). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)
Foreign promoters	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)
Government promoters	0.0007** (0.0003)	0.0007*** (0.0003)	0.0007** (0.0003)	0.0007** (0.0003)	0.0007*** (0.0003)	0.0007*** (0.0003)	0.0007*** (0.0003)
Indian Financial Institutions	-0.0002 (0.0005)	-0.0002 (0.0005)	-0.0002 (0.0005)	-0.0002 (0.0005)	-0.0001 (0.0005)	-0.0002 (0.0005)	-0.0001 (0.0004)
Foreign Financial Institutions	0.0018*** (0.0004)	0.0018*** (0.0004)	0.0018*** (0.0004)	0.0018*** (0.0004)	0.0018*** (0.0004)	0.0018*** (0.0004)	0.0018*** (0.0004)
Size	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Age	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0001 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)
Leverage	-0.0439*** (0.0103)	-0.0426*** (0.0103)	-0.0437*** (0.0103)	-0.0442*** (0.0103)	-0.0425*** (0.0102)	-0.0432*** (0.0102)	-0.0426*** (0.0102)
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.0059 (0.0036)					0.0076 (0.0058)
Degree			0.0002 (0.0004)			-0.0007 (0.0006)	-0.0007 (0.0006)
Betweenness				-0.0000 (0.0000)		-0.0000 (0.0000)	**-0.0000* (0.0000)**
Eigen vector					**0.2913*** (0.1052)**	**0.4368*** (0.1328)**	**0.3502** (0.1461)**
R squared	0.1946	0.1838	0.1952	0.1922	0.1788	0.1742	0.1622
Chi-Square statistic	98.69***	101.51***	98.52***	98.88***	107.36***	111.46***	113.35***
Number of firm-year observations	585	585	584	585	585	584	584

Table 19: Director Interlocks and Tobin's-Q Ratio (Fixed Effects Models-Manufacturing Sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q Ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0109** (0.0045)	0.0107** (0.0045)	0.0108** (0.0045)	0.0107** (0.0045)	0.0107** (0.0045)	0.0106** (0.0045)	0.0106** (0.0046)
Foreign promoters	-0.0024 (0.0069)	-0.0025 (0.0069)	-0.0025 (0.0069)	-0.0024 (0.0069)	-0.0032 (0.0069)	-0.0031 (0.0070)	-0.0030 (0.0070)
Government promoters	0.0186*** (0.0056)	0.0186*** (0.0056)	0.0187*** (0.0056)	0.0183*** (0.0056)	0.0183*** (0.0056)	0.0181*** (0.0057)	0.0182*** (0.0057)
Indian Financial Institutions	-0.0202* (0.0113)	-0.0189* (0.0114)	-0.0194* (0.0114)	-0.0200* (0.0113)	-0.0191* (0.0113)	-0.0189* (0.0114)	-0.0188 (0.0115)
Foreign Financial Institutions	0.0334*** (0.0086)	0.0338*** (0.0087)	0.0345*** (0.0088)	0.0336*** (0.0087)	0.0334*** (0.0087)	0.0349*** (0.0088)	0.0349*** (0.0088)
Size	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Age	0.0302 (0.0192)	0.0232 (0.0206)	0.0227 (0.0211)	0.0279 (0.0195)	0.0296 (0.0192)	0.0275 (0.0217)	0.0267 (0.0228)
Leverage	0.5202** (0.2025)	0.5354*** (0.2032)	0.5343*** (0.2033)	0.5241*** (0.2027)	0.5449*** (0.2032)	0.5463*** (0.2039)	0.5474*** (0.2043)
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.0741 (0.0799)					0.0134 (0.1133)
Degree			0.0084 (0.0096)			0.0009 (0.0119)	0.0008 (0.0120)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					3.3024 (2.5120)	2.9364 (2.9790)	2.8028 (3.1897)
R squared	0.4054	0.4065	0.4064	0.4060	0.4076	0.4079	0.4079
F-statistic	19.52***	18.41***	18.36***	18.38***	18.50***	16.46***	15.60***
Number of firm-year observations	585	585	584	585	585	584	584

Table 20: Director Interlocks and Tobin's-Q ratio (Random Effects Models-Manufacturing sub-sample)

The table below depicts the regression output of director Boardedness and connectedness variables on Tobin's-Q ratio. The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix. The standard errors are represented in parenthesis

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0079** (0.0039)	0.0079** (0.0039)	0.0078** (0.0039)	0.0079** (0.0039)	0.0079** (0.0039)	0.0079** (0.0039)	0.0079** (0.0039)
Foreign promoters	0.0177*** (0.0047)	0.0178*** (0.0047)	0.0178*** (0.0047)	0.0176*** (0.0047)	0.0177*** (0.0047)	0.0175*** (0.0047)	0.0177*** (0.0047)
Government promoters	0.0143*** (0.0048)	0.0146*** (0.0049)	0.0141*** (0.0048)	0.0144*** (0.0048)	0.0145*** (0.0048)	0.0141*** (0.0048)	0.0138*** (0.0049)
Indian Financial Institutions	-0.0133 (0.0094)	-0.0129 (0.0094)	-0.0134 (0.0094)	-0.0133 (0.0094)	-0.0129 (0.0094)	-0.0133 (0.0094)	-0.0135 (0.0094)
Foreign Financial Institutions	0.0413*** (0.0077)	0.0415*** (0.0078)	0.0423*** (0.0078)	0.0415*** (0.0077)	0.0416*** (0.0078)	0.0427*** (0.0078)	0.0428*** (0.0078)
Size	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Age	0.0041 (0.0045)	0.0036 (0.0046)	0.0042 (0.0045)	0.0034 (0.0046)	0.0035 (0.0046)	0.0034 (0.0046)	0.0034 (0.0045)
Leverage	0.3875** (0.1898)	0.3948** (0.1905)	0.3834** (0.1903)	0.3952** (0.1899)	0.3952** (0.1901)	0.3933** (0.1903)	0.3876** (0.1909)
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		0.0339 (0.0679)					0.0357 (0.1074)
Degree			-0.0031 (0.0083)			-0.0143 (0.0109)	-0.0141 (0.0109)
Betweenness				0.0000 (0.0000)		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					1.4322 (1.9753)	2.6111 (2.4799)	3.0002 (2.7309)
R squared	0.2584	0.2555	0.2667	0.2581	0.2533	0.2734	0.2770
Chi-Square statistic	315.19***	314.97***	314.93***	316.14***	315.74***	317.88***	316.65***
Number of firm-year observations	585	585	584	585	585	584	584

below the respectivecoefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01*respectively.

Appendix 1: Variable Definitions

Dependent variables:

Return on Assets (ROA): Profit after tax/Total assets
Tobin's-Q ratio: (Market value of equity as on last day of the financial year+ book value of Total Debt)/Book value of Total Assets
Return on Equity (ROE): Profit after tax/ (Equity +Reserves)

Key explanatory variables:

Boardedness: Σ(1+Total number of multiple directorships held by director)/Size of the board

Connectedness variables
Degree: measures the number of links to and from a person
Betweenness: measures the frequency a person lies on the shortest path connecting everyone else in the network
Eigen vector: measures the centrality of a person based on the centrality of the neighborhood

Control variables:

Indian promoters: Total percentage of domestic promoter shareholding
Foreign promoters: Total percentage of foreign promoter shareholding
Government promoter: Total percentage of central and state government shareholding
Indian Financial Institutions: Total percentage of domestic financial institution shareholding
Foreign Financial Institutions: Total percentage of foreign financial institution shareholding
Size: Total Assets
Age: Years since incorporation of the firm
Leverage: Total Debt/Total Assets

Dummy variables:

Industry dummies: 3 dummy variables - (a) Manufacturing (b) Services (c) Financial Services and Banks
Year dummies: 10 dummies for years from 2001 to 2010

Appendix 2: Clause 49 implementation time line

[Adapted from Black and Khanna, Journal of Empirical Legal Studies, 2007]

Effective Date	Company Category	Comment
March 31, 2001	Companies in Group A of the BSE.[29]	
March 31, 2002	Companies, not in BSE Group A, with paid up share capital of at least 100 million Rs, or net worth of at least 250,000,000 Rs. at any time in the company's history.	Of the firms in our sample expected to comply by March 31, 2002, 71% are B1 firms and the remainder are B2 firms.
March 31, 2003 (later extended to April 1, 2005)	Other companies with paid up share capital of at least 30,000,000 Rs.	Of the firms in our sample expected to comply by March 31, 2003, 76 % are B2 firms and the remainder are B1 firms.
Time of listing	Companies seeking listing for the first time.	

Appendix 3

Panel A: Director Interlocks and ROE (Fixed Effects Models)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROE). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01* respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0008** (0.0004)	0.0006* (0.0004)	0.0008** (0.0004)	0.0008** (0.0004)	0.0008** (0.0004)	0.0008** (0.0004)	0.0007* (0.0004)
Foreign promoters	0.0009** (0.0005)	0.0009** (0.0005)	0.0008** (0.0004)	0.0010** (0.0005)	0.0009* (0.0005)	0.0009** (0.0005)	0.0009** (0.0005)
Government promoters	0.0006 (0.0005)	0.0005 (0.0004)	0.0006 (0.0004)	0.0006 (0.0004)	0.0006 (0.0005)	0.0005 (0.0004)	0.0005 (0.0004)
Indian Financial Institutions	-0.0006 (0.0006)	-0.0005 (0.0006)	-0.0005 (0.0006)	-0.0005 (0.0006)	-0.0008 (0.0004)	-0.0006 (0.0006)	-0.0005 (0.0006)
Foreign Financial Institutions	0.0010* (0.0006)	0.0010* (0.0006)	0.0011* (0.0006)	0.0010* (0.0006)	0.0010* (0.0006)	0.0010* (0.0006)	0.0010* (0.0006)
Size	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)
Age	-0.0011 (0.0016)	-0.0028* (0.0017)	-0.0019 (0.0017)	-0.0015 (0.0017)	-0.0008 (0.0016)	-0.0009 (0.0017)	-0.0021 (0.0019)
Leverage	-0.0319** (0.0131)	-0.0295** (0.0131)	-0.0307** (0.0131)	-0.0300** (0.0131)	-0.0306** (0.0131)	-0.0295** (0.0131)	-0.0295** (0.0131)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.0239*** (0.0073)**					**0.0199** (0.0098)**
Degree			0.0011 (0.0008)			-0.0009 (0.0018)	-0.0004 (0.0009)
Betweenness				**0.0000* (0.0000)**		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					**0.5389** (0.2140)**	**0.5134** (0.2506)**	0.3158 (0.2682)
R squared	0.1218	0.1340	0.1243	0.1252	0.1291	0.1308	0.1356
F-statistic	6.19***	6.52***	5.97***	6.03***	6.24***	5.68***	5.63***
Number of firm-year observations	947	947	946	947	947	946	946

Panel B: Director Interlocks and ROE (Random Effects Models)

The table below depicts the regression output of director Boardedness and connectedness variables on Return on Assets (ROE). The *Models (1) to (7)* represent fixed effects models. *Model (1)* represents the base model with just controls. *Models (2) to (5)* represent director Boardedness and connectedness variables introduced separately into the base model. *Models (6) and (7)* represent the global models with all key explanatory variables estimated simultaneously. *Model (6)* takes all connectedness variables together while *Model (7)* estimates all connectedness and Boardedness variables simultaneously. All models include an intercept, industry dummies and year dummies but these are not reported. All variables are as defined in the appendix 1. The standard errors are represented in parenthesis below the respective coefficients. The asterisks *, **, *** represent *p values* of *< 0.10, < 0.05, and <0.01* respectively.

Variables	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***
Indian promoters	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)
Foreign promoters	0.0012*** (0.0003)	0.0013*** (0.0003)	0.0013*** (0.0003)	0.0012*** (0.0003)	0.0013*** (0.0003)	0.0013*** (0.0003)	0.0012*** (0.0003)
Government promoters	0.0007** (0.0004)	0.0008** (0.0003)	0.0008** (0.0003)	0.0008** (0.0004)	0.0008** (0.0003)	0.0008** (0.0003)	0.0008** (0.0003)
Indian Financial Institutions	-0.0001 (0.0005)	-0.0001 (0.0005)	-0.0002 (0.0005)	-0.0001 (0.0005)	-0.0001 (0.0005)	-0.0002 (0.0005)	-0.0002 (0.0005)
Foreign Financial Institutions	0.0013** (0.0005)	0.0013** (0.0005)	0.0013** (0.0005)	0.0013** (0.0005)	0.0013** (0.0005)	0.0013** (0.0005)	0.0013** (0.0005)
Size	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Age	0.0005 (0.0003)	0.0004 (0.0003)	0.0004 (0.0003)	0.0004 (0.0003)	0.0003 (0.0003)	0.0003 (0.0003)	0.0003 (0.0003)
Leverage	-0.0279** (0.0117)	-0.0252** (0.0116)	-0.0267** (0.0116)	-0.0247** (0.0117)	-0.0272** (0.0116)	-0.0255** (0.0117)	-0.0252** (0.0117)
Industry dummies	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included
Boardedness		**0.0190*** (0.0056)**					0.0077 (0.0087)
Degree			**0.0018*** (0.0006)**			0.0003 (0.0003)	0.0002 (0.0009)
Betweenness				**0.0000*** (0.0000)**		0.0000 (0.0000)	0.0000 (0.0000)
Eigen vector					**0.5485*** (0.1616)**	**0.4116** (0.2047)**	0.3178 (0.2289)
R squared	0.1315	0.1467	0.1594	0.1556	0.1489	0.1581	0.1544
Chi-Square statistic	129.38***	142.49***	138.05***	137.69***	142.44***	144.98***	145.87***
Number of firm-year observations	947	947	946	947	947	946	946

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'Bala' N. Balasubramanian has been a Visiting Professor at the Indian Institute of Management Bangalore since 1994, specializing in areas of corporate governance, responsibility and citizenship. He was the founding chairman of the institute's center for development cases and teaching aids and was chief editor of the institute's journal, IIMB Management Review. Bala has over three and a half decades of senior executive and/or board-level experience in the Imperial Chemical Industries group in the Imperial Chemical Industries group in India and the United Kingdom, Britannia Industries and the diversified Wipro Corporation. Bala is a Fellow Chartered Accountant (FCA) and has a PhD in Business Finance. He has extensively taught, lectured, advised and written on corporate governance issues. Bala has served or continues to serve on several corporate boards and editorial boards of various national and international journals.

Samir Barua is the Director, Indian Institute of Management, Ahmedabad. Samir has been on the faculty of IIM, Ahmedabad since 1980. Samir has published extensively on a variety of subjects in management in academic journals and business publications. He has expertise in the areas of financial markets, decision sciences, corporate strategy and corporate governance. In addition, Samir has wide ranging consulting, corporate advisory and training experience, in India and abroad. He has been associated with the Indian corporate sector for over a decade and a half through membership of Boards of several corporate entities including fortune 500 companies. He has been associated as a Board member of two international organizations and has also been associated with the financial sector through Board membership of companies in the financial sector and membership of committees of regulatory bodies. Samir has contributed to public policy making in the financial and banking sector through research and policy papers.

Suresh Bhagavatula is an Assistant Professor at Indian Institute of Management, Bangalore. He is at the NS Raghavan Centre for Entrepreneurial Learning also known as NSRCEL. His research interests are in two partly overlapping domains – entrepreneurship and social networks. In entrepreneurship, his interests are in low technology firms in rural India. Within the social network domain he is interested in understanding the influence of social capital on performance of entrepreneurs and interlocking of Board of Director of Indian listed firms. At IIM, he is co-coordinator for two unique programs: a one year Management Program for Entrepreneurs and Family Businesses, which focuses on professionalizing owner-managers and a month long Management Program for Women Entrepreneurs to help women become entrepreneurs. He is active in building an eco-system to support technology entrepreneurship in India and is one of the co-founders of the organization HeadStart, which runs a popular monthly event called Startup Saturday. He has trained as an engineer in India and Germany and has a PhD from Vrije Universiteit, Amsterdam in Entrepreneurship.

Rejie George is an Assistant Professor at Indian Institute of Management, Bangalore. Rejie's research interests are in the areas of Corporate Governance and Strategic Management. In particular, his

research has focused on issues pertaining to the influence of differences in ownership structure, internal capital market operations among business groups and diversification strategies on the performance of firms in India. Rejie teaches courses in competition and strategy and multi-business strategy. Rejie is a recipient of the Jan Tinbergen Fellowship and he pursued his PhD at Tilburg University. Rejie has published in international journals and has presented his work at several conferences.