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**Director Networks and Firm Performance:
The case of India**

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Abstract

This thesis examines the impact of director networks on corporate strategic decisions, and consists of three main studies. The first and the second investigate the influence of director networks on M&A short-term and long-term performance, respectively, using a sample of large Indian firms from the BSE 500 and CNX 500 indices from 2000 to 2014. Specifically, the key focus of the first two studies is whether the continuity of director networks affects the performance of bidding firms, and whether independent director networks matter to M&A short-term and long-term performance. Consistent with the market reaction to connected deals at the announcement date, the study shows a negative association between bidding firms' operating performance following M&A transactions in which bidders and targets are connected through shared directors.

The third study examines the relationship between busy independent boards and corporate external finance using an unbalanced panel data of 445 top firms in India from 2000 to 2014. The results show that there is a negative association between busy independent boards and external leverage. The results reveal the existence of an internal capital market in Indian business groups, and shows a negative relationship between net loan receivers and external finance. The study also reflects that, compared to non-group firms with busy independent boards,

group firms with a greater connectedness of independent directors face more limited access to external finance.

Declaration

I, Tran Thi Ngoc Vy, declare that this thesis, entitled “Director networks and firm performance: The case of India”, is my work and has not been submitted in substantially the same form for the award of a higher degree elsewhere.

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1. Introduction

1.1 Motivation and overview of thesis structure

This thesis focuses on the impact of director networks on mergers and acquisitions (M&A) and external finance, being the two major aspects of corporate strategic activities. It fills a gap in the literature by examining important, yet previously overlooked, network attributes that drive key corporate operation outcomes.

The thesis builds on the ongoing debate on whether director networks benefit or harm firms, which is central to the divergence of these main views: 1) busyness hypothesis; 2) reputation hypothesis and 3) resource dependency theory.

Those following the busyness hypothesis (Ferris et al. 2003) claim that well-connected directors (i.e. directors with networks) become too busy to effectively monitor managerial behaviour. Thus, their presence in the boardroom reduces management supervision and hence the firm's market value as well as exacerbates agency problems.

On the other hand, supporters of the reputation hypothesis (Fama and Jensen 1983a) argue that outside directors are motivated to build up their reputation as experts and that their

experience in other organizations will reflect the value of their human capital. As a result, their networks will send a positive signal on their ability in the labour market. Owing to their effort to deliver high-quality performance, the presence of well-connected directors in the boardroom helps to improve firm performance and reduces agency problems.

In the same vein as reputation scholars, resource dependency scholars (Pfeffer and Salancik 1978) contend that via linkages to external parties, well-connected directors provide firms with valuable resources including advice from individuals with expertise in different areas, information, commitments and legitimacy. This will, hence, help to improve corporate performance.

A notable feature of the director network debate is that most scholars have focused on the effects of such networks on corporate performance in general. In contrast, few have looked at the impacts of director networks on mergers and acquisitions. Additionally, the main network types addressed are intra-firm ties between the CEO and the board members of a given firm (e.g. Schmidt 2015; Fracassi and Tate 2012), and inter-firm ties from current and past employment, education, or memberships from other activities such as clubs or charitable organizations (e.g.

Fracassi 2017; Fang et al. 2018; Ishii and Xuan 2014). Very little attention, however, has been paid to current and direct professional connections (i.e. the acquirer and the target have a board connection at the time of the acquisition announcement).

Among these few exceptions are the studies of Cai and Sevilir (2012) and Renneboog and Zhao (2014). In particular, Cai and Sevilir (2012) find that announcement returns tend to be higher for acquirers in transactions where the acquirer and the target share a common director. Meanwhile, Renneboog and Zhao (2014) conclude that the market does not take these connections into account when they evaluate M&A transactions. However, neither study examines the potential impact of continuous connections between bidders and targets via the shared directors.

In addition, the literature on inter-firm connections mainly concentrates on the role of the CEOs' network (Renneboog and Zhao 2014), but overlooks the influence of independent directors' network on M&A performance.

Furthermore, the settings of the majority of studies on director networks are the US and UK, while very few papers provide insights into this topic in emerging markets, which have different corporate governance mechanisms from those of developed markets.

Therefore, **Chapter 3** focuses on the continuity of connections between bidder and target via shared board member, independent director's networks, and investigates their effects on M&A announcement returns in an emerging market.

Another striking feature of the existing literature on professional connections is the focus on the short-term (i.e. at the M&A announcement date) performance results, whilst paying scant attention to the relationship between such connections and the post-merger performance of bidding firms. The lack of attention on subsequent performance represents a significant gap in the literature given that the market reaction at the time of the announcement may well not provide an accurate assessment of the post-merger performance. As a result, **Chapter 4** focuses on the impact of the continuity of connections between bidder and target via shared board member and independent director's networks on M&A post-merger performance.

In addition to the relationship between director networks and M&A activities, very few papers have focused on the impact of such networks on corporate external finance. Specifically, Chuluun et al. (2014) measure the impact of well-connected boards on publicly-traded corporate debt for US firms using social network measures, and find that having a more connected board

leads to more debt. However, they only focus on corporate bonds and do not take into account the matter of independence (i.e. the networks of independent directors). Chakravarty and Rutherford (2017) examine if busy directors influence the cost of bank loans for US firms through the lens of takeover vulnerability. They conclude that as the level of board busyness increases, the cost of debt decreases. Thus, both Chuluun et al. (2014) and Chakravarty and Rutherford (2017) show that busy boards favourably relate to external debt in developed markets. Unlike these studies, **Chapter 5** focuses on independent directors and addresses the dynamic relation between independent board networks and external leverage. Additionally, the association between the internal capital markets and external finance of group-affiliated firms is investigated.

1.2 Data, methodology and results

This thesis uses data from India to test hypotheses relating to the impact of director networks on short-term and post-merger performance (Chapters 3 and 4, respectively), and on external finance (Chapter 5). India provides an interesting research context for a number of following reasons.

First, as an emerging market, India has governance mechanisms and institutional frameworks that are markedly

different³ from those of the US and UK, which have been the setting of most studies in corporate governance.

Second, in terms of economic development, the Indian economy has significantly developed over the past decade (Chakrabarti et al. 2008). Between 2005 and the beginning of the global economic crisis, its economic growth rate was, on average, approximately 9% a year, and the country was ranked second among the world's largest emerging economies (OECD 2011). The annualised average increase for the period 2014-2016 of around 7.5% makes India the fastest-growing G20 economy (OECD 2017). Meanwhile, it is expected that India's GDP growth will rise to about 7.3% between 2018-2019 and 2022-2023 (OECD 2018).

Third, compared to firms in developed markets, there are more directors who serve on multiple boards in Indian firms. Moreover, the number of busy boards (i.e. a board in which above 50 percent of directors serve on three or more outside corporate boards) is higher. Specifically, the average number of directorships per director is around five for top Indian firms (Jackling and Johl 2009), while the average director in developed markets only holds around two directorships (e.g. Fich and

³ Details of these differences are presented in Section 2.1.2

Shivdasani 2006; Jiraporn et al. 2008; Cashman et al. 2012). With respect to busy boards, the proportion of independent directors who serve on three or more outside boards was around 65% for top Indian firms (Sarkar and Sarkar 2009), whereas the percentage of busy boards for US firms ranges from 16% to 21% (Chakravarty and Rutherford 2017; Fich and Shivdasani 2006).

Due to having more directors serving on multiple boards, Indian firms may have a higher level of interaction with one another via shared board members. Taking M&A activity for example, 14% of acquisitions performed by top Indian firms are connected. This ratio is much higher compared to the US takeover samples in Wu (2011) and Ishii and Xuan (2014) (6.38% and 10.60% respectively), and to the UK sample in Renneboog and Zhao (2014) (9.4%). This makes it very interesting to examine the role of director networks with regards to corporate strategic activities in India.

Fourth, compared to developed markets, M&A is a recent phenomenon in India. Developed markets have participated in M&A transactions for quite some time already. In particular, five completed M&A waves have been examined in the academic literature: those of the early 1900s, the 1920s, the 1960s, the 1980s, and the 1990s (Martynova and Renneboog 2008).

Meanwhile, the pace for Indian M&As has picked up after the liberalization of the Indian economy in 1990-1991 as industry shocks and deregulation posed as key drivers for acquisition activities (Beena 2004; Chakrabarti 2008; Mantravadi and Reddy 2008a). From 1991 to 1995, consolidation in the Indian economy started to achieve economies of scale and scope. From 1995 to 2000 was regarded as a period of consolidation of subsidiaries by multinational companies operating in India, followed by the entry of multinational companies into the Indian market. Then from 2001 onwards Indian firms started venturing abroad, and making acquisitions in developed markets (Mantravadi and Reddy 2008b).

Under these three significant waves of M&A in India, from quite a small number of deals in the early 1990s, they have since increased in both number and volume (Arora 2013). Since mid-2003, in line with an M&A wave occurring on a global scale, there has been a sharp increase in the number of M&A in this market. The volume of mergers and acquisitions reached \$27.8 billion in 2006 (Chakrabarti et al. 2008). It is expected that in the period 2010-2019, the number of M&A deals by Indian industry is likely to more than treble. Even during the economic slowdown, India is still among the top five countries in the Asian Pacific region with the highest number of M&A deals (Sinha et al. 2010). According

to the global consultancy firm Grant Thornton, the total number of M&A deals announced in 2017 was 900 worth \$47.8 billion, which is the highest value since 2007, compared to 1,150 transactions valued at \$35.6 billion in 2016.

Table 1: Takeover waves

This table illustrates the takeover waves most frequently mentioned in academic literature

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	New wave
<i>Period</i>	1890s-1903	1910s-1929	1950s-1973	1981-1989	1993-2001	2003-present
<i>Geographical scope</i>	US	US	US, UK, Europe	US, UK, Europe, Asia	US, UK, Europe, Asia	US, UK, Europe, Asia
<i>M&A outcome</i>	Formation of monopolies	Formation of oligopolies	Growth through diversification	Elimination of inefficiencies	Adjustment to globalization	Global expansion

Source: Reproduced from Martynova and Renneboog (2008), page 2151.

Fifth, compared to developed markets, India has less developed capital markets. Indian companies place more reliance on external finance from banks and financial institutions for investment and performance (Khanna and Palepu 1997; Khanna and Palepu 2000a; Chacar and Vissa 2005).

For the abovementioned reasons, India provides an interesting context to test the impacts of director networks on M&A performance and external finance.

This thesis studies the networks of boards of directors with a special focus on independent directors because of the following

institutional background of India. First, India is dominated by family-owned business groups (Denis and McConnell 2003; Jackling and Johl 2009) characterized by pyramidal control (Morck and Yeung 2003), cross-holdings (Goswami 2000), and opacity of insider control (Sarkar and Sarkar 2012).

Second, large shareholders in Indian companies are mostly insiders (i.e. promoters) (Chakrabarti et al. 2008; Bhaumik and Selarka 2012) rather than outsiders as in Anglo-Saxon economies (e.g. the US, UK).

Third, promoters often occupy such important board positions as chairman and managing director. There is some concern that those promoter managers may act in the interest of the controlling family, sometimes at the expense of minority shareholders and/or other stakeholders (Morck and Yeung 2003).

This is further exacerbated by a weak legal framework (Sarkar and Sarkar 2012) and an ineffective market for corporate control (Mathew 2007). Finally, large blockholders such as financial institutions play little role in disciplining a firm's management (Sarkar and Sarkar 2000). Against this background, the presence of independent directors in the boardroom could be a powerful internal mechanism to protect the interest of minority shareholders.

Moreover, the Securities and Exchange Board of India (SEBI) enacted Clause 49 into the Listing Agreement of the Stock Exchange, implementing stringent criteria for independent directors for all listed firms. The revised Clause 49, introduced in 2004, is comparable to the UK and US codes (Sarkar and Sarkar 2012; Lange and Sahu 2008). Recent regulatory developments such as the 2009 Corporate Governance Voluntary Guidelines and the 2011 Companies Bill have further encouraged the growth of independent directors.

Furthermore, compared to developed markets, the average ratio of independent directors on Indian boards is lower. Taking the sample of the thesis for example, independent directors account for approximately 51% of the total number of directors in the boardroom, whereas this ratio is around 70% for US boards (Bhojraj and Sengupta 2003; Ashbaugh-Skaife et al. 2006). Meanwhile, 62% of all independent boards in the sample are classified as busy.

For these reasons, it is interesting to focus on independent directors, and specifically, on the impact of their networks on Indian corporate performance.

The context of this thesis blends M&A, corporate governance, firm characteristics, and external finance variables

from several datasets. In particular, it combines five separate databases: Prowess, Thomson One, Bloomberg, Prowess IQ, and Capital IQ-Professional (Compustat database). Other necessary information is taken from the Bombay Stock Exchange (BSE), National Stock Exchange (NSE), company websites, and other reliable online sources ⁴. The sample of the thesis is sourced from the BSE 500 and CNX 500. These indices include top 500 firms in National Stock Exchange and Bombay Stock Exchange in India. More specifically, BSE 500 index represents roughly 93% of the total market capitalization of BSE and covers all 20 major industries of the Indian economy, whereas CNX 500 index represents more than 95% of the free float market capitalization of the stocks listed on NSE. These large firms have available data on corporate governance, which facilitates the studies on the impact of corporate governance on firm performance in the thesis. Some small and medium firms have available financial data on Prowess database, but do not have sufficient information on corporate governance. Thus, related studies on corporate governance in India mainly focus on top 500 firms (e.g. Sarkar and Sarkar 2008; Jackling and Johl 2009, among others).

⁴ Regulations on corporate governance were obtained from SEBI website; some company and director profiles were collected from Nexis database.

Two datasets on corporate governance and networks were manually collected from corporate governance (CG) reports in Prowess. In particular, the first hand-collected dataset, which was sourced from the CG reports of all bidders and targets over the research period, was used for the analysis in Chapters 3-4. The second hand-collected dataset for panel data analysis in Chapter 5 was sourced from CG reports of 445 top Indian firms from 2000 to 2014. Overall, it took more than a year to extract, clean and check the data on corporate governance and networks for the analysis contained in Chapters 3-5 because of the following reasons: 1) director names in CG reports follow different formats; 2) components of a director's name may change from firm to firm; 3) director category⁵ associated with each name was scattered across different sections of the CG report; 4) the print quality of a number of CG reports was low. Thus, elaborate data processing steps were carried out to allocate the same name for the same person and to obtain a director category, which supports our measurement of director connections over time.

⁵ Director category includes types of director (e.g. executive, non-executive, independent, non-independent), directorships and other governance characteristics.

The thesis cover the period 2000-2014 because of the following reasons: in 2000, the Securities and Exchange Board of India (SEBI) incorporated Clause 49 into the listing agreement, which requires all listed firms in India to file a corporate governance report with detailed information on board functions. More importantly, this clause strongly emphasizes the role of independent directors in the boardroom. Before the year 2000, such information was not available for research. The last year of the sample is 2014 because we would like to examine the operating performance of bidding firms several years after the mergers.

The substantive part of this thesis comprises three empirical chapters that share a common theme of director networks. Chapter 3 examines the relationship between director networks and M&A short-term performance. In particular, two types of director networks are addressed. The first type of connection (i.e. direct connection) involves the bidder and target sharing at least one board member before the announcement of a deal. The second type of connection (indirect connection) refers to the bidder's network centrality. More specifically, two measures of network centrality at both firm level and director level, namely, *Degree* and *Closeness* are used. These measures are central to

the social network literature (Larcker et al. 2013). *Degree* is the number of direct links held by an individual company (director). *Closeness* represents how close a bidder (director) is to other companies (directors) in the network.

The key research question addressed is whether the market takes these two connections into account when they evaluate an M&A transaction. To answer this question, a sample of 426 deals from 2000 to 2012 conducted by the top 450 non-financial firms sourced from the BSE 500 and the CNX 500 was used.

With respect to the direct connection between bidder and target, the result suggests that the market adversely reacts to continuously connected deals as indicated by lower abnormal returns for bidding firms around the announcement periods. The results are robust to adding extra variables of firm characteristics and deal characteristics, changing event windows and controlling for other unobservable firm characteristics of the bidding firms in connected transactions. This finding also persists after addressing the potential endogeneity issues arising from this type of connection and M&A performance.

Regarding indirect connection (i.e. a bidder's network centrality), using OLS regressions with year-fixed effects and industry-fixed effects, and controlling for firm, governance and

deal characteristics, we cannot find a significant relationship between indirect connection measured by Degree and Closeness at the independent director level and at the firm level and the CARs. The same result is found, using the IV 2SLS approach and addressing potential endogeneity issues. This implies that the market does not take into account this type of connection when it evaluates the M&A transaction. In addition, the study in Chapter 3 reveals that the ratio of independent directors positively impacts CARs.

Chapter 4 focuses on the impact of director networks on post-merger performance. The major research question addressed is whether the direct and indirect connections (mentioned in Chapter 3) impact the post-M&A performance of bidding firms. Using a sample of 214 non-overlapping and completed deals, the finding reveals that a direct connection between bidder and target worsens the post-merger performance. This result is robust to adding more variables of firm and deal characteristics, changing operating performance measures, and controlling for other unobservable firm characteristics of the bidding firms in connected transactions. Meanwhile, this chapter provides no evidence of any significant effect of indirect connections at both firm level and independent director level on

post-M&A performance, after addressing the reverse causality of the relationship between director connections and M&A performance, and using alternative measures for independent director's network centrality.

Chapter 5 focuses on the impact of busy independent boards on external finance. A firm with a busy independent board is one where at least half the independent directors serve on three or more boards. The research questions addressed are: (1) whether busy independent boards impact external finance; (2) whether intra-group loans affect external finance; (3) whether the impact of a busy independent board on external finance differs between group and non-group firms.

To answer these questions, unbalanced panel data from a sample of 445 top firms (both group and non-group firms) in India over the period 2000-2014 were used. Using alternative measures of director networks, fixed effects regressions, and a two-step system GMM model, the study shows a negative association between busy independent boards and firms' external finance. In addition, the result confirms the existence of an internal capital market in Indian business groups, and shows a negative relationship between net loan receivers and external finance. The study also reveals that, compared to non-group firms with greater

connectedness of independent directors, group firms with such boards face more limited access to external finance.

1.3 Key contributions

This thesis aims to advance existing knowledge of the impact of director networks on M&A and corporate external finance. Moreover, it provides insights into such impacts on an emerging market whose governance mechanisms and institutional frameworks ⁶ are markedly different from those of the US and the UK, which have been the setting of the majority of studies on corporate governance.

Chapters 3 and 4 make several contributions to the literature on director networks, and M&A performance. First, unlike previous studies on direct connections (via shared board member) and M&A performance that have only focused on whether the existence of connection enhances M&A short-term performance (i.e. announcement returns), while neglecting the potential impact of continuous connections between bidders and targets, this study focuses on the influence of their continuous connections on M&A performance. Furthermore, not only are

⁶ Details of governance mechanisms and institutional frameworks of developed and emerging markets are presented in Section 2.1.2

announcement returns examined but so too is post-merger performance. Thus, it is believed that this study is the first to address the impact of the continuity of connection between bidder and target on both short-term and long-term M&A performance.

The findings suggest that the market expresses its concern about the effectiveness of deals whose bidders and targets have continuous connections via shared board members at the announcement date. This is justified by worse post-merger performance for bidders with continuously connected deals. The results shed light on the possibility that director quality (i.e. the level of independence and participation in corporate decisions) reduces over time if they serve as a link between bidders and targets for a long period of time. Thus, this issue deserves a closer look, especially in emerging markets where exist intensely powerful inside management, acting as controlling shareholders and holding key positions in corporate boards. Additionally, the positive relationship between a bidder's abnormal returns and its ratio of independent directors indicates that independent directors are expected to act as a powerful internal mechanism to protect the interests of shareholders and to improve the strategic operations of firms in emerging markets. From the point of view of outside investors, this internal mechanism may help

compensate for governance regimes and institutional frameworks that may not be as effective as those in developed markets. The finding of this study, to some extent, may influence Indian companies in terms of compliance with Clause 49 on the independent director ratio in the boardroom.

Second, unlike most previous studies on indirect connections and M&A performance that build measures of connection either at the CEO-level or at the firm-level, this study rather focuses on the influence of independent directors' network centrality on M&A performance. No evidence is found to suggest that deals performed by bidders with better-connected independent directors are more profitable. The result does not support the claim of resource dependency theory that well-connected bidders will have greater access to information about the target, and hence will be able to better avoid "lemons" problem (Akerlof 1970) in post-merger performance.

Chapter 5 makes several contributions to the literature on the impact of director networks on corporate external leverage. First, unlike previous related studies that only focus on either corporate bonds or bank loans, and do not take into account the matter of independence (i.e. the networks of independent

directors), this study investigates the impact of independent directors' networks on external leverage.

Second, it contributes to the literature on internal capital markets that are a channel of capital allocation among group members in emerging countries. Instead of indirectly relying on cashflow-investment sensitivity approach as in previous research, this study examines the association between the internal capital markets and external finance of group-affiliated firms.

Third, it provides insights into one of the governance attributes (i.e. busy independent board) that may exacerbate potential conflict between creditors and borrowers in emerging markets with ubiquitous business groups.

2. Corporate governance, mergers and acquisitions and corporate finance patterns in India

The majority of studies on the impact of networks of board of directors on M&A and external finance have mainly been based on US and UK data. Compared to these research contexts, as an emerging market, India is very different in terms of corporate governance mechanisms, institutional frameworks, timing of M&A waves, and corporate finance patterns. The insight into these themes are thus very important to understand the rationale behind the reaction of outside investors to director networks on these key corporate activities. It also helps to explain why the findings from studies in the US and UK contexts in this area of research may not be the same as those reported in India in particular and in emerging markets in general. As a result, Chapter 2 provides the background of these themes prior to the substantive analyses presented in Chapters 3-5.

2.1 Corporate governance

2.1.1 *Indian economy*

The Indian economy has significantly developed over the past decade with a steady inflow of foreign investment (Chakrabarti et al. 2008).

According to the surveys of OECD (2011), between 2005 and the beginning of the global financial crisis, India's economic growth rate was approximately 9% on average annually, and the country was ranked second among the world's largest emerging economies. Exports expanded robustly, especially of manufactured goods, software and business services. In addition, private investment was a key source of growth.

Macro-economic indicators exhibited a high degree of stability for this period before the global crisis. Inflation rose in late 2008, but did not exceed much the target range of 4 to 5% of the Reserve Bank of India.

During the global financial crisis, India's economic growth rate declined to around 5%, but increased back quickly. Compared to other large economies, India's economy recovered earlier due to the acceleration of output in the industrial sector by mid-2009. Since the impact of the economic slowdown in mid-2011, India

again recovered quickly and its real GDP reached 6.4% for the year 2015. The annualised average increase for the period 2014-2016 of around 7.5% makes India the fastest-growing G20 economy (OECD 2017). It is expected that India's GDP growth will rise to about 7.3% between 2018-2019 and 2022-2023 (OECD 2018).

Table 2.1: Indian Macro-economic indicators

This table provides macro-economic indicators of India including real GDP, private consumption, public consumption, fixed capital formation, exports, imports, and CPI.

	<i>Real GDP (market prices)</i>	<i>Private consumption</i>	<i>Public consumption</i>	<i>Fixed capital formation</i>	<i>Exports</i>	<i>Imports</i>	<i>Inflation =CPI</i>
% share in GDP 2004-09		58.6	10.8	31.7	20.9	25.8	
Average 1998- 2004	6.2	4.9	3.6	9.5	16.1	10.2	
2005	9.3	8.5	8.9	16.2	25.8	32.5	
2006	9.3	8.3	3.7	13.8	20	21.3	
2007	9.8	9.3	9.5	16.2	5.9	10.2	
2008	4.9	7.7	10.7	1.5	14.4	22.7	
2009	9.1	7.3	16.4	7.3	-5.5	-1.8	
2010	10.1	8.3	4.7	16.1	14.7	5.7	
2011	7.8	10.4	6.2		20.6	18.2	8.6
2012	4.9	5.6	7.4		8	11.6	7.2
2013	4.7	4	4.4		5.4	-1	6.9
2014	5.4	5.6	6.1		7.1	1.2	6.9
2015	6.4	5.9	4		8.1	6.8	5.4
2016	6.6	6.2	5		9.1	10.6	5.6
2016-17	7	7	8.3	0.4	4.5	-2.3	4.8
2017-18	7.3	7.8	4.9	4.3	4.6	5.4	5
2018-19	7.7	7.6	6.8	7.3	5.2	6.3	4.6

Source: Reproduced from OECD (2011); OECD (2014); OECD (2017): Table 1.1 and Table 1.

2.1.2 Corporate governance mechanisms

This section explains the governance mechanisms, the institutional framework, recent reforms on corporate governance laws, the impact of independent directors and their multiple directorships on corporate performance in the Indian context.

Governance mechanism and the institutional framework in developed and emerging markets

Table 2.2 and Table 2.3 describe and compare the governance mechanism and institutional frameworks between India and the US, respectively. According to Dwivedi and Jain (2005), the governance system in India is a combination between the Anglo-Saxon system popular in the US and the UK and the bank-dominated systems in Germany and Japan. Striking features that characterize corporate control and ownership in India include: low equity relative to firm size; equity ownership camouflaged through complicated firm cross-holdings (Goswami 2000) and dominated by family-owned businesses (Denis and McConnell 2003; Jackling and Johl 2009); and high share ownership by promoters (Chakrabarti et al. 2008). For example, the average promoter stakes are more than 48% and nearly 50% in BSE 100 and in BSE 500, respectively (Mathew 2007). Compared to the US, the market for corporate control in India is still ineffective

(Mathew 2007). The equity markets are illiquid. While shareholder rights generally are strong in the US, they are weak in India. Additionally, the disclosure framework has lower transparency (Khanna and Palepu 1997; Sarkar and Sarkar 2012).

Table 2.2: Governance mechanism in developed and emerging markets

	<i>Emerging Economies (e.g. India)</i>	<i>Anglo-Saxon Economies (e.g. US)</i>
<i>Board of Directors</i>	Predominant presence of controlling owners/family members	Professional managers present.
<i>Large shareholders</i>	Mostly insiders. Alleviate Type I agency problem and incentives to monitor manager. But potential conflict of interest with minority shareholders.	Mostly outsiders; incentives to monitor management, but can strategically align with management. Possibility of entrenchment.
<i>Executive compensation</i>	Less important as an incentive mechanism; internally determined by controlling owner and less sensitive to market pressures	Important incentive mechanism to align interest of management with shareholders. Largely market determined.
<i>Role of banks</i>	Important as blockholders. Important in monitoring and disciplining.	Not important as blockholders and in monitoring/disciplining.
<i>Market for corporate control</i>	Relatively inactive. Concentrated ownership barrier to takeovers.	Active as a disciplining mechanism of "last resort"

Source: Adapted from Sarkar and Sarkar (2012)

Table 2.3: Institutional frameworks in developed and emerging markets

This table presents the difference between emerging economies and Anglo-Saxon economies in terms of institutional frameworks.

<i>Institutional feature</i>	<i>Emerging Economies (e.g. India)</i>	<i>Anglo-Saxon Economies (e.g. US)</i>
<i>Market for finance</i>	Underdeveloped, illiquid equity markets.	Equity focused; managers monitored by disclosure rules and the market for corporate control
<i>Market for labor</i>	Few business school; little training; management talent is scarce, workers inflexible	Business schools and consulting firms offer talent, certified skilled and welfare benefits enhance mobility
<i>Market for product</i>	Limited enforcement of liability laws, little information dissemination, few activist consumers	Reliable enforcement of liability laws and efficient information dissemination, many activist consumers
<i>Governmental regulation</i>	High, corruption is common. Weak legal framework; poor contracting agreement.	Low, relatively free of corruption. Strong legal framework and contracting environment.
<i>Enforcement mechanism</i>	Unpredictable	Predictable
<i>Investor rights</i>	Shareholder rights generally weak; creditor rights stronger.	Shareholder rights generally strong; creditor rights weaker.
<i>Disclosure framework</i>	Low transparency and inadequate disclosure.	High transparency and strong disclosure regime
<i>Corporate scope</i>	Groups may have many advantages	Focused; diversified groups have disadvantages

Source: Reproduced from Khanna and Palepu (1997) and Sarkar and Sarkar (2012)

Recent reforms in corporate governance laws

There was not much attention to corporate governance in India until the early 1990s (Bhat 2007). Since the establishment of the Securities and Exchange Board of India (SEBI) by the Indian Parliament in 1992 and its increasing jurisdiction over issues pertaining to corporate governance (Rajagopalan and Zhang 2008), laws and regulations on governance mechanisms have been promulgated. In terms of board regulations, all registered firms are required to obey the Companies Act, 1956 and Clause 49 introduced by SEBI. This Clause has significantly been adjusted over time as follows:

In 1998, the Confederation of Indian Industry (CII) developed the first voluntary code of corporate governance (Chakrabarti et al. 2008). Then, SEBI appointed the Birla Committee to create a code of corporate governance. In 2000, SEBI accepted this committee's recommendations and enacted Clause 49 into the Listing Agreement of Stock Exchange. All listed firms were required to come under this Clause in 2003. Also in 2003, the Murthy Committee was instituted by SEBI to examine further the corporate governance framework in India. SEBI, then, implemented the Committee's recommendations and the revised Clause 49 became law on January 1, 2006 (Bhat 2007).

This Clause consists of such provisions as board composition, non-executive directors' compensation and disclosures, and other provisions as to the board and committees, and code of conduct (SEBI 2000). Most importantly, Clause 49 provides a very detailed definition of "independent director" (Appendix A). In 2008, some adjustments to this Clause were made and board independence was further strengthened.

It is said that the revised Clause 49 is a well-specified code for the board of directors that compares well with the codes present in the UK and the US (Sarkar and Sarkar 2012). Moreover, it also helps to move Indian corporate governance towards international standards (Lange and Sahu 2008).

2.1.3 Independent directors

The definition of "independent director" in Clause 49 has changed dramatically over time (details in Appendix A). Accordingly, the criteria for independent directors have been more stringent as opposed to its original version promulgated in 2000.

The need to have independent boards is emphasized in the case of India. This country is characterized by large number of family-owned firms belonging to business groups. In these companies, family members with significant ownership and

control rights are in charge of managerial positions in the company (Sarkar and Sarkar 2012). As a result, the manager-shareholder conflict (Type I- Agency problems) is reduced.

However, the concern is that managers may act for the controlling family, but not for the shareholders in general (Morck and Yeung 2003). Specifically, there may be a conflict of interests between the controlling shareholders and minority shareholders in the firms (Type II- Agency problems). Accordingly, the controlling shareholders may try to extract private benefits for themselves at the expense of minority shareholders through several ways: taking important positions in the firms to become involved directly in operational management; using stock pyramids and tunnelling (i.e., a way to transfer wealth from firms in which cashflow rights are lower to firms where controlling shareholders have higher cashflow rights). In this context, the presence of independent directors in the board becomes one of the most powerful internal mechanisms (Sarkar and Sarkar 2012) to deal with the high tendency of expropriation of minority shareholders by controlling shareholders.

2.1.4 Multiple directorships

Multiple directorships held by directors in a corporate board (i.e. a board in which its members serve on multiple boards

simultaneously) gradually developed in India mainly due to the shortage of industrial leadership with adequate experience to sit on firm boards (Jackling and Johl 2009), and the institution of the Managing Agency System (Sarkar and Sarkar 2012). Accordingly, managing agents, who set up new firms, wanted to control the management by sitting on company boards.

Directors serving on multiple boards are very common in Indian corporate sectors in general and in business groups in particular. The results from a study of the top 500 listed firms by Sarkar and Sarkar (2012) reveal that over the period 2003-2008, nearly 78% of directors hold more than one directorship, whereas the ratio of directors with three or more directorships is above 60%. More than 60% of independent directors have three or more directorships and their average number of directorships is five over the period of research.

Another study also shows that the proportion of independent directors with three or more directorships was around 65% and the average number of directorships per independent directors was 5.19 for group affiliates in the top 500 firms in 2003 (Sarkar and Sarkar 2009).

2.1.5 Multiple directorships and firm performance

There have been very few studies on the impact of independent directors and their networks on firm performance in India since the regulations on independent boards were applied to all listed firms (Sarkar and Sarkar 2012).

A study of 164 firms in BSE 200 over the period 1997-2003 shows that independent directors did not effectively monitor and improve firm performance (Garg 2007). Similarly, using data on 127 listed manufacturing firms for 2003, Ghosh (2006) finds no statistically significant relationship between outside directors and firm performance.

In another study of 500 large firms for the period 2002-2003, Sarkar et al. (2008) reveal that the diligence of independent directors measured in terms of their attendance of board meetings is associated with lower earnings manipulation, while outsiders with multiple board seats exhibit higher earnings management. Using a sample of 180 top firms in the period 2005-2006, Jackling and Johl (2009) note that outsiders with multiple board seats have a negative impact on firm performance.

On the contrary, in a sample of 500 large firms for the years 2003 and 2004, Sarkar and Sarkar (2009) find a positive

correlation between independent directors with multiple board seats and firm value. Independent directors are also noted to participate in more board meetings and annual general meetings.

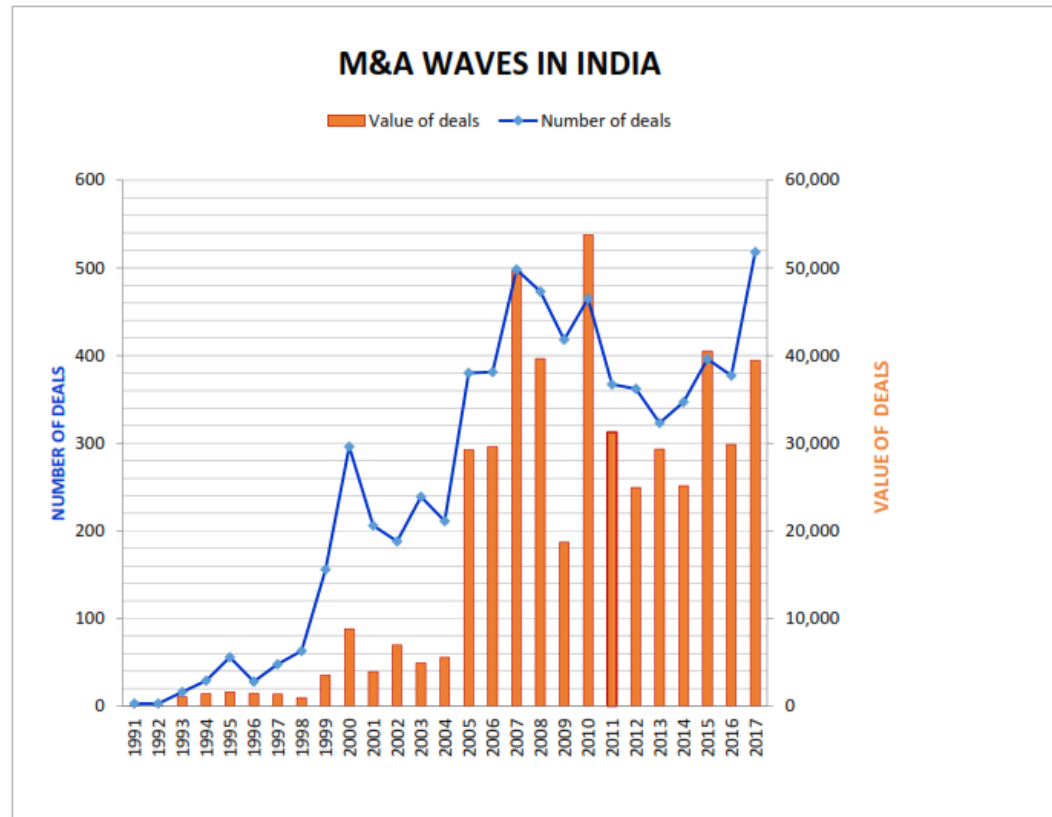
In short, the studies showed mixed results on the impact of independent directors and their multiple directorships on overall firm performance. None of them addressed director networks (i.e. direct connections between two firms and a firm's network centrality via shared board members) and their potential impact on corporate strategic decisions.

2.2 Mergers and acquisitions

After the reforms in 1991, three distinct trends can be seen in M&A activity in India: in the first period, there was a wave of consolidation within Indian industry to achieve economies of scale; in the second trend, since 1995, there has been increased activity in the consolidation of subsidiaries by multinational companies operating in India, followed by the entry of some multinational companies into India's markets, through the acquisition route; finally, since 2002, the third wave is that of Indian companies going abroad, and performing M&A in foreign countries (Mantravadi and Reddy 2007).

Figure 2.1: M&A waves in India

This figure illustrates M&A waves in India from 1991 to 2017. All completed deals that had available information on deal values (in \$ million) were included in the graph.



Source: Thomson One database.

Under these three significant waves of M&A, from quite a small number of deals in the early 1990s, M&A deals in India have increased in both number and volume (Arora 2013). The volume of mergers and acquisitions reached \$27.8 billion in 2006 (Chakrabarti et al. 2008). Meanwhile, it is expected that in the decade 2010-2019, M&A deals by Indian industry is likely to more than treble. Even during the economic slowdown, India was

among the top five countries in the Asian Pacific region with the highest number of M&A deals (Sinha et al. 2010).

According to the global consultancy firm Grant Thornton, the total number of M&A deals announced in 2017 was 900 worth \$47.8 billion, which is the highest value since 2007, compared to 1,150 transactions valued at \$35.6 billion in 2016 (Grant Thornton 2017).

In a survey among Indian corporate managers across various industry sectors, Grant Thornton (2006) reported that the two major motives of any M&A transaction in India are: improving revenues and profitability, and faster growth in scale and quicker time to market.

Given this background, empirical studies on whether M&A transactions help to improve the performance of Indian companies have been conducted, the majority of which show a positive impact of M&A on firm performance. Other studies find no significant relationship between M&A and corporate performance.

With regard to M&A announcement returns, using a sample of 1,477 M&A cases in 10 Asian countries (including India), Ma, Pagan, and Chu (2009) document positive cumulative abnormal returns around the announcement for bidding firms. Specifically,

shareholders in acquiring firms earn 0.96% in a two-day window, 1.28% in a 3-day window, and 1.7% in a five-day window. In a sample of 106 acquisitions, Jit Singh Mann and Kohli (2011) note that acquisitions have increased shareholder wealth on the announcement date. Banerje et al. (2014) confirm that the announcement returns to Indian acquirers are on average significantly positive during the period 1995–2011.

Regarding post-merger performance, Pawaskar (2001) finds that acquiring firms performed better than industry in terms of profitability, and that mergers led to financial synergies and a growth of the acquiring firms' asset base, using a sample of 36 bidding firms between 1992 and 1995.

In a sample of 74 deals in 2003, Kumar and Bansal (2008) show that the M&A activities benefit acquiring firms in the form of higher cash flow, more business and cost cutting. Similarly, Kaur and Kaur (2010) find that mergers have a positive influence on the cost efficiency of Indian commercial banks merged over the period 1990-91 to 2007-08. In other studies, Mantravadi and Reddy (2008), Sinha et al. (2010), and Khan (2011) find a positive impact of M&A on financial sectors. Using a sample of 383 mergers and acquisitions from 2003 to 2008, Rani, Yadav, and Jain (2013) find an increase in the long-term operating profit margin following

the merger. Azhagaiah and Sathishkumar (2014) reveals that the M&A process has a positive effect on the operating performance of acquiring manufacturing firms in India after merger, using 39 selected acquiring manufacturing firms during the financial year 2006–2007.

In contrast, Beena (2004) could not find any evidence of improvement in the financial ratios of the acquiring firms during the post-merger period, using a sample of 115 deals between 1995 and 2000. With a sample of 59 firms that had undergone mergers and acquisitions from 2001 to 2008, Verma and Sharma (2014) find that the overall financial performance insignificantly improved in the post-merger period. Similarly, Smita (2011) shows that there is no positively significant effect of M&A on financial performance, using a sample size of 10 Indian industries, from 2005 to 2007. Kanahalli and Jayaram (2014) find no significant difference between financial performance of companies before and after mergers for Tata Group. In a similar vein, Gupta and Banerjee (2017) show that there is no improvement in financial performance of acquirer companies after merger, using a sample size consisting of seven different industries that had undergone M&A during 2006-2012.

Overall, empirical evidence on the impact of M&A on corporate performance in India shows mixed results, and the majority of studies have focused on the operating performance of bidding firms.

2.3 Corporate financing patterns

Corporate financing patterns in India have undergone changes depending on the development of the financial markets, which has relied on the extent of government intervention in financial sector activities.

With regard to equity markets, Indian capital markets played a key role in the mobilization of savings till the 1950s. However, their importance reduced considerably during the period from 1960 to 1980 (Khambata and Khambata 1989). Accordingly, funds mobilized from the capital market as a percentage of net domestic savings decreased from 13 percent in the 1950s to 0.4 percent in the 1980s. The authors also point out two reasons for the decline in the role of equity markets: first, commercial banks and financial institutions were able to offer funds at a lower cost; and second, equity was either not attractive to investors or to issuers.

After the early 1990s, as part of the liberalization programme, major reforms in financial sectors took place in India. In particular, in 1991, India launched comprehensive banking sector reforms with an aim to enhance its efficiency and commercial orientation. These were followed in 1992 with capital market reforms to improve pricing and disclosure systems. All of these reforms help to facilitate the access to external finance and allow for a greater role of market forces in determining the availability and allocation of finance to firms' operations.

To find out if the sources of finance for corporate sectors have changed dramatically since liberalization, using all Indian firms in Prowess database⁷ from 1991 to 2008, Sarkar and Sarkar (2012) find that external funds accounted for 71% of the total funds mobilized by Indian companies in 1991, and this figure by 2008, after some fluctuations, was the same (i.e. 71% of the total funds). Consistent with Sarkar and Sarkar (2012), in another study, using a 5,000 firm-level database from 1990-2001, Shirai

⁷ Prowess database created by the Centre for Monitoring the Indian economy (CMIE) is the largest database of financial performance of Indian companies. Recent empirical studies on Indian context have used this database as a main source to obtain required data for analysis (see for example, Khanna and Palepu 2000; Gopalan et al. 2007; Sarkar et al. 2008; Bhaumik and Selarka 2012; Banerjee et al. 2014)

(2004) also concludes that banks remain important financiers for both high- and low-quality firms in India.

Overall, external finance is an important source of funding for Indian firms, particularly bank borrowings for their performance and investments given the less developed capital markets (Khanna and Palepu 2000a; Chacar and Vissa 2005). This is also in keeping with the prediction of pecking order theory (Myers 1983) that debt is preferred to equity if external financing is required.

To sum up, this chapter, first, provides an overview of corporate governance in India and points out the difference between developed markets and emerging markets in terms of governance mechanisms and institutional framework. Second, it discusses Indian merger waves and their performance. Third, it describes and explains why directors with multiple board seats are common in India as well as their impact on corporate performance. It also notes that external finance is an important source of funding for firms given India's less developed capital market.

3. Director networks and short-term performance of mergers and acquisitions ⁸

This chapter focuses on the impact of two types of director networks on M&A announcement performance. The first type of connection involves the bidder and target sharing at least one board member before the announcement of a deal. The second type of connection refers to the bidder's network centrality. The key research question addressed is whether the market takes these connections into account when they evaluate the M&A transaction. Using a sample of 426 deals between 2000-2012 conducted by the top 450 non-financial firms sourced from the BSE 500 and the CNX 500, this is confirmed to be true for the first type, but not for the second type of connections.

3.1 Introduction

There has been growing academic interest in the impact of director networks on different aspects of corporate finance and governance. Director networks can provide firms with market information, management practices, better contracts, and higher

⁸ A paper based on the work in this chapter was accepted for the 2017 BAM Conference and was awarded the BAM Best Student paper prize.

returns (Perry and Peyer 2005; Cai and Sevilir 2012; Field et al. 2013). Larcker et al. (2013), for example, demonstrate that firms with well-connected boards earn superior risk-adjusted stock returns and experience higher future return-on-assets growth. But, such networks may also spread bad practices and information, leading to a reduction of director effort, and possibly collusion (Loderer and Peyer 2002; Jiraporn et al. 2009; Larcker and Tayan 2010).

Very few recent studies have addressed the impact of board connections on M&A performance. Two types of such connections have been examined: direct connections (i.e. the bidder and target share at least one director in the boardroom) and indirect connection (i.e. the bidder's network centrality). First, the literature on direct connections focuses on whether the existence of a connection enhances the deal performance (Cai and Sevilir 2012; Ishii and Xuan 2014), while neglecting the potential effectiveness (or otherwise) of continuous connections among bidders and targets. Second, the literature on indirect connections build measures of connection either at the CEO-level or at the firm- level, i.e. for all directors (Chikh and Filbien 2011; Liu 2014; Renneboog and Zhao 2014), but overlooks the influence of

independent directors' network on M&A performance. This study seeks to fill these gaps in the literature.

In particular, for the first type of connection, we analyse whether M&A performance increases with the length at which bidders and targets are continuously connected by shared directors. The longer time the shared directors serve on the boards of both bidder and target, the more they understand the two firms individually and possibly their compatibility and/or synergy. This arises from greater experience, commitment, competence and greater monitoring (Buchanan 1974; Salancik 1977; Vance 1983) after their long-term interaction on both boards. However, a longer serving period may also impair directors' effectiveness and independence in performing their roles (Ferris et al. 2003; Vafeas 2003; Fich and Shivdasani 2006).

For the second type of connection, we study the networks of independent directors. In India, the concept of independent directors is relatively new. Unlike in developed markets such as in the US and the UK, there is little evidence regarding the role that independent directors play in the Indian corporate context. Regulatory developments since 2000 mandate the inclusion of independent directors in Indian boardrooms, making the

regulations and rules regarding independent directors in India on par with that in the US and the UK.

However, unlike the US and the UK, India is dominated by family-owned business groups (Denis and McConnell 2003; Jackling and Johl 2009) characterized by pyramidal control (Morck and Yeung 2003), cross-holdings (Goswami 2000) and an opacity of insider control (Sarkar and Sarkar 2012).

Large shareholders in Indian companies are mostly insiders (i.e. promoters) (Chakrabarti et al. 2008; Bhaumik and Selarka 2012) rather than outsiders as in Anglo-Saxon economies (e.g. the US, UK). Furthermore, promoters often occupy such important board positions as chairman and managing director. There is concern that those promoter managers may act in the interest of the controlling family, sometimes at the expense of minority shareholders and/or other stakeholders (Morck and Yeung 2003). This is further exacerbated by a weak legal framework (Sarkar and Sarkar 2012) and an ineffective market for corporate control (Mathew 2007). Finally, in India, large blockholders such as financial institutions play only a small role in disciplining a firm's management (Sarkar and Sarkar 2000). All of these features provide an interesting institutional background to study the role

that independent directors and their networks play in the Indian corporate setting.

This study combines reputation hypothesis (Fama and Jensen 1983a) and resource dependency theory (Pfeffer and Salancik 1978). It is hypothesised that both continuous connections between bidder and target and bidder's network centrality will impact the acquirer's announcement CARs positively.

To test these hypotheses, a sample of M&A transactions of the top 450 non-financial Indian firms during the period 2000-2012 was constructed. Our results suggest that the market adversely reacts to continuously connected deals as indicated by lower abnormal returns for bidding firms around the announcement periods. This finding persists after our attempt to address the potential endogeneity issues arising from this type of connection and M&A performance. Meanwhile, using the IV 2SLS approach, we cannot find a significant relation between indirect connection measured by Degree and Closeness at independent director level and at firm level and the CARs. This implies that the market does not take into account this type of connection when it evaluates the M&A transaction. In addition, one consistent finding in our study is that the ratio of independent directors positively

impacts CARs. Regardless of the models used, this relation holds when we analyse the impact of both types of connections on CARs.

Our research contributes to the M&A and corporate governance literature in several important ways. First, the market expresses its concern about the effectiveness of deals whose bidders and targets have continuous connections via shared board members. The rationale for its adverse reaction to such deals is that it is likely director quality (i.e. level of independence and participation in corporate decisions) may reduce over time if they serve as a link between bidders and targets for a long time. Thus, this issue deserves a closer look and further analysis, especially in emerging markets where exist intensely powerful inside management, acting as controlling shareholders and holding key positions on corporate boards.

Second, independent directors are expected to act as a powerful internal mechanism to protect the interests of shareholders and to improve the strategic operations of firms in emerging markets. From the point of view of outside investors, this internal mechanism may help compensate for governance regimes and institutional frameworks that may not be as effective as those in developed markets. The finding of this study, to some

extent, may influence Indian companies in terms of compliance with Clause 49 on the independent director ratio in the boardroom.

The remainder of this chapter is organized as follows. Section 3.2 provides an overview of relevant literature and presents the hypotheses; Section 3.3 describes the sample, methodology and variables; Section 3.4 presents the empirical results and robustness checks; and Section 3.5 concludes the study.

3.2 Literature review and hypothesis development

To facilitate the decision-making process in an M&A transaction, both bidder and target have to collect information on the potential synergies and profitability of the deal. They may get access to the relevant information on the transactions through two different channels. Through the first, if the bidder and target are directly and continuously connected through cross-directorships, these common directors may already have disclosed relevant information on the potential benefits of a deal before the beginning of the negotiations. Through the second channel, the bidder may obtain the necessary information via its wide networks with other companies rather than the target company (i.e. bidder's network centrality). Overall, in either channel of information, the bidder will possibly have more advantage than

those without such direct and indirect connections. However, the facts that whether or not the market acknowledges the benefits of such connections on M&A transactions at the announcement date, and if there is any difference in the reaction of outside investors to the two types of connections in an M&A deal are unknown. We formulate our hypotheses on the relation between M&A announcement performance and the two distinct types of director networks.

Direct and continuous connections and bidder's announcement CARs

Direct connections between bidders and targets via shared directors may provide related parties with informational advantages. For instance, Cai and Sevilir (2012) document that when at least one director sits on the board of both the bidder and target of an M&A deal, the bidder pays a lower acquisition premium, and at the same time experiences higher announcement returns. They attribute this result to the private information collected by the connected bidder via the shared directors. In a similar vein, Renneboog and Zhao (2014) show that the informational advantage could enhance trust between the related parties, leading to a higher probability of M&A deals being completed.

Moreover, a long-term director engagement in both bidder and target is related to greater experience, commitment, competence and greater monitoring (Buchanan 1974; Salancik 1977; Vance 1983). This will probably impact M&A transactions positively. More specifically, there are multiple processes involved in an M&A transaction, such as due diligence, negotiation, and integration, all of which are dynamic and involve learning (March 1991; Shimizu et al. 2004). The more the acquiring firm learns about the target firm, the better the acquisition performance will be (Ahammad and Glaister 2013). To facilitate the decision-making process in an M&A deal, prior understanding of related parties, if any, can of course be very helpful. Through long-term interaction between both companies, shared directors are expected to understand clearly each party involved.

Taking due diligence process for example, the long-term shared directors may know well the involved parties in terms of their strategic and cultural fit, employee capabilities and business competence, investment and financing issues, legal tax and IT issues. This will definitely help to expedite the negotiation, and streamline the integration processes, and reduce the risk of M&A failure due to any inappropriate choice of potential target. Even in the case of a time constraint placed on the acquirer by the seller

when there is a seller's market (Harvey and Lusch 1995), earlier and wider knowledge about the target of the bidder via long-term shared directors will be a great advantage over other rivals in such a transaction.

If the market realizes that it will benefit from continuously connected deals via long-term shared directors between bidders and targets, it will favourably react to such deals. This leads to our first testable hypothesis:

Hypothesis 1: Acquirer's CARs increase with the level of direct and continuous connections between the acquirer and target.

Network centrality and bidder's announcement CARs

Not only serving on either one or two boards, directors have been found to expand their connections via board memberships in multiple companies (i.e. a network of companies). There are conflicting arguments on the relationship between such board networks and firm performance. The first strand of literature (i.e. reputation hypothesis) suggests that the presence of outside directors on the board helps to improve firm performance and reduces agency problems. The rationale for this argument is that outside directors are motivated to build up their reputation as

experts in decision control, and the quality of their performance as internal decision managers in other organizations will reflect the value of their human capital. They will work well to send a positive signal on their ability to the labor market (Fama and Jensen 1983a). Thus, outside directors with more board seats than others are expected to be more competent and experienced. In other words, a board whose independent directors with wide networks possibly signals its high quality (Paige Fields, Fraser and Subrahmanyam 2012), which will, in turn, improve corporate performance.

There exists ample empirical evidence that corroborates this viewpoint. In detail, board network is documented to provide firms with higher value (Sarkar and Sarkar 2009; Field, Lowry and Mkrtchyan 2013); better performance and market-to-book ratios (Masulis and Mobbs 2011); more board meeting attendance (Baccouche, Hadriche and Omri 2014); higher future excess returns (Larcker et al. 2013); positive effects on R&D, patenting and innovation induced by information transmission through interlocks (Helmerts et al. 2017; Chuluun et al. 2017).

In the context of M&A, there has been little attention paid to the relationship between board network and the acquiring firm's shareholder wealth. The majority of research based on US and UK

data concludes that board network helps to increase acquisition performance. Specifically, a positive association between the number of outside directorships held by independent directors and bidders' abnormal returns has been documented (Subrahmanyam et al. 1997; Harris and Shimizu 2004; Chan and Emanuel 2011). In addition, Frye and Wang (2010) note that busy boards are more knowledgeable since they are less likely to seek an FO from financial advisors in takeover activity. Using a sample of 200 acquisitions announced between 2000 and 2005, Chikh and Filbien (2011) report that well-connected CEOs in French firms are more likely to complete any deals in spite of a negative market reaction to acquisition announcement.

Renneboog and Zhao (2014) also find that director networks have a positive impact on a wide range of aspects of M&A. Based on a sample of 743 M&A announcements of UK firms during the period 1995-2012, they conclude that board networks lead to higher success rate and shorter negotiation time. However, they do not find any evidence on market reaction to whether it is a connected or not connected deal. Nor do they focus on the continuity of connection between the bidder and the target.

Another strand of literature suggests that widely connected directors do not have enough time to perform monitoring and

advising roles, thus inversely impact a firm's market value as well as exacerbate agency problems (Ferris et al. 2003).

According to the Principles of Corporate Governance issued by the Business Roundtable, the relevant number of hours needed by a director to fulfil his tasks depends on the complexity of the corporation and its operations (The Business Round table 2002). Meanwhile, firms in India are smaller in size and the proportion of transnational firms is lower as opposed to firms in the US or UK (Sarkar and Sarkar 2012). Therefore, independent directors in India can afford to be on more boards than those in the US or UK.

In addition, multiple directorships in India evolved mainly due to a shortage of managerial labor with adequate experience and expertise to sit on firm boards (Sarkar and Sarkar 2012). Also, in the context of the high proportion of group affiliates in Indian corporations, independent directors' networks via board memberships in different companies inside and outside each group are expected to become a vital link between the firm and the necessary resources (such as advice, information, commitment and legitimacy) needed to maximize corporate performance (Pfeffer and Salancik 1978). In other words, consistent with the resource dependency theory, this network may benefit corporate performance in India.

Furthermore, if the bidder has a well-connected independent board, and is hence better informed, the bidder's inside management may be less likely to succumb to building empires through M&As at the expense of value creation. Evidence supporting this hypothesis has been documented for the US by Cai and Sevilir (2010).

In India, it is quite common to observe intensely powerful inside management, acting as controlling shareholders and holding key positions on corporate boards. For instance, in the top 500 Indian listed companies in 2008, three out of every five companies had a promoter as a board member. The ratio of companies with promoters as inside directors increased from 32% in 2003 to 47% in 2008. 95% of the top 500 Indian corporate boards have promoters acting as chairman or managing director (Sarkar and Sarkar 2012). As a result, the presence of such better informed independent directors on Indian boards is remarkably important to protect shareholders' interests.

If the market is aware that its interests will be protected by such a better informed independent board, and hence is persuaded that the bidder is unlikely to waste resources through an unsuccessful takeover, it will react positively to such a deal. This leads to our second testable hypothesis:

Hypothesis 2: Acquirer's CARs increase with its level of network centrality.

In other words, well-connected independent directors on a bidder's board will positively impact its announcement CARs in an M&A transaction.

3.3 Data and methods

3.3.1 Data sources and sample

M&A data and firm-level data

Our sample covers M&A deals between 2000-2012 by the top 450 non-financial firms sourced from the BSE 500 and the CNX 500⁹. Before 2000, there were relatively few M&A deals. More importantly, in 2000, the Securities and Exchange Board of India (SEBI) incorporated Clause 49 into the listing agreement, which requires all listed firms in India to file a corporate governance report with detailed information on board functions. Data on M&A deals are collected from the Prowess database¹⁰ of the Centre for

⁹ BSE 500 index represents roughly 93% of the total market capitalization of Bombay Stock Exchange and covers all 20 major industries of the Indian economy. CNX 500 index accounts for more than 95% of the free float market capitalization of the stocks listed on National Stock Exchange.

¹⁰ Prowess database created by the Centre for Monitoring the Indian economy (CMIE) is the largest database of financial performance of Indian companies including time-series data from 1999 onwards. Recent empirical studies on Indian context have used this database as a main source to obtain required data for analysis (see for example, Khanna and Palepu 2000; Gopalan et al.

Monitoring the Indian Economy (CMIE), Thomson One and Bloomberg database. The merging process among the three databases is carried out based on bidders' ISIN codes and deal announcement dates. Our sample includes 426 deals, of which 327 were completed whilst 99 deals were incomplete.

Stock prices for bidders, and the BSE Sensex Index for event study analysis of M&A transactions were collected from the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). Data on operating performance and other firm characteristics are from Prowess. Ownership and business-group affiliation were sourced from the Prowess IQ database¹¹.

Network and corporate governance data

Data for network measures and board characteristics were collected manually from corporate governance (CG) reports in Prowess. We extracted all directors' names and categories (e.g. executive, non-executive, independent, non-independent)¹². We

2007; Sarkar et al. 2008; Bhaumik et al. 2012; Bhaumik and Selarka 2012; Banerjee et al. 2014)

¹¹ This database is the latest online version of CMIE. It was launched on the first of January 2016. As opposed to the previous versions, Prowess IQ is the first one to reflect time-series data on ownership classification (i.e., whether a firm is group-affiliated or non-affiliated on a yearly basis) from 1989 onwards. This makes research results relating to group affiliation more reliable.

¹² We use Able2Extract Professional 9 software developed by Investintech to extract navigated contents on each report.

manually checked the accuracy of the extracted names due to the print quality of a number of CG reports, especially those before 2004 in Prowess. For the years without CG reports in Prowess, we relied on company websites and other online resources. After obtaining all director names for bidders and targets for the research period, we cleaned these names with tailored software, because director names in CG reports follow different formats. Accordingly, names may start with or without titles or contain varying spaces among first names, middle names and last names. The majority of reports have director names ending with special characters (e.g. #, *). Moreover, the components of a director's name change from firm to firm. So surnames can be accompanied by different combinations of first and middle names.

Specifically, the surname may be accompanied by the first name and middle name or by the initial of the first name and the initial of the middle name. Alternatively, the surname can go together with the initial of the first name and no middle name. This leads to a situation in which several names simultaneously address a single person. For example, four following names belong to a single director: K M Mistry, Keki M Mistry, Keki Mistry, K Mistry, and Keki Minno Mistry.

To avoid this problem, after being cleaned, names were checked against those available in the Capital IQ-Professional (in Compustat database). Based on the surname and first-name initial, similar names from all firms are arranged next to one another to facilitate the checking process. For those unavailable in Capital IQ, we checked them against CG reports (usually the directorships section, if available) and directors' profiles from company websites and Bloomberg. This process helps to allocate the same name for the same person, which supports our measurement of director connections over time. In cases where there is not a clear tabulation of the director category associated with each name (e.g., where information on the director category is scattered across different sections of the CG report), we read each CG report in detail to derive this information. Overall, it took more than one year to extract and clean network and corporate governance data.

3.3.2 Methodology

To test the hypotheses, the following model was estimated:

$$y_i = \alpha + \beta * \text{NetworkMeasure}_i + \sum \gamma * \text{ControlVariables}_i \\ + \sum \text{industry}_k + \sum \text{year}_t + \varepsilon_i$$

The dependent variable y_i is the bidder's abnormal returns

over the three-day event window (-1, +1). $NetworkMeasure_i$ captures the two different types of connections: direct and continuous connection between bidder and target; indirect connection between bidder and target (i.e. network centrality of bidder). $ControlVariables_i$ contains a set of variables on firm characteristics, board characteristics and deal characteristics. Definitions of all variables are presented in Appendix B and explained in Sections 3.3.3-3.3.5. A set of industry and year dummies was included to control for potential systematic differences in industry and time. In addition, tests were conducted to check if there is any evidence of autocorrelation and heteroscedasticity in the data. Using Breusch-Godfrey LM test for autocorrelation, we find no evidence for serial correlation in the data (*p-values* greater than 0.42, Tables 3.3 and 3.4). Using Breusch-Pagan/Cook-Weisberg test for the null hypothesis that the variance of the residuals is homogenous, we find no evidence for heteroscedasticity in the data (*p-values* greater than 0.15, Tables 3.3 and 3.4). All t-statistics are based on robust, firm-clustered standard errors. Variables are measured in constant price with 2005 as the base year.

Potential endogeneity issues

It is not uncommon for studies in corporate governance to be plagued by endogeneity (Bhagat and Jefferis 2002). Regarding the direct and continuous connection, there is a concern that board connections do not arise randomly, and they may be related to some factors which could independently influence M&A outcome (Cai and Sevilir 2012). Put differently, it is concerned that whether the relation between board connections and acquirer returns can be explained by acquirer's managerial quality and talent, corporate governance and board characteristics of the acquirer, the existence of a previous business relation between the acquirer and the target, as well as other unobservable firm characteristics of the acquirer in connected transactions.

With respect to bidder's network centrality and M&A performance, a possible criticism is that director memberships could be endogenous (Fich and Shivdasani 2006; Jiraporn *et al.* 2009). Specifically, better-connected independent directors may have a positive impact on corporate performance (e.g. M&A). However, the direction of causality may be reverse; bidders with better performance potential may merely attract better-connected directors.

The ways that such potential endogeneity concerns arising

from the relation between these two types of board connections and M&A performance are addressed as follows.

For direct and continuous connections and M&A performance, we follow Cai and Sevilir (2012) and take into account factors that may independently influence M&A outcome: board tenure; corporate governance and board characteristics of the acquirer; firm similarity between the acquirer and the target in connected transactions; and the existence of a previous business relation between the acquirer and the target. We also control for other unobservable firm characteristics of the acquirer in connected transactions by comparing the connected and non-connected deals made by the same acquirer. To do this, only bidders that have both connected deals and non-connected deals were included in this sub-sample. This reduced the sample size to 110 deals. We first perform the univariate tests to compare the CARs over three event windows of bidders who have both connected and non-connected deals. We then analyze the impact of the continuous connection between these bidders and their targets on their announcement CARs.

With regard to bidders' network centrality and M&A performance, very few recent studies have addressed the potential endogeneity issues. They use an instrumental variable

approach and/or natural experiments such as a change in corporate governance policy that impact directors' network centrality.

Specifically, Lei and Deng (2014) study the effect of independent directors' multiple directorships on firm value in Hong Kong-listed firms. They take advantage of the reforms to HKEx Listing Rules in 2004¹³, which provide a natural experiment to address the endogeneity of independent directors' multiple appointments.

Chuluun et al. (2017) examine the impact of firms' network centrality (via board interlocks) on innovation. To deal with endogeneity issues of network measures, they construct the following two instruments: the average geographical distance between a firm and other firms in the issuer's Census region (Avg. Distance), and the number of publicly-listed firms in the issuer's interstate megalopolis region (Megalopolis Public Companies). Avg. Distance is based on the location of each firm's headquarters (Compustat), the latitude and longitude corresponding to these locations (US Census Gazetteer files), and in which of the nine

¹³ The 2004 policy change requires firms with fewer than 3 independent directors (INEDs) must increase the number of INEDs to meet the minimum requirement

Census Bureau divisions the firm's headquarters is located (US Census Bureau). The physical distance between any two firms within a given Census division is computed using this latitude and longitude information.

Meanwhile, analysing the relation between CEO compensation and *networks of executive and non-executive directors* for all listed UK companies, Renneboog and Zhao (2011) apply an instrumental variable approach with board size and the CEO's honorary title as the instrumental variables for the centrality measures *at both firm level and CEO level*.

In our study, we find no natural experiment that helps deal with endogeneity issues of network centrality *at the firm level and at the independent director level*. Thus, we use an instrumental variable approach to address them. A key requirement of the IV approach is to obtain relevant and valid instruments. For this purpose, we follow the approach of Renneboog and Zhao (2011) and select board size and percentage of independent directors as the instrumental variables in our IV 2SLS. These instruments are also applied in another related study of Chuluun et al. 2010 to examine the impact of board networks on the cost of corporate debt for US firms. In addition, a number of tests were conducted to check the validity of the instruments used in our IV 2SLS

estimations including underidentification test, weak identification test, and test of overidentifying restrictions (Wooldridge 2002). The results obtained from the tests in Tables 3.6 and 3.7 reflect that the instruments used in our IV 2SLS are valid.

3.3.3 Dependent variable

The event study methodology is used to examine the short-term stock price reaction to mergers and acquisitions under the impact of board network. The rationale for applying event study is that it captures the influence of a specific unanticipated event related to a firm on the wealth of its shareholders by analysing the abnormal returns around the event period (Brown and Warner 1980, 1985). In this study, the performance of M&A is measured by cumulative abnormal returns (CARs) over the three-day event window following Masulis et al. (2007) because of the following reasons: First, short-window event studies provide the most statistically reliable evidence on whether M&A creates value for shareholders or not. In other words, the accuracy will be lower when more days are included in the event window because of the possibility of confounding effects from other market events (Mackinlay 1997). Second, the commonly used event windows are the three days (i.e., one day before the announcement to one day after the announcement date) and a longer window beginning

several days prior to the announcement (Andrade et al. 2001; Hackbarth and Morellec 2008).

Before deriving CARs, the announcement abnormal return is calculated based on standard market model event study methodology as in Brown and Warner (1985). In particular, the market model assumes the following linear relationship between the return of any security and the return of the market portfolio:

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it} \quad (1)$$

Where t denotes the time index, $i = 1, 2, \dots, N$ represents for security, R_{it} and R_{mt} are the returns on security i and the returns on the market portfolio respectively, during period t . The return in the market portfolio is measured by the variation in BSE Sensex index (i.e., the value weighted market index acting as a benchmark equity index that reflects the health of the Indian economy) and e_{it} is the error term for the security i .

Equation (1) is estimated over a period running between 190 days prior to the event up to 20 days prior to the event date. With the estimates of α_i and β_i from the equation (1), the normal return (i.e., the return that would be expected if the event did not occur) is predicted during the days covered by the event windows. The difference between the actual return and the predicted normal

return is the abnormal return (AR) which is obtained as per equation (2):

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i * R_{mt} \quad (2)$$

Where

AR_{it} : abnormal return for firm i on day t

R_{it} : actual return for firm i on day t

$\hat{\alpha}_i, \hat{\beta}_i$: OLS values from the estimation period

The daily abnormal returns from (2) are then summed over the event window to get the cumulative abnormal return (CARs) as per equation (3):

$$CAR_i (T_1 - T_2) = \sum_{t=T_1}^{T_2} AR_{it} \quad (3)$$

Where CAR_i is the cumulative abnormal return for company i over the event window (T_1, T_2) .

3.3.4 Independent variables

Two types of connections are measured as follows:

Continuity of connection

An M&A transaction is connected when a bidder and a target share at least one director at the M&A announcement date.

To quantify the continuity in connection between bidder and target, we count the number of years they have the same directors preceding the announcement date. For instance, for a deal between Amtek Auto Ltd and Ahmednagar Forgings Ltd with the announcement date of 31st July 2008, based on the 2008 Corporate Governance (CG) report, both bidder and target share three directors. We manually check the number of years each director has simultaneously served in both boards without interruption using all CG reports since 2000. For example, if the three directors served in both boards in each of the years 2008, 2007, 2006, 2005, 2004, then the number of years of connection for this bidder-target pair is 5. If the three directors have different numbers of years in both boards, we take the average of years of connection of all shared directors of each bidder-target pair.

Bidder's centrality measures

A bidder may be well-connected if it has relatively many channels of communication or resource exchange via its network centrality, yielding such a bidder more opportunities, access, or alternatives than other bidders.

Following Renneboog and Zhao (2014), we construct networks to quantify network centrality. A network is a set of vertices and links between them. Accordingly, each director (firm)

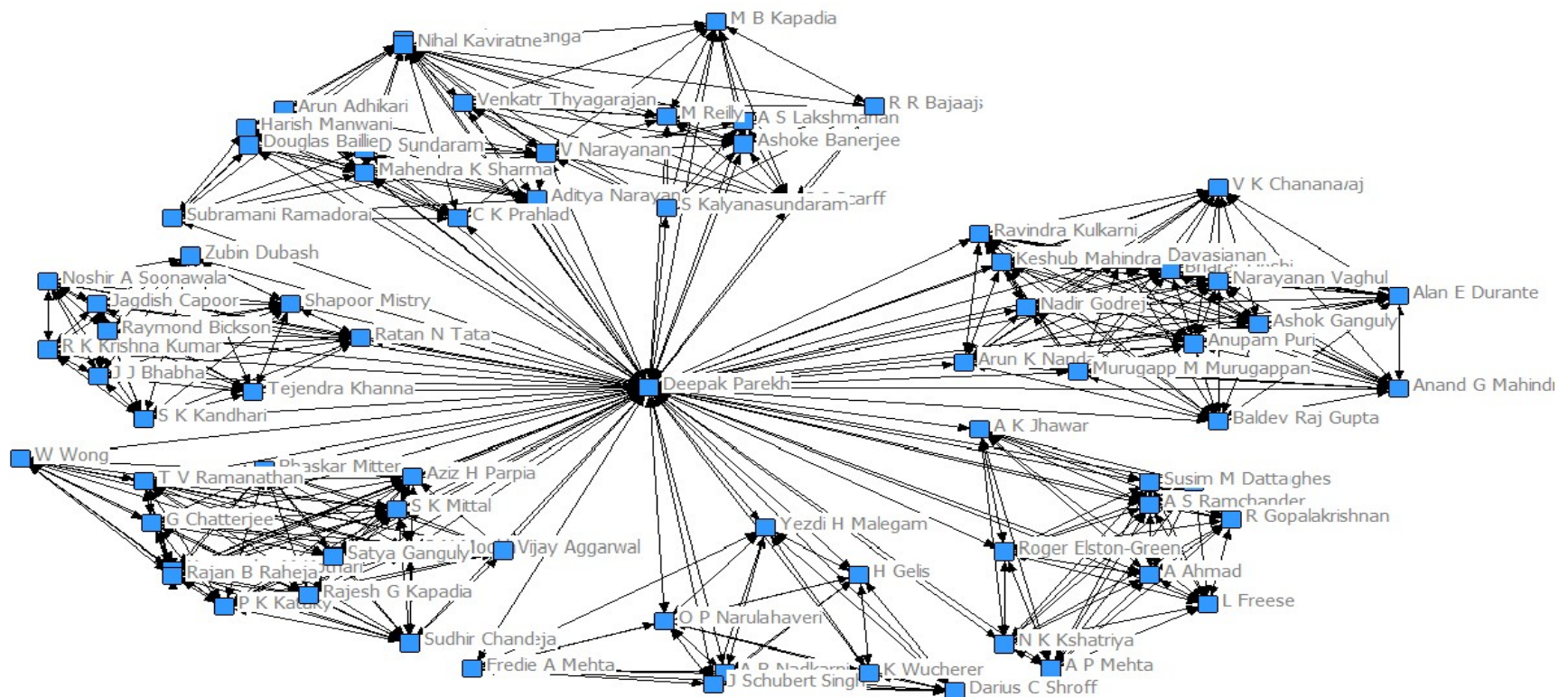
is a vertex in the network and an annual network includes all directors (firms) in each year. Two matrices are created to measure network centrality at director level and bidder level. The first matrix utilizes all board directors sourced from bidders and targets and the second matrix consists of all firms from the research sample. Each cell in each matrix has a value of either 1 or 0. The value of 1 indicates a connection and 0 indicates non-connection between directors (firms). Connections between two directors (firms) are established when these two directors are sitting on the same board in the same year (when two firms share one common director in the same year). Below are the illustrations of a director's and a bidder's networks based on the information extracted from the CG reports of the sample firms in 2005.

We use graph-theoretical measures, namely, *Degree*, *Closeness* as introduced in Proctor and Loomis (1951), Sabidussi (1966), respectively. These measures are basic dimensions of well-connectedness that are central to the social networks literature (Larcker et al. 2013). They reflect different aspects of network properties and have been used in recent finance studies such as Hochberg et al. (2007), Renneboog and Zhao (2011), Larcker et al. (2013), Liu (2014), Helmers et al. (2017); Chuluun et al. (2017). In particular, *Degree* centrality is a direct centrality

measure, while *Closeness* centrality represents an indirect centrality dimension.

Figure 3.1: Illustration of a director's professional network.

This figure depicts the director networks surrounding Deepak Parekh (the blue square in the middle of the graph). In this figure, each square stands for a vertex (director) in the network. Directors sitting on the same board establish links between them. The lines between squares are the links between vertices (directors).

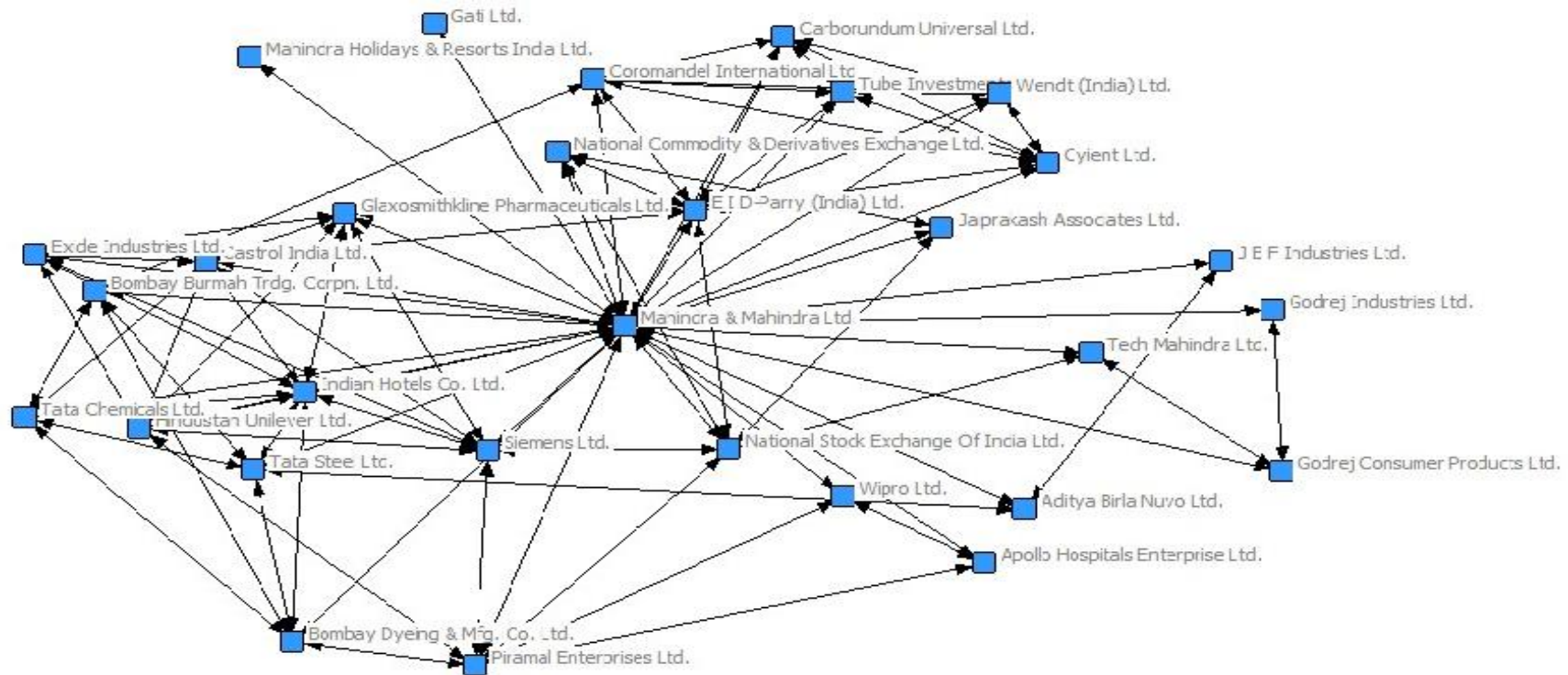


This figure depicts the director networks surrounding Deepak Parekh (the red circle in the middle of the graph), and seven companies (blue squares in the graph) in which he is a board member.



Figure 3.3: Illustration of a bidder's professional networks.

This figure depicts the company networks surrounding Mahindra & Mahindra Ltd. (the blue square in the middle of the graph). In this figure, each square stands for a vertex (company) in the network. Companies that share board members establish links between them. The lines between squares are the links between vertices (companies).



In order to differentiate and compare the network advantage of the entire company and the independent director, we construct network measures at both firm level (C) and independent director level (I). We describe each measure conceptually and how they are computed below.

Degree is the number of direct links held by an individual director (company). In our analysis, *Degree (C)* indicates the number of companies connected to bidders by common directors, and *Degree (I)* describes the number of directors connected to the bidder's independent directors. This network measure represents direct ability to collect information in the network.

Normalized Closeness (nCloseness) is defined by the following formula where $n-1$ represents the maximum possible direct ties that a vertex has, n is the number of vertices in the network, and the denominator is the sum of all geodesic paths from vertex v to any other vertex t :

$$C'_c(v) = \frac{100(n-1)}{\sum d_G(v,t)}$$

nCloseness (C) represents how close a bidder is to other firms in the network. *nCloseness (I)* indicates how close an independent director is to other directors in the network. A higher closeness value indicates shorter distance to all other vertices in

the network. This measure is defined over all connected vertices in the network (which means that all isolated vertices do not have a closeness measure) as in Renneboog and Zhao (2014).

In short, *Degree* centrality enumerates the number of first-degree links to outside companies (directors), while *Closeness* centrality represents how easily or quickly a company (director) can reach an outside company (director) through interlocking directorates.

3.3.5 Control variables

In addition to the main explanatory variables, a set of control variables relating to firm-specific economic, corporate governance, and deal characteristics was also used.

With regard to firm-specific controls, size of firm was proxied by the natural logarithm of total assets. Moeller et al. (2004) find that announcement returns for acquiring firm shareholders are around two percentage points higher for smaller acquiring companies. Firm age was proxied by number of years since incorporation. Moreover, following Renneboog and Zhao (2014), and Banerjee et al. (2014), debt/total assets, ROA, R&D/total assets, sales growth, cash/total assets are further included. Debt-to-total assets was proxied by sum of short-term

and long-term debt divided by total assets. ROA was proxied by profit before interest and taxed divided by total assets. R&D-to-total assets was proxied by research expenditure divided by total assets. Cash-to-total assets was proxied by cash and bank balances divided by total assets.

In terms of corporate governance controls, it is plausible that firms with good corporate governance are more likely to have board connections to other firms since their directors might be in greater demand from other firms. At the same time, these firms might be more likely to take better quality M&A deals (Cai and Sevilir 2012). To address this possibility, we include in the analysis measures of corporate governance quality of the acquirer including board tenure, board size, independent director ratio, directors with more than 3 directorships, CEO duality, foreign promoter ownership. In particular, board tenure (Vafeas 2003), was proxied by the average number of years directors have served on the board. Board size was proxied by the number of directors in a board. Yermack (1996) suggests that smaller boards of directors are more effective. Similarly, Weisbach (1988) and Rosenstein and Wyatt (1990) conclude that firms with greater ratio of independent directors perform better. CEO duality dummy variable takes a value of 1 if a bidder's CEO is also the chairman

of the board and to zero otherwise (Core et al. 1999). Also, there is evidence that ownership concentration impacts firm performance in Indian context (Sumon and Selarka 2012; Sarkar et al. 2008; Ghosh 2006). Thus, foreign promoter ownership variable was included in the analysis.

In examining acquisition performance, following previous literature (Morck et al. 1990; Moeller et al. 2004; Banerje et al. 2014), the study also controlled for common deal-specific characteristics. These include same industry, relative deal size, toehold, and same group. The existing work in the M&A literature has established that more focused acquisitions lead to greater acquirer announcement returns (Morck et al. 1990). Thus, same industry dummy variable, which takes a value of 1 if a bidder and a target are within the same 2-digit industry and to zero otherwise, was added. Relative deal size was proxied by the ratio of deal value to bidder's market value of equity, where the market value of equity is at the end of the fiscal year prior to the acquisition announcement date. Given the possibility that previous business relations might involve an equity investment by the acquirer in the target (Cai and Sevilir 2012), toehold indicator variable was added in the analysis. It takes on the value of 1 if the acquirer has an equity stake in the target before the deal

announcement, and zero otherwise. Same group dummy variable takes a value of 1 if the bidder and target belong to the same business group and to zero otherwise.

3.4 Results

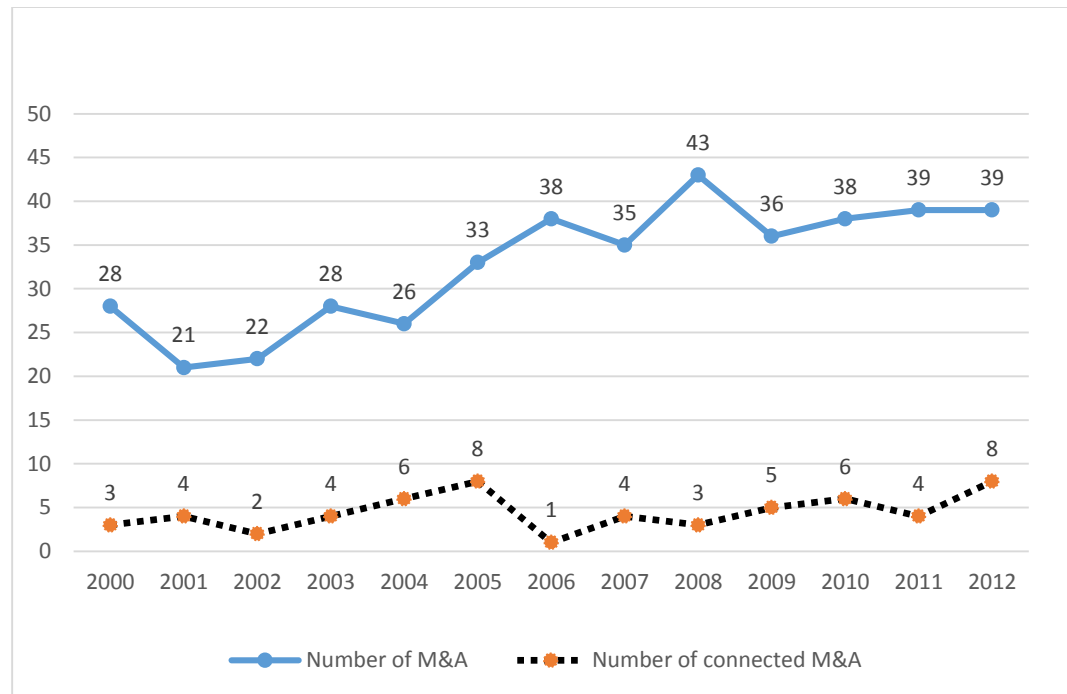
In this section, we provide descriptive statistics on M&A characteristics and bidder characteristics in Section 3.4.1. The results on market reaction to network measures around M&A announcements are presented in Section 3.4.2. Section 3.4.3 reports further robustness checks.

3.4.1 Descriptive statistics

Figure 3.4 shows the number of (connected) deals over the period 2000-2012.

Most takeover announcements in the sample size occur from 2005 onwards. On average, 14% of all acquisitions are connected. This ratio is much higher compared to the US takeover samples in Wu (2011) and Ishii and Xuan (2014) (6.38% and 10.60% respectively), and to the UK sample in Renneboog and Zhao (2014) (9.4%).

Figure 3.4: Distribution of M&As over the period 2000-2012



Source: Prowess, Thomson One.

Table 3.1 reports the characteristics of M&A deals, including the number of announcements per bidder, completion rate, the cumulative abnormal returns (CAR). Nearly half of the bidders (i.e. 48.15%) acquire more than one target (Panel A). The success rate of our M&A sample is 76.76%. Based on the shared directors between bidder and target, deals are classified into connected and not-connected ones (Panel B). The success rate is lower in connected deals (74.14% versus 77.17%).

In Panel C, we present bidders' CARs over three main windows, namely $(-1, +1)$, $(-5, +5)$, $(-10, +10)$. Contrary to the findings in developed countries (e.g. Jensen and Ruback 1983;

Andrade et al. 2001), bidders' CARs in our sample are positive in all three event windows. There is similar evidence reported in previous studies on the Indian market (Chakrabarti 2008; Zhu and Malhotra 2008; Ma et al. 2009; Dixit 2011; Jit Singh Mann and Kohli 2011). On average, connected deals have a substantially lower CAR than unconnected deals in all three event windows.

Table 3.1: M&A transaction characteristics.

This table presents M&A transaction characteristics. Panel A shows the number of M&A announcements per bidder. Panel B shows the completion rate by subsamples of connected and non-connected deals. Panel C reports the bidder announcement CARs for the event windows: $[-1,+1]$, $[-5,+5]$ and $[-10,+10]$. Day 0 is the announcement date. ***, **, * indicate that differences in mean between connected and not-connected deals are significant at 1%, 5%, and 10%, respectively. a, b, c indicate differences in median between connected and non-connected deals at 1%, 5%, and 10%, respectively using Mann-Whitney-Wilcoxon nonparametric test.

Panel A. Number of M&A announcements by bidder		
Deals per bidder	Number of bidders	Percentage
1	112	51.85%
2	47	21.76%
3	33	15.28%
4	13	6.02%
5	3	1.39%
6	4	1.85%
7	3	1.39%
9	1	0.46%
Total	216	100%

Panel B. M&A completion rate			
Group	Completed deals	Total M&A announcements	Success rate
All	327	426	76.76%
Connected	43	58	74.14%
Not-connected	284	368	77.17%

Panel C. Cumulative abnormal returns for the bidders					
		N	Mean	St.dev.	Median
CAR[-1, +1]	All	426	0.600	5.539	0.163
	Connected	58	-0.598*	4.867	-0.585 ^b
	Not-connected	368	0.789	5.621	0.248
CAR[-5, +5]	All	426	0.428	9.527	0.294
	Connected	58	-2.748***	10.114	-3.492 ^a
	Not-connected	368	0.928	9.347	0.807
CAR[-10, +10]	All	426	1.073	13.805	0.526
	Connected	58	-2.884**	13.729	-4.690 ^a
	Not-connected	368	1.697	13.732	1.156

Table 3.2: Bidder characteristics

This table provides statistics on the direct connections between bidders and targets, bidders' network centrality measures, and other bidder characteristics. Panel A shows the statistics on the direct connections bidders and targets. Panel B shows bidder's network centrality measures at company level. Panel C shows the statistics on bidder's network centrality measures at independent director level. Panel D presents director tenure. Panel E shows other bidder characteristics. All variable definitions are provided in Appendix B.

<i>Panel A. Direct connection between bidders and targets</i>								
	<i>N</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Min</i>	<i>25%</i>	<i>Median</i>	<i>75%</i>	<i>Max</i>
<i>Connected (C)</i>	426	0.136	0.343	0	0	0	0	1
<i>Continuity (C)</i>	58	3.453	2.418	1	1.860	3	4	10
<i>Panel B. Bidder's network centrality at company level</i>								
	<i>N</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Min</i>	<i>25%</i>	<i>Median</i>	<i>75%</i>	<i>Max</i>
<i>Degree (C)</i>	426	7.486	7.026	0	2	5	11	31
<i>nCloseness(C)</i>	426	0.264	0.111	0	0.241	0.292	0.333	0.429
<i>Panel C. Bidder's network centrality at independent director level</i>								
	<i>N</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Min</i>	<i>25%</i>	<i>Median</i>	<i>75%</i>	<i>Max</i>
<i>Degree (I)</i>	426	19.705	13.142	0	12	18	27	61
<i>nCloseness(I)</i>	426	0.215	0.093	0	0.203	0.243	0.275	0.339
<i>Panel D. Director tenure</i>								
	<i>N</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Min</i>	<i>25%</i>	<i>Median</i>	<i>75%</i>	<i>Max</i>
<i>Average tenure</i>								
<i>Board tenure</i>	426	4.270	2.141	1	2.560	4.185	5.780	10.500
<i>Ind. director tenure</i>	426	3.917	2.130	0	2	3.750	5.400	10.500
<i>Panel E. Other bidder characteristics</i>								
	<i>N</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Min</i>	<i>25%</i>	<i>Median</i>	<i>75%</i>	<i>Max</i>
<i>Total assets (INR m)</i>	426	57,067.130	204,407.300	144.500	6,312.100	14,165.700	39,363.400	2,500,000
<i>Cash/total assets</i>	426	0.019	0.053	0	0	0.001	0.009	0.361
<i>EBITDA/total assets</i>	426	0.164	0.083	0	0.110	0.150	0.200	0.460
<i>Debt/total assets</i>	426	0.241	0.171	0	0.095	0.247	0.360	0.657
<i>Ind.directors/board size</i>	426	0.514	0.133	0	0.440	0.500	0.580	0.940
<i>Board size</i>	426	11.009	3.438	4	9	10.500	13	22
<i>Ex. directors/board size</i>	426	0.261	0.126	0.063	0.143	0.250	0.350	0.833
<i>Foreign promoter own.</i>	426	0.086	0.190	0	0	0	0.008	0.800
<i>Same group</i>	426	0.495	0.501	0	0	0	1	1

Table 3.2 exhibits bidders' characteristics. Out of 58 connected deals, the number of years of continuous connection between bidders and targets before the M&A announcement date is, on average, 3.45 (Panel A). Panels B and C report bidder's centrality measures at company level and at independent director level. In detail, on average, bidder directors in our sample serve in eight other boards, compared to six in the UK as documented by Renneboog and Zhao (2014). The average number of directors connected to the bidder independent directors is 20. Panel E contains bidders' statistics on financial information and board characteristics.

3.4.2. Regression results

In this section, we provide the results on the impact of both continuous connections and network centrality on the acquirer's announcement CARs.

Direct and continuous connections and acquirer's announcement CARs

Table 3.3 reports the effects of direct and continuous connection between bidder and target on bidder's announcement CARs. We predict that bidder's announcement CARs increase with the level of direct and continuous connection between acquirer

and target. Model 1 shows that the market reacts negatively to deals where a bidder and a target are connected via shared board members. In detail, bidder's CARs is negatively related to the coefficient on Connected (C), controlling for firm characteristics.

This finding is different from other studies using US and UK data. In detail, using a sample of 1,664 completed US mergers and acquisitions between 1996 and 2008, Cai and Sevilir (2012) find that acquirer returns are higher in transactions where bidder and target share a common director. Meanwhile, Renneboog and Zhao (2014) do not find any evidence that the market acknowledges connections between bidders and targets as the announcement returns are not statistically different from those bidders and targets which are not connected.

In Model 2 (the base model), we observe that CARs decrease if bidder and target have been continuously connected before the announcement date. The coefficient on continuity of connection is negative and statistically significant. In Model 4, when further controlling for board characteristics and deal characteristics, we obtain the same results ($p\text{-value} = 0.011$). Considering a one standard deviation increases in the continuity of connection, we find that bidders' CARs decrease by 0.61%. Hence, we reject Hypothesis 1, and conclude that bidder's

announcement CARs decrease with the level of direct and continuous connection between acquirer and target. Put differently, outside investors express their concerns about the potential profitability of continuously connected deals via long-tenure shared directors.

The intuition behind the adverse reaction of the market to such deals is that the shared directors in continuously connected deals may reduce their effectiveness and independence over time. This possibly arises from the following reasons: First, inside management (promoters) in either bidders or targets are potentially more able to influence or sway the shared directors' opinions after a long period of interaction; Second, these shared directors may take actions in favour of one firm at the expense of the other due to their ties (through stock ownership and personal connections with colleagues) with the employer for whom they work longer. Thus, acquirer executives and directors are more likely to collude with target management to pursue personal gains (Wu 2011). Furthermore, these directors may become less active in performing their consulting roles over time. Additionally, personal relationship may hamper the shared director's judgement and lead to flawed decision-making (Ishii and Xuan 2014), which may be severe over time. As a result, the market

believes that these shared directors may be unable to provide consulting effectively and properly. This, in turn, may let strategic corporate decisions be taken with undue influence of the inside management. Given all abovementioned consequences of continuously connected deals, we observe an unfavourable reaction of outside investors to such deals.

Consistent with the previous research, in Table 3.3, we also find that bidders' CARs are negatively related to firm age (Bhaumik and Selarka 2012), and positively related to the following control variables: the ratio of independent directors (e.g. Byrd and Hickman 1992; Jackling and Johl 2009); and foreign promoter ownership (Khanna and Palepu 2000; Sarkar and Sarkar 2000; Bhaumik and Selarka 2012).

Table 3.3: Bidder's announcement CARs (-1, 1) and direct and continuous connection between bidder and target

This table presents results examining the impact of direct and continuous connection between bidder and target on bidder's announcement CARs (-1, 1). Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Connected (C)</i>	<i>Continuity (C)</i>	<i>Connected (C)</i>	<i>Continuity (C)</i>
<i>Network measures</i>	-1.4635*	-0.4131***	-1.6208**	-0.4120**
	(0.7581)	(0.1572)	(0.7655)	(0.1606)
<i>Firm size</i>	-0.1750	-0.1732	-0.0661	-0.0701
	(0.2379)	(0.2379)	(0.2835)	(0.2834)
<i>Firm age</i>	-0.0262**	-0.0268**	-0.0264**	-0.0275**
	(0.0111)	(0.0110)	(0.0119)	(0.0119)
<i>Board tenure</i>			-0.0454	-0.0046
			(0.2456)	(0.2463)
<i>Board size</i>			-0.7864	-0.7459
			(1.0219)	(1.0171)
<i>Independent directors (%)</i>			0.0387*	0.0391*
			(0.0218)	(0.0218)
<i>More than 3 directorships</i>			-0.0222*	-0.0228*
			(0.0127)	(0.0128)
<i>CEO duality</i>			-0.0441	-0.0127
			(0.7177)	(0.7158)
<i>Foreign promoter ownership</i>			0.0469***	0.0453***
			(0.0173)	(0.0173)
<i>Same industry</i>			0.5947	0.5607
			(0.6511)	(0.6522)
<i>Toehold</i>			0.8574	0.7646
			(0.5939)	(0.5918)
<i>Same group</i>			0.0570	0.0959
			(0.6264)	(0.6234)
<i>Constant</i>	2.2526	2.1131	1.2043	1.0349
	(2.6537)	(2.6591)	(3.1786)	(3.1869)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.1577	0.1611	0.1928	0.1944
<i>Breusch-Godfrey LM test</i>	0.42	0.51	0.59	0.68
<i>Breusch-Pagan/Cook Weisberg test</i>	0.15	0.17	0.19	0.20
<i>Number of observations</i>	426	426	426	426

Network centrality and the acquirer's announcement CARs

Tables 3.4-3.7 report the effect of bidder's network centrality on acquirer's announcement CARs. We hypothesize that the acquirer's announcement CARs in M&As increase with the level of its centrality in the network. However, we do not find sufficient evidence for Hypothesis 2, using network centrality measures at both company level and independent director level.

At the firm level (Table 3.4), the coefficients on Degree (C) and on nCloseness (C) are positive and insignificant in the base models (Models 1-2). As shown in Models 3-4, these two coefficients continue insignificantly positive, after we control for firm, board, and deal characteristics that could affect the occurrence of M&A transactions.

Similarly, at the independent director level (Table 3.5), the coefficients on Degree (I) and on nCloseness (I) are also insignificantly positive in the base Model. The same results are reported in Models 3-4, after our controlling for other factors that could impact the occurrence of M&A deals.

Table 3.4: Bidder's announcement CARs (-1, 1) and Bidder's centrality at firm level (OLS)

This table presents results examining the impact of bidder network centrality at firm level on bidder's announcement CARs (-1, 1), using OLS model. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Degree</i>	<i>nCloseness</i>	<i>Degree</i>	<i>nCloseness</i>
<i>Network measures</i>	<i>(C)</i>	<i>(C)</i>	<i>(C)</i>	<i>(C)</i>
<i>Network measures</i>	0.0160	2.4922	0.0419	3.5716
	(0.0451)	(2.9774)	(0.0508)	(3.0029)
<i>Firm size</i>	-0.2394	-0.2530	-0.2627	-0.2272
	(0.2539)	(0.2421)	(0.2830)	(0.2735)
<i>Firm age</i>	-0.0275**	-0.0288**	-0.0294**	-0.0288**
	(0.0123)	(0.0113)	(0.0133)	(0.0124)
<i>Board tenure</i>			-0.0789	-0.0902
			(0.2486)	(0.2473)
<i>Board size</i>			-0.9811	-1.1109
			(1.0292)	(1.0151)
<i>Independent directors (%)</i>			0.0417*	0.0419*
			(0.0218)	(0.0219)
<i>CEO duality</i>			-0.2434	-0.1726
			(0.7608)	(0.7197)
<i>Foreign promoter ownership</i>			0.0493***	0.0490***
			(0.0179)	(0.0179)
<i>Same industry</i>			0.7398	0.0000
			(0.6587)	(.)
<i>Toehold</i>			0.7047	0.6487
			(0.6005)	(0.5905)
<i>Same group</i>			-0.2714	-0.3164
			(0.6211)	(0.6132)
<i>Constant</i>	2.7829	2.3761	2.1475	1.4014
	(2.7348)	(2.6688)	(3.2848)	(3.1355)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.1507	0.1521	0.1797	0.1813
<i>Breusch-Godfrey LM test</i>	0.57	0.56	0.61	0.63
<i>Breusch-Pagan/Cook</i>				
<i>Weisberg test</i>	0.26	0.30	0.32	0.35
<i>Number of observations</i>	426	426	426	426

Table 3.5: Bidder's announcement CARs (-1, 1) and Bidder's centrality at independent director level (OLS).

This table presents results examining the impact of bidder network centrality at independent director level on bidder's announcement CARs (-1, 1), using OLS model. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Degree</i>	<i>nCloseness</i>	<i>Degree</i>	<i>nCloseness</i>
<i>Network measures</i>	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>
<i>Network measures</i>	0.0244	3.6651	0.0324	4.4165
	(0.0227)	(3.4583)	(0.0261)	(3.5014)
<i>Firm size</i>	-0.2655	-0.2526	-0.2484	-0.2172
	(0.2471)	(0.2430)	(0.2766)	(0.2734)
<i>Firm age</i>	-0.0292**	-0.0290**	-0.0289**	-0.0284**
	(0.0114)	(0.0112)	(0.0124)	(0.0123)
<i>Board tenure</i>			-0.0718	-0.0831
			(0.2494)	(0.2490)
<i>Board size</i>			-1.1930	-1.1153
			(1.0448)	(1.0153)
<i>Independent directors (%)</i>			0.0437**	0.0413*
			(0.0219)	(0.0219)
<i>CEO duality</i>			-0.2346	0.1433
			(0.7271)	(0.7131)
<i>Foreign promoter ownership</i>			0.0458**	0.0476***
			(0.0184)	(0.0180)
<i>Same industry</i>			0.7458	0.7474
			(0.6479)	(0.6439)
<i>Toehold</i>			0.7103	0.6745
			(0.6006)	(0.5951)
<i>Same group</i>			-0.2580	-0.3210
			(0.6125)	(0.6136)
<i>Constant</i>	2.8810	2.4434	2.2357	1.5592
	(2.6690)	(2.6429)	(3.2498)	(3.1381)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.1525	0.1530	0.1813	0.1817
<i>Number of observations</i>	426	426	426	426

In short, using the OLS model and controlling for other related factors that may independently affect bidder's CARs, we find no statistically significant relation between bidder's network centrality at firm level and independent director level and its announcement CARs.

One concern with our analysis is that there may exist the causality in the relation between bidder's network centrality and its CARs. To address this potential endogeneity issue, we apply a two-stage least squares instrumental variable regression (IV 2SLS).

In line with Renneboog and Zhao (2011), we use board size and percentage of independent directors as the instrumental variables for the centrality measures. In the first stage of the IV approach, we regress network centrality measures against the independent variables along with the two instrumental variables. We then use the predicted values from the first stage as regressors in the second stage along with the same independent variables used in the first stage excluding the instrumental variables. Results from the second stage of the estimation are reported in Tables 3.6 and 3.7, using the `ivreg2` command invoked with the `robust` option in Stata.

Table 3.6 reports the results at firm level. In the base models, (Models 1-2), we find an insignificant and negative relation between bidder's network centrality and its announcement CARs. As shown in Models 3-4, the coefficients on Degree (C) and nCloseness (C) remain negative after our controlling for other governance and deal characteristics.

Table 3.7 shows the results at independent director level. Consistent with the results reported for firm level, we also observe an insignificantly negative relation between bidder's network centrality at independent director level and its announcement CARs.

In terms of the validity of the instruments used in our IV 2SLS estimations, a number of tests were reported in Tables 3.6 and 3.7, including underidentification tests, weak identification test, and test of overidentifying restrictions (Wooldridge 2002). The results obtained from the tests reflect that the instruments used in our IV 2SLS are valid. The details of the tests are described below.

For all models in Tables 3.6 and 3.7, in the underidentification tests, we reject the null hypothesis that the equation is underidentified at *p-value* of 0.00.

To test for weak instruments, we conduct a test for the joint significance of the instruments in the first stage regression. As a rule of thumb, if the F statistic from this test is less than 10, we should be concerned that the instruments are weak. As shown in Tables 3.6 and 3.7, we have all F statistics greater than 10, thus we do not find evidence of a weak instrument problem.

In the tests of overidentifying restrictions, we cannot reject the null hypothesis that all instruments are valid in all models shown in Tables 3.6-3.7.

To sum up, we cannot find a significant relation between network centrality measured by Degree and Closeness at both firm level and independent director level and the CARs, using the OLS regressions and the IV 2SLS estimations.

The main focus of the market's attention is whether or not bidder and target are continuously connected via shared board member before the announcement date. It seems that deals conducted by either a well-connected bidder or a bidder with well-connected independent directors do not matter much to outside investors in India.

This finding is consistent with Renneboog and Zhao (2014) who find no relation between bidder's centrality and announcement CARs for UK firms. However, our finding differs from other research based on US data which reports a positive effect of board network on acquisition performance (Harris and Shimizu 2004; Cai and Sevilir 2012). Also, one consistent finding in all regressions reflecting the relation between each type of

connection and CARs is that the ratio of independent directors positively impacts CARs regardless of the models used.

Table 3.6: Bidder's announcement CARs (-1, 1) and Bidder's centrality at firm level (*IV 2SLS*).

This table presents results examining the impact of bidder network centrality at firm level on bidder's announcement CARs (-1, 1), using IV 2SLS estimation. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)
	<i>Degree</i>	<i>nCloseness</i>	<i>Degree</i>	<i>nCloseness</i>
	<i>(C)</i>	<i>(C)</i>	<i>(C)</i>	<i>(C)</i>
<i>Network measures</i>	-0.2157 (0.2076)	-11.5002 (11.7050)	-0.2275 (0.2243)	-12.2876 (11.1872)
<i>Firm size</i>	0.1981 (0.4715)	-0.0074 (0.3202)	0.2373 (0.5116)	-0.0050 (0.3067)
<i>Firm age</i>	-0.0031 (0.0240)	-0.0121 (0.0168)	-0.0023 (0.0260)	-0.0117 (0.0166)
<i>Board tenure</i>			-0.1155 (0.2414)	-0.0619 (0.2357)
<i>CEO duality</i>			-0.6290 (1.0931)	-0.0920 (0.7366)
<i>Foreign promoter ownership</i>			0.0404* (0.0163)	0.0412* (0.0162)
<i>Same industry</i>			0.2554 (0.6715)	0.3890 (0.6374)
<i>Toehold</i>			0.5648 (0.6102)	0.8143 (0.5717)
<i>Same group</i>			0.0788 (0.5977)	0.1382 (0.6136)
<i>Constant</i>	-0.9379 (4.3700)	3.2201 (2.6489)	-1.9308 (4.5467)	2.4882 (2.7776)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.1044	0.1020	0.1192	0.1161
<i>Number of observation</i>	426	426	426	426
<i>Underidentification test (p-value)</i>	0.0000	0.0000	0.0000	0.0000
<i>Weak identification test</i>	10.126	13.199	10.662	13.671
<i>Test of overidentifying restrictions (p-value)</i>	0.4596	0.4263	0.2444	0.2478

Table 3.7: Bidder's announcement CARs (-1, 1) and Bidder's centrality at independent-director level (*IV 2SLS*).

This table presents results examining the impact of bidder network centrality at independent director level on bidder's announcement CARs (-1, 1), using IV 2SLS estimation. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Degree</i>	<i>nCloseness</i>	<i>Degree</i>	<i>nCloseness</i>
	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>
<i>Network measures</i>	-0.0805 (0.0672)	-13.9458 (14.0494)	-0.1102 (0.0759)	-12.8164 (13.5993)
<i>Firm size</i>	-0.0237 (0.2913)	-0.0443 (0.2958)	0.0807 (0.3217)	-0.0606 (0.2878)
<i>Firm age</i>	-0.0148 (0.0138)	-0.0138 (0.0154)	-0.0112 (0.0152)	-0.0152 (0.0155)
<i>Board tenure</i>			-0.1343 (0.2390)	-0.0794 (0.2337)
<i>CEO duality</i>			-0.3222 (0.7793)	0.0454 (0.7019)
<i>Foreign promoter ownership</i>			0.0538** (0.0172)	0.0442** (0.0161)
<i>Same industry</i>			0.3627 (0.6262)	0.3910 (0.6469)
<i>Toehold</i>			0.5916 (0.5896)	0.7305 (0.5698)
<i>Same group</i>			-0.0862 (0.5782)	0.1132 (0.6120)
<i>Constant</i>	1.3563 (2.8466)	2.8423 (2.6361)	-0.1957 (3.0991)	1.9673 (2.7153)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.1142	0.0945	0.1195	0.1230
<i>Number of observation</i>	426	426	426	426
<i>Underidentification test (p-value)</i>	0.0000	0.0000	0.0000	0.0000
<i>Weak identification test</i>	35.81	13.035	22.632	12.598
<i>Test of overidentifying restrictions (p-value)</i>	0.7407	0.4377	0.189	0.1404

3.4.3. Other robustness checks

In this section, we conduct additional robustness checks for the relation between director networks and M&A announcement performance: First, we include extra variables of firm and deal characteristics. Second, we change event windows. Third, we

control for other unobservable firm characteristics of the acquirer in connected transactions. For the third check, we compare the connected and non-connected deals made by the same acquirer. Our sample size reduces significantly to 110 in this specification because we focus only on the deals made by acquirers that undertake at least one acquisition where they have a board connection to the target. Fourth, we estimate a fixed effects model to examine the impact of continuous connection between bidder and target on bidder's announcement CARs. Fifth, we also relate the analysis to the recent global financial crisis. In particular, we re-examine the impact of board connections on M&A performance for the periods before and after the crisis.

All of these robustness results are reported in Tables 3.8-3.12 below.

In Table 3.8, we re-estimate the regressions from Table 3.3 by including extra variables to further control for deal characteristics (i.e. relative deal size (Moeller et al. 2004)), and for bidder characteristics including ROA, cash-to-total assets, leverage, RD-to-total assets (Banerjee et al. 2014; Renneboog and Zhao 2014; Lamin 2013). The coefficient on continuity of connection is consistently negatively related to bidders' CARs with p-value less than 0.01 (Model 2). With one standard deviation

increase in the continuity of connection, bidders' CARs decrease by 0.81%. In model 4, when further controlling for governance and deal characteristics, we reach the same conclusion. The same results are obtained when we expanded the event windows to CARs (-5, 5) and CARs (-10, 10). At CAR (-5, +5), the coefficient on continuity of connection is significant and negatively associated with bidder's CARs ($\beta = -0.7696$, $p\text{-value} = 0.011$). At CAR (-10+10), the same relation holds ($\beta = -0.8584$, $p\text{-value} = 0.059$).

The negative and statistically significant relation between continuously connected deals and bidder's CARs continues to hold in Tables 3.9 and 3.10 with a sub-sample of 110 observations of bidders who have both connected and not-connected deals. The univariate tests in Table 3.9 again confirm that not-connected deals outperform connected deals. Put differently, acquirers obtain lower announcement returns from those acquisitions where they have a connection to the target, compared to the acquisitions where they have no connection to the target. The values of CARs at three event windows (-1, +1), (-5, +5), (-10, +10) are all higher for not-connected deals than for connected deals.

Table 3.8: Bidder's announcement CARs (-1, 1) and direct connections (*extra control variables*).

Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Connected</i> (C)	<i>Continuity</i> (C)	<i>Connected</i> (C)	<i>Continuity</i> (C)
<i>Network measures</i>	-2.0348** (0.8211)	-0.5046*** (0.1797)	-1.9826** (0.8195)	-0.4488** (0.1789)
<i>Firm size</i>	-0.3163 (0.2931)	-0.3209 (0.2937)	-0.1952 (0.3532)	-0.1829 (0.3531)
<i>Firm age</i>	-0.0143 (0.0123)	-0.0165 (0.0122)	-0.0122 (0.0131)	-0.0145 (0.0131)
<i>Relative deal size</i>	0.0228* (0.0121)	0.0221* (0.0120)	0.0199* (0.0120)	0.0192 (0.0119)
<i>ROA</i>	0.0127 (0.0476)	0.0097 (0.0481)	0.0144 (0.0466)	0.0105 (0.0475)
<i>Cash-to-total assets</i>	-0.1424 (0.1148)	-0.1525 (0.1148)	-0.1279 (0.1313)	-0.1330 (0.1317)
<i>Leverage</i>	0.0275 (0.0208)	0.0281 (0.0209)	0.0348 (0.0219)	0.0356 (0.0220)
<i>RD-to-total assets</i>	-0.2905 (0.4789)	-0.3063 (0.4827)	-0.1947 (0.4924)	-0.2188 (0.4977)
<i>Board tenure</i>			-0.1777 (0.2908)	-0.1346 (0.2919)
<i>Board size</i>			-1.4154 (1.1205)	-1.4035 (1.1155)
<i>Independent director (%)</i>			0.0256* (0.0232)	0.0258* (0.0232)
<i>More than 3 directorships</i>			-0.0159 (0.0157)	-0.0179 (0.0158)
<i>CEO duality dummy</i>			-0.0857 (0.7826)	-0.0470 (0.7773)
<i>Foreign promoter ownership</i>			0.0285* (0.0173)	0.0270 (0.0174)
<i>Same industry</i>			0.7663 (0.7502)	0.7264 (0.7493)
<i>Toehold</i>			1.1571* (0.6724)	0.9899 (0.6743)
<i>Same group</i>			-0.3287 (0.6737)	-0.3481 (0.6686)
<i>Constant</i>	1.4822 (3.3955)	1.3277 (3.3815)	2.1765 (3.9046)	1.9970 (3.9109)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.2241	0.2253	0.2557	0.2538
<i>Number of observations</i>	314	314	314	314

As shown in Model 4 (Table 3.10), bidder's announcement CARs decrease with the level of direct and continuous connection between bidder and target ($\beta = -0.6217$; $p\text{-value} = 0.027$). All of these findings imply that it is the board connection between the acquirer and the target which leads to lower acquirer returns as opposed to some unobservable characteristics of the connected bidders.

Table 3.9: CARs for bidders with both connected and not-connected deals.

This table presents the announcement CARs $[-1,+1]$, $[-5,+5]$ and $[-10,+10]$ of bidders who have both connected and not-connected deals. Day 0 is the announcement date. ***, **, * indicate that differences in mean between connected and not-connected deals are significant at 1%, 5%, and 10%, respectively. a, b, c indicate differences in median between connected and non-connected deals at 1%, 5%, and 10%, respectively using Mann-Whitney-Wilcoxon nonparametric test.

		<i>N</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Median</i>
<i>CAR</i> $[-1,+1]$	All	110	0.464	5.712	0.352
	Connected	42	-0.696*	4.391	-0.173 ^c
	Not-connected	68	1.181	6.318	0.884
<i>CAR</i> $[-5,+5]$	All	110	-1.664	9.167	-1.405
	Connected	42	-3.962**	9.813	-3.493 ^b
	Not-connected	68	-0.244	8.512	0.089
<i>CAR</i> $[-10,+10]$	All	110	-1.521	12.963	-0.884
	Connected	42	-4.082*	12.550	-4.965 ^b
	Not-connected	68	0.061	13.051	0.544

Table 3.10: Bidder's announcement CARs (-1, 1) and direct connections (*sub-sample*).

This table shows the impact of the continuous connection between bidder and target on bidder's CAR (-1, +1). Bidders are those who have both connected and not-connected deals. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Connected</i> (C)	<i>Continuity</i> (C)	<i>Connected</i> (C)	<i>Continuity</i> (C)
<i>Network measures</i>	-1.9213*	-0.5374*	-2.5357*	-0.6217**
	(1.2623)	(0.2843)	(1.4173)	(0.2752)
<i>Firm size</i>	0.9988	1.0402	0.5426	0.6639
	(0.8788)	(0.8864)	(1.1593)	(1.1615)
<i>Firm age</i>	-0.0420	-0.0405	-0.0562*	-0.0593**
	(0.0305)	(0.0297)	(0.0296)	(0.0292)
<i>Board tenure</i>			0.7176	0.9115
			(0.8426)	(0.8731)
<i>Board size</i>			1.2486	0.9483
			(5.1551)	(5.1436)
<i>Independent directors (%)</i>			0.0078	0.0033
			(0.0637)	(0.0649)
<i>More than 3 directorships</i>			0.0314	0.0283
			(0.0530)	(0.0527)
<i>CEO duality</i>			-2.4791	-1.7432
			(2.5627)	(2.5668)
<i>Foreign promoter ownership</i>			0.0948*	0.0937*
			(0.0536)	(0.0537)
<i>Same industry</i>			1.4331	1.1474
			(1.6704)	(1.6755)
<i>Toehold</i>			4.6353**	4.4584**
			(1.6119)	(1.5752)
<i>Same group</i>			-1.2771	-1.4423
			(1.4428)	(1.4495)
<i>Constant</i>	-4.5636	-5.8638	-9.3878	-10.0643
	(8.8550)	(8.8057)	(11.6942)	(11.7389)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.3735	0.3764	0.5096	0.5087
<i>Number of observations</i>	110	110	108	108

In Table 3.11, we re-examine the impact of the continuous connection between bidder and target on bidder's CAR (-1, +1) from Table 3.3, using fixed effects model instead of the OLS model. In model 1, the coefficient on continuity of connection is negatively related to bidder's CARs. In model 2, when further controlling for governance and deal characteristics, we reach the same conclusion with p-value less than 0.05. In model 3, we include extra variables to further control for deal characteristics and for bidder characteristics including relative deal size, ROA, cash-to-total assets, leverage, RD-to-total assets (Banerjee et al. 2014; Renneboog and Zhao 2014; Lamin 2013). The coefficient on continuity of connection is also negatively related to bidders' CARs with p-value less than 0.1 (Model 3).

In short, we reach the same conclusion when examining the relationship between the continuity of connection between bidder and target and bidder's CARs using either the OLS model in Table 3.3 or the fixed effects model in Table 3.11.

Table 3.11: Bidder's announcement CARs (-1, 1) and continuous connections (*using fixed effects model*)

This table shows the impact of the continuous connection between bidder and target on bidder's CAR (-1, +1), using fixed effects model. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)
<i>Continuity (C)</i>	-0.6791** (0.3446)	-0.6554** (0.3329)	-0.6301* (0.3858)
<i>Firm size</i>	0.6287 (0.8480)	0.4562 (0.9941)	0.0383 (1.3372)
<i>Firm age</i>	0.0439 (0.1574)	-0.1569 (0.2636)	0.5445 (0.4435)
<i>Relative deal size</i>			0.0317 (0.0221)
<i>ROA</i>			0.0882 (0.0845)
<i>Cash-to-total assets</i>			-0.2209 (0.1731)
<i>Leverage</i>			0.1514** (0.0654)
<i>RD-to-total assets</i>			0.6204 (1.0209)
<i>Board tenure</i>		0.2999 (0.6354)	-0.5139 (0.7824)
<i>Board size</i>		-1.6978 (2.2970)	-5.8033** (2.9206)
<i>Independent director (%)</i>		0.0189 (0.0358)	0.0031 (0.0407)
<i>More than 3 directorships</i>		-0.0101 (0.0374)	-0.0073 (0.0474)
<i>CEO duality dummy</i>		-2.8640* (1.3970)	-4.9890*** (1.4657)
<i>Foreign promoter ownership</i>		0.3271*** (0.0859)	0.1810** (0.0909)
<i>Same industry</i>		0.3499 (1.2001)	1.3468 (1.6507)
<i>Toehold</i>		1.3759 (0.9950)	0.6602 (1.2325)
<i>Same group</i>		-0.2636 (1.0868)	-0.0733 (1.2216)
<i>Constant</i>	-8.1298 (7.8109)	-0.8511 (10.3182)	-14.4091 (15.2329)
<i>Year fixed effects</i>	Yes	Yes	Yes
<i>R-square</i>	0.1398	0.2026	0.2913
<i>Number of observations</i>	426	426	314

Table 3.12: Bidder's announcement CARs (-1, 1) and direct and continuous connection between bidder and target (*before and after global financial crisis*).

This table shows the impact of the direct and continuous connection between bidder and target on bidder's CAR (-1, +1) before and after financial crisis. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	2000-2007				2008-2012			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Connected</i>	<i>Continuity</i>	<i>Connected</i>	<i>Continuity</i>	<i>Connected</i>	<i>Continuity</i>	<i>Connected</i>	<i>Continuity</i>
	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)
<i>Network measures</i>	-2.9090** (1.1378)	-1.1316*** (0.3749)	-3.2006*** (1.0955)	-1.1612*** (0.3367)	-0.4226* (1.2741)	-0.2993** (0.2002)	-0.8006* (1.3223)	-0.3686* (0.2175)
<i>Firm size</i>	-0.0536 (0.3661)	-0.1067 (0.3696)	0.0542 (0.4808)	0.0331 (0.4789)	-0.3256 (0.3591)	-0.2690 (0.3518)	-0.1869 (0.3960)	-0.1726 (0.3922)
<i>Firm age</i>	-0.0138 (0.0160)	-0.0136 (0.0158)	-0.0102 (0.0169)	-0.0100 (0.0168)	-0.0342* (0.0186)	-0.0362* (0.0186)	-0.0452** (0.0207)	-0.0490** (0.0208)
<i>Board tenure</i>			-0.0339 (0.4559)	-0.0580 (0.4558)			0.1680 (0.3745)	0.2329 (0.3780)
<i>Board size</i>			-1.7255 (1.4888)	-1.7771 (1.4709)			-0.5432 (1.5765)	-0.2871 (1.5622)
<i>Independent directors (%)</i>			0.0432* (0.0314)	0.0405* (0.0318)			0.0138* (0.0448)	0.0116 (0.0448)
<i>More than 3 directorships</i>			-0.0262 (0.0221)	-0.0284 (0.0220)			-0.0237 (0.0180)	-0.0243 (0.0181)
<i>CEO duality</i>			-0.0524 (1.0986)	-0.1145 (1.0835)			0.3250 (1.1216)	0.2097 (1.1330)
<i>Foreign promoter ownership</i>			0.0512** (0.0266)	0.0475** (0.0266)			0.0418* (0.0243)	0.0415* (0.0243)
<i>Same industry</i>			0.0042 (1.0479)	0.0130 (1.0546)			1.2105 (1.0511)	1.1683 (1.0590)
<i>Toehold</i>			1.6428 (0.9770)	1.5053 (0.9626)			0.2375 (0.7962)	0.1885 (0.7822)
<i>Same group</i>			-0.8514 (1.0875)	-0.7195 (1.0659)			1.2861 (0.9376)	1.4436 (0.9403)
<i>Constant</i>	1.2333 (3.6630)	1.3148 (3.6747)	2.5270 (4.7322)	2.7468 (4.7403)	1.2564 (4.2719)	0.7354 (4.2607)	1.5176 (5.1554)	0.4391 (5.1485)
<i>Year and industry fixed effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>R-square</i>	0.2292	0.2391	0.2829	0.2891	0.2142	0.2219	0.2560	0.2656
<i>Number of observations</i>	231	231	231	231	195	195	195	195

In Table 3.12, we re-estimate the regressions from Table 3.3 using deals from 2000 to 2007 for Models 1-4 and deals from 2008 to 2012 for Models 5-8. The results from Table 3.12 show that the magnitude and the levels of significance of the coefficients on *Connected C* and *Continuity C* are larger for the 2000-2007 period when compared to the 2008-2012 period in our sample. However, both periods reflect that board connections negatively impact bidder's announcement CARs (Models 1-8)

To sum up, our results so far suggest that direct and continuous connections between bidder and target lead to lower announcement returns for acquirers, whereas no significant relation between bidder's network centrality and its CARs is acknowledged.

3.5 Conclusions

In this chapter, we examine how the continuity of the connection between bidder and target impacts bidding firms at the deal announcement date. We also figure out whether bidder's network centrality at firm level and at independent director level matters to outside investors when M&A deals are announced.

Our analysis involves M&A transactions of the top 450 non-financial Indian firms during the period 2000-2012. The results

suggest that the market adversely reacts to continuously connected deals as indicated by lower abnormal returns for bidding firms around the announcement periods. The findings are robust to adding more control variables, changing event windows and using a sub-sample including only bidders who have both connected and not-connected deals. Meanwhile, the attitudes of outside investors towards deals in which bidders and independent directors are well-connected are not entirely clear at announcement periods. Both OLS and IV 2SLS estimations report a statistically insignificant relation between bidders' network centrality at the firm level and independent director level and bidders' CARs.

The findings in our study have both theoretical and practical implications. With regard to theoretical implications, our study sheds light on the possibility that director quality (i.e. the level of independence and the effectiveness of participation in corporate decisions) may reduce over time if directors serve as a link between bidders and targets for a long time. Thus, our results support the management friendliness hypothesis (Vafeas 2003), which argues that seasoned directors are more likely to befriend and less likely to monitor managers, especially when CEOs have the power to influence the director nomination process.

This issue deserves a closer look especially in emerging markets where exist intensely powerful inside management, acting as controlling shareholders and holding key positions on corporate boards. India is a perfect example to illustrate the power of inside management. According to Sarkar and Sarkar (2012), in the top 500 Indian listed companies, two out of every five companies had a promoter as a board member in 2003, whereas by 2008, this ratio is three out of every five. The proportion of companies having promoters as outside directors increased from 26% in 2003 to 33% in 2008, and the ratio of companies with promoters as inside directors increased from 32% in 2003 to 47% in 2008. In 2008, 95% of the top 500 Indian corporate boards have promoters acting as chairman or managing director.

In family business group firms, the concern is that managers may act for the controlling family, but not for shareholders in general (Morck and Yeung 2003) (Type II- Agency Problems). The finding that the ratio of independent directors is positively related to bidder's CARs again reflects the notion that independent directors are expected to protect shareholders' rights in the country where ubiquitous family business groups exist.

Regarding practical implications, there are a number of issues that should be addressed as follows: First, our finding about

the negative impact of continuously connected deals is a reminder that more due diligence on targets should be conducted before making a decision on this type of deal. In other words, connections should not be regarded as substitutes for a thorough investigation in terms of the compatibility and potential synergy between two companies after a merger takes place. More importantly, additional attention should be given to the issue of effectiveness of shared directors between bidder and target over time. Third, the positive impact of independent directors on bidder's returns around the time of the M&A announcement reflects that the market does take into account the role of these directors regarding corporate strategic decisions, and has acknowledged the recent effort of the Indian government in strengthening board independence (i.e. Clause 49). These results again confirm the more significant role of independent directors in countries with weaker legal protection for shareholders as opposed to countries with strong shareholder protection (Dahya et al. 2008). As a result, on the part of Indian companies, to have more favourable assessments from outside investors, they should tightly comply with the requirement on independent directors' ratio in the boardroom as specified in Clause 49. Currently, there are still a number of firms that have not yet obeyed this rule. In

particular, despite an improvement in the compliance ratio compared to the period 2003-2004, the level of non-compliance among Indian firms is around 12% in 2008 (Sarkar and Sarkar 2012).

Given the obvious impact of long-term shared directors between bidder and target on M&A transactions, future research should examine the influence of such directors on other corporate strategic decisions. Moreover, this study mainly focuses on the network centrality of independent directors and its influence on M&A deals. Further research should thus be conducted to analyse if there is any difference in the effect of non-independent directors' and independent directors' network centrality on specific strategic decisions and on firm performance in general.

4. Director networks and long-term performance of mergers and acquisitions.

This chapter focuses on the impact of two types of director networks on post-merger performance. The first type of connection involves the bidder and target sharing at least one board member. The second type of connection refers to the bidder's network centrality. The major research question addressed is whether these connections impact the post-M&A performance of bidding firms. Using a sample of 214 non-overlapping and completed deals, we find that the first type of connection worsens post-merger performance. We do not find a significant relationship between the second type of connection and the post-M&A performance.

4.1 Introduction

Boards of directors are considered as monitoring devices in firms. They can ratify and supervise the most important corporate issues and make decisions related to hiring, firing and compensating top managers (Fama and Jensen 1983b). Additionally, they have an advising role (Mace 1979) as to corporate strategic investment activities.

A few recent studies have analysed the role of board connections and networks in mergers and acquisitions (M&A). These studies, mainly based on US data, have addressed the intra-firm ties between the CEO and the board members of a given firm (e.g. Schmidt 2015; Fracassi and Tate 2012)¹⁴, and inter-firm social ties from current and past employment, education, and other activities (e.g. Fracassi 2017; Fang et al. 2018; Ishii and Xuan 2014)¹⁵.

Very little attention, however, has been paid to current and direct professional connections (i.e. the acquirer and the target must have a board connection at the time of the acquisition announcement). Specifically, Cai and Sevilir (2012) find that announcement returns tend to be higher for acquirers in

¹⁴ Schmidt (2015) examines the costs and benefits of internal ties between the CEO and board members of a firm, and finds that more friendly boards are associated with higher announcement returns for bidder with greater advisory needs. Fracassi and Tate (2012) conclude that firms with more CEO-director ties engage in more value-destroying acquisitions, and suggest that network ties with CEO weaken the intensity of board monitoring.

¹⁵ Using biographical information about executives and directors of US public companies, Fracassi (2017) find that more connections two companies share with each other, more similar their capital investments are. Fang et al. (2018) find CEOs with strong connections to people of different demographic backgrounds and skill sets create high firm value, and this greater firm value comes from successful M&As and better corporate innovations. Ishii and Xuan (2014) conclude that social ties between the acquirer and the target lead to poorer decision making and lower value creation for shareholder.

transactions where the acquirer and the target share a common director. Meanwhile, Renneboog and Zhao (2014) find that the market does not take these connections into account when they evaluate M&A transactions. Neither study examines the potential impact of continuous connections among bidders and targets via the shared directors. In addition, the literature on inter-firm connections mainly concentrates on the role of the firm's CEO, but overlooks the influence of independent directors' network on M&A performance.

Another striking feature of the existing literature on professional connections is the almost exclusive focus on the short-term (i.e. at the M&A announcement date) performance results, whilst paying scant attention to the relationship between such connections and the post-merger performance of the bidding firm.

The lack of attention on subsequent performance represents a significant gap in the literature given that the market reaction at the time of the announcement may well not provide an accurate assessment of the post-merger performance. Addressing this gap is a key aim of this study. More interestingly, this study is conducted in Indian context whose governance mechanism and

institutional framework are significantly different from those of developed markets (details in Section 2.1.2).

In this chapter, by focusing on board networks, we measure the impact of direct and continuous connections between bidder and target on the bidder's post-M&A performance. We also test whether there is a relation between bidder's network centrality and its post-deal performance. The network centrality is measured at both the firm level and independent director level.

Given the unfavourable reaction of the market to connected deals (details in Chapter 3), we hypothesize that bidders with continuously connected deals perform worse after a merger than those with non-connected deals, and that bidder's network centrality will negatively impact its post-merger performance.

To test these hypotheses, a sample of non-overlapping¹⁶ and completed M&A transactions of the top 450 non-financial Indian firms during the period 2000-2012 was constructed.

Our results suggest that bidder's post-merger performance decreases with the level of direct and continuous connection between acquirer and target via shared board members. We reach

¹⁶ If a bidder makes acquisitions within three years of a previous acquisition, the cases were considered "overlapping", otherwise, events are considered "non-overlapping" cases.

the same conclusion when a shared board member is an independent director. Thus, these findings help to explain why the market reacts negatively to continuously connected deals at the announcement date. Meanwhile, we cannot find a significant relation between bidder's network centrality and its post-deal performance.

Our research builds on and contributes to three main strands of literature. First, it is related to a growing literature on the role of networks in financial contexts and, more broadly, on the influence of individual directors through cross-firm connections on corporate strategic decisions.

In addition to professional networks, this research is related to the mergers and acquisitions literature. Specifically, it examines the relationship between the bidder and the target in general and the professional relation between them in particular and its impact on merger outcomes, which has been less explored in the literature. To the best of our knowledge, our research is the first study that investigates the direct and continuous links between directors at the bidder and the target firms and their implications for both short-term and long-term merger outcomes. More interestingly, this is done in an emerging market with a

different institutional background as opposed to that of developed markets (details in Section 2.1.2).

Furthermore, this study is related to the literature on board of directors, an interesting aspect of corporate governance. It focuses on shared board members among firms. Most importantly, it examines the effectiveness (or otherwise) of these shared directors over time, which has not been addressed in the literature.

The remainder of this chapter is organized as follows. Section 4.2 provides an overview of the relevant literature and presents the hypotheses; Section 4.3 describes the sample, methodology and variables; Section 4.4 presents the empirical results and robustness checks; and Section 4.5 concludes the study.

4.2 Literature review and hypothesis development

In the short-term, the market reacts negatively to deals performed by bidders that share at least one director with their target at the announcement date. Meanwhile, it does not take bidders' network centrality into account when evaluating transactions (details in Section 3.4.2)

To examine how bidders with connected deals perform

compared to those without such deals, and to check if bidder's network centrality matters to the post-M&A performance of bidding firms, we formulate our hypotheses on the relation between post-M&A operating performance and these two distinct types of director networks.

Direct and continuous connections and post-M&A performance

If the market makes accurate predictions about the deteriorating effect of networks on M&A performance, then we may expect a negative association between those networks and the post-M&A performance of bidding firms. There is evidence that directors themselves become less active in performing their consulting roles over time. For instance, Vafeas (2003) finds that high-tenure boards experience relatively low committee participation. If they remain on the job for too long, directors can become entrenched and reduce firm performance (Hermalin and Weisbach 1991). A positive association between board tenure and corporate debt cost has also been documented (Anderson et al. 2004).

When these seasoned directors simultaneously serve on the boards of both bidder and target, they are more likely to befriend

and less likely to monitor managers of the related parties. As a result, the agency problems associated with acquisitions could be exacerbated. For instance, the shared directors may compromise with management to carry out M&A transactions regardless of any incompatibility between the bidder and target and of there being no synergy value from the deal. Such compromise may become more severe over time.

Additionally, based on trust via shared directors, bidder may allocate insufficient resources toward collecting information about their target or interpret information on targets in a biased way. This can result in flawed decision-making such as not resisting unfavourable bids hard enough or overpaying targets (Ishii and Xuan 2014). This is likely to be reflected by the poor post-merger performance of the bidding firms and of the combined entities.

These long-term shared directors may not think as critically as new members due to decreasing effectiveness and increasing compromise over time in both bidder and target. This leads to our first testable hypothesis:

Hypothesis 1a: The acquirer's post-M&A performance decreases with the level of direct and continuous connections between acquirer and target.

However, the market may also make incorrect predictions about the effect of networks on post-merger performance because of the following reasons:

Direct connections between bidders and targets via shared directors may provide related parties with informational advantages. For instance, Cai and Sevilir (2012) document that when at least one director sits on the board of both the bidder and target of an M&A deal, the bidder pays a lower acquisition premium, and at the same time experiences higher announcement returns. They attribute this result to the private information collected by the connected bidder via the shared directors. In a similar vein, Renneboog and Zhao (2014) show that the informational advantage could enhance trust between the related parties, leading to a higher probability of M&A deals being completed.

Moreover, a long-term director engagement in both bidder and target is related to greater experience, commitment, competence and greater monitoring (Buchanan 1974; Salancik 1977; Vance 1983). This will probably impact M&A transactions positively. More specifically, there are multiple processes involved in an M&A transaction, such as due diligence, negotiation, and integration, all of which are dynamic and involve learning (March

1991; Shimizu et al. 2004). The more the acquiring firm learns about the target firm, the better the acquisition performance will be (Ahammad and Glaister 2013). To facilitate the decision-making process in an M&A deal, prior understanding of related parties, if any, can of course be very helpful. Through long-term interaction between both companies, shared directors are expected to understand clearly each party involved. All of these will help improve bidder's post-merger performance. This leads to our first alternative hypothesis:

Hypothesis 1b: The acquirer's post-M&A performance increases with the level of direct and continuous connections between acquirer and target.

Bidder's network centrality and post-M&A performance

There are conflicting arguments on the relationship between bidder's network centrality and firm performance.

The first strand of literature suggests that widely connected directors inversely impact corporate performance as well as exacerbate agency problems (Ferris et al. 2003). More specifically, at the firm level, bidders may be linked with other companies through cross-directorships of their directors. Such a large

network may lead to a reduction of director effort and attention as well as the spread of bad practices and information (Larcker and Tayan 2010). Information overload faced by highly-connected directors can have a negative effect on firm performance (Omer et al. 2012).

At the independent director level, the listing agreement requirement regarding the independent director ratio combined with the shortage of industrial leadership with adequate experience lead to a high number of outside directorships per independent director in India. For instance, among India's top 500 firms, the proportion of independent directors with three or more directorships was around 65% and the average number of directorships per independent director was 5.19 for group affiliates (Sarkar and Sarkar 2009). In contrast, the mean board seats for outside independent directors of US companies range from 1.6 to 3 (Ferris et al. 2003; Fich and Shivdasani 2006).

The growing evidence on the ineffectiveness of well-connected directors on corporate performance found in developed markets and also in India has recently raised questions about whether such well-connected directors are able to fulfil their duty of monitoring and advising on corporate activities. More specifically, a large body of empirical work in the US and UK

confirms that widely-connected directors do not have enough time to perform monitoring and advising roles, which badly affects a firm's market value and exacerbates agency problems (Ferris et al. 2003). For instance, firms with well-connected directors experience a decline in value and performance (Fich and Shivdasani 2006; Jiraporn et al. 2008; Cashman et al. 2012); higher CEO compensation (Renneboog and Zhao 2011); lower sensitivity of CEO turnover to corporate performance (Devos et al. 2009); and lower levels of attendance at board meetings (Jiraporn et al. 2009).

A negative impact of board networks has also been reported in M&A events (Ahn et al. 2010; Ishii and Xuan 2014). As a result, the market tends to react positively to the resignation of this type of director (Bar-Hava et al. 2013), whilst responding negatively to firms in which directors receive their third (or greater) independent directorship appointment (Masulis and Mobbs 2011).

In India, recent empirical studies have linked director networks to higher earnings management (Sarkar et al. 2008) and worse firm performance (Jackling and Johl 2009). These studies (which have not yet focused on M&As) use the number of outside directorships of board members to measure the impact of multiple

directorships and firm performance within a one-year period (Ghosh 2006; Sarkar et al. 2008; Jackling and Johl 2009).

Overall, if networks distract directors from performing their roles and reduce their effectiveness, then we should expect to see poorer post-merger performance of well-connected Indian bidders. This leads to our second testable hypothesis:

Hypothesis 2a: The acquirer's post-M&A performance decreases with its network centrality.

Another strand of literature suggests that the presence of outside directors on the board helps to improve firm performance and reduces agency problems.

More specifically, in the context of the high proportion of group affiliates in Indian corporations, directors' networks via board memberships in different companies inside and outside each group are expected to become a vital link between the firm and the necessary resources (such as advice, information, commitment and legitimacy) needed to maximize corporate performance (Pfeffer and Salancik 1978). In other words, consistent with the resource dependency theory, this network may benefit corporate performance in India.

Furthermore, if the bidder has a well-connected independent board, and is hence better informed, the bidder's inside management may be less likely to succumb to building empires through M&As at the expense of value creation. Evidence supporting this hypothesis has been documented for the US by Cai and Sevilir (2010).

In India, it is quite common to observe intensely powerful inside management, acting as controlling shareholders and holding key positions on corporate boards. For instance, in the top 500 Indian listed companies in 2008, three out of every five companies had a promoter as a board member. The ratio of companies with promoters as inside directors increased from 32% in 2003 to 47% in 2008. 95% of the top 500 Indian corporate boards have promoters acting as chairman or managing director (Sarkar and Sarkar 2012). As a result, the presence of such better informed independent directors on Indian boards is remarkably important to protect shareholders' interests.

If the market is aware that its interests will be protected by such a better informed independent board, and hence is persuaded that the bidder is unlikely to waste resources through an unsuccessful takeover, it will react positively to such a deal. This leads to our second alternative hypothesis:

Hypothesis 2b: The acquirer's post-M&A performance increases with its network centrality.

4.3 Sample and methodology

4.3.1 Data sources and sample

From the sample covering M&A deals between 2000-2014 by the top 450 non-financial firms sourced from the BSE 500 and the CNX 500, we chose only non-overlapping and completed deals to examine the impact of board networks on post-M&A performance. If a bidder makes acquisitions within a period of three years of a previous acquisition, the cases were considered “overlapping”; otherwise, events are referred to as “non-overlapping” cases (Andre et al. 2004; Dutta and Jog 2009). This reduced the sample size to 214 deals.

The data on M&A characteristics, firm-level characteristics, networks and corporate governance are manually collected from the same sources as in Chapter 3 (Section 3.3.1).

4.3.2 Methodology

To test the hypotheses, the following model was estimated:

$$y_i = \alpha + \beta * \text{NetworkMeasure}_i + \sum \gamma * \text{ControlVariables}_i \\ + \sum \text{industry}_k + \sum \text{year}_t + \varepsilon_i$$

The dependent variable y_i is the bidder's performance-adjusted ROA and industry-adjusted ROA. ROA is measured by EBITDA-to-total assets. NetworkMeasure_i captures two different types of connection: direct and continuous connection between bidder and target; indirect connection between bidder and target (i.e. network centrality of bidder). $\text{ControlVariables}_i$ contains a set of variables on firm characteristics, board characteristics and deal characteristics. We take a log of firm size, firm age, board tenure, board size. In another robustness check, instead of taking a log, we standardize variables. Definitions of all variables are presented in Appendix B and explained in Sections 3.3.4 and 3.3.5 (Chapter 3). In addition, a set of industry and year dummies was included to control for potential systematic differences in industry and time. All variables are winsorized at the 1st and 99th percentiles and measured in constant price with 2005 as the base year.

A sample of non-overlapping and completed deals was used for the analysis of the impact of director networks on post-merger performance because it is often difficult to disentangle the influences of overlapping acquisitions (Megginson et al. 2004). Moreover, the cross-sectional dependence problem (e.g. when return calculations involve overlapping periods or there is severe industry clustering) may arise due to the overlapping acquisitions

events by the same firms (Lyon et al. 1999). This problem in sample observations can lead to misspecified test statistics (Brav 2000).

Thus, if an acquisition occurs within three years of a previously included acquisition by the same firm, we remove the later observation (Andre et al. 2004). No look-ahead bias is present in this restriction (Loughran and Vijh 1997).

Regarding the potential endogeneity arising from the relation between two types of board connections and post-M&A performance, we take a similar approach to that explained in Section 3.3.2. Accordingly, we examine factors that may independently influence M&A outcome (Cai and Sevilir 2012), and apply an instrumental variable approach with board size and percentage of independent directors as the instrumental variables for the centrality measures at both firm level and independent director level (Renneboog and Zhao 2011).

4.3.3 Dependent variable

We compare the operating performance of our sample firms to two benchmarks to control for factors beyond the merger transactions that may influence performance. First, to control for possible mean reversion resulting from abnormal pre-event

performance, we compare the operating performance of the sample firms to that of a sample of firms in a similar industry with similar pre-event performance (i.e. performance-adjusted measure). Second, to control for changing industry and economy-wide conditions, we compute an industry-adjusted performance metric by comparing the operating performance of the sample firms to the median operating performance of firms in the same three-digit industry (i.e. industry-adjusted measures).

In particular, for performance-adjusted measures, following Heron and Lie (2002), to create the sample of matching firms with similar operating performance, we first identify all firms with the same two-digit industry. Among these firms, we choose those with an operating performance within $\pm 10\%$ or within ± 0.01 of the performance of the sample firm in the year preceding the completion of the M&A. Among firms that meet these criteria, we choose the firm whose performance is closest to that of the original sample firm. These criteria yield matching firms for about 97% of our sample firms. If no firms satisfy these criteria, we repeat the process for firms with the same one-digit industry, which yields matching firms for approximately 3% of our sample firms. This benchmark is documented to be superior to that based solely on industry (Barber and Lyon 1996).

Following Healy et al. (1992), for each year and firm, industry-adjusted measures are calculated by subtracting the industry median from the sample firm value. Also, the data for sample firms are not included when calculating the industry median.

4.3.4 Independent variables

As in Chapter 3 (Section 3.3.4), two types of connections are examined as follows: the continuity of connection and bidder's network centrality. For network centrality, Degree (C) and nCloseness (C) are used at the firm level. Meanwhile, Degree (I) and nCloseness (I) are used at the independent director level. In addition, two alternative measures for network centrality at the independent director level are constructed: Degree (IX) and nCloseness (IX). Degree (IX) is the sum of the degree value of all independent directors in a bidder board divided by board size. nCloseness (IX) is the weighted average of an individual independent director's nCloseness (I), and the weight is the number of connections of each independent director. These alternative measures take into account the effect of different board sizes on the calculation of network centrality measures.

4.3.5 Control variables

In addition to the main explanatory variables, a set of control variables relating to firm-specific economic, corporate governance, and deal characteristics was also used. In detail, in our analysis, we control for firm size (Moeller et al. 2004); firm age; board tenure, board size, independent director ratio, directors with more than three directorships, CEO duality, toehold (Byrd and Hickman 1992; Core et al. 1999; Vafeas 2003; Cai and Sevilir 2012), foreign promoter ownership (Khanna and Palepu 2000; Sarkar and Sarkar 2000; Douma et al. 2006; Bhaumik and Selarka 2012); whether target and bidder are in the same industry (Morck et al. 1990); and whether target and bidder are in the same group.

Definitions and explanation of these variables are clearly described in Chapter 3 (Section 3.3.5)

4.4 Results

In this section, we provide univariate analysis of bidder's operating performance in Section 4.4.1. The results reflecting the impact of network measures on bidder's operating performance are presented in Section 4.4.2. Section 4.4.3 reports further robustness checks.

4.4.1 Univariate analysis of bidder's operating performance

Table 4.1 shows that the trends in the levels of operating performance are quite similar across different measures of performance. Among three measures (i.e. unadjusted ROA, industry adjusted ROA, and performance adjusted ROA), bidders have significantly higher levels of operating performance than their counterparts in the same industry in the year leading up to the acquisition. The superior operating performance continues following the acquisitions.

Following Barber and Lyon (1996), the conclusions and analyses in this chapter are based on the median measure, because non-parametric tests are found to be uniformly more powerful than parametric tests in studies of operating performance.

More specifically, bidders outperform their industry medians by margins that are significantly at the 1% level in year one, year two and year three after mergers. Our results further suggest that the difference in operating performance between bidders and their control firms ranges from +0.008 in year one to +0.011 in year three.

Most importantly, in our sample, bidders with non-

connected deals outperform those with connected deals across all measures of performance. Also, the difference in performance between these two types of deals becomes distinct after mergers. For instance, in year 1, the industry-adjusted ROA for connected and non-connected deals are 0.020 and 0.06, respectively. Similarly, the performance-adjusted ROA for connected and non-connected deals are -0.018 and 0.017, respectively. All of these figures differ from zero at the 0.01 significance level.

Table 4.1: Post-M&A performance.

This table reports three measures of median operating performance of bidder firms: unadjusted ROA, industry-adjusted ROA, and performance-adjusted ROA. ROA is measured by EBITDA-to-total assets. Year 0 is the completion year. Industry-adjusted ROA is the paired difference between ROA of the sample firms and the median figure for firms with the same three-digit industry. Performance-adjusted ROA is the paired differences between the ROA of the sample firms and the ROA of their respective performance matched control firms. a, b, c indicate differences in median between connected and non-connected deals at 0.01, 0.05 and 0.1 levels respectively. ***, **, * indicate that differences in mean between connected and non-connected deals are significant at the 0.01, 0.05 and 0.1 levels, respectively using Wilcoxon Mann-Whitney test.

	Median					Mean				
	-1	0	1	2	3	-1	0	1	2	3
<i>Unadjusted ROA</i>	0.147	0.151	0.14	0.142	0.141	0.163	0.164	0.160	0.152	0.151
<i>Unadjusted ROA for Connected (C) =1</i>	0.135	0.121 ^c	0.114 ^b	0.127 ^b	0.107	0.141	0.138*	0.132**	0.128*	0.138
<i>Unadjusted ROA for Connected (C) =0</i>	0.151	0.153	0.144	0.146	0.148	0.167	0.169	0.164	0.156	0.154
<i>Industry adjusted ROA</i>	0.054	0.057	0.047	0.048	0.043	0.068	0.071	0.069	0.060	0.059
<i>Industry adjusted ROA for Connected (C) =1</i>	0.041	0.039 ^b	0.020 ^a	0.022 ^b	0.029	0.048	0.045**	0.037***	0.034**	0.048
<i>Industry adjusted ROA for Connected (C) =0</i>	0.054	0.057	0.06	0.051	0.046	0.072	0.076	0.074	0.065	0.061
<i>Performance adjusted ROA</i>	-0.004	0.007	0.008	0.009	0.011	0.000	0.019	0.013	0.017	0.023
<i>Performance adjusted ROA for Connected (C) =1</i>	-0.04	0.000 ^c	-0.018 ^a	0.002	0.01	-0.061	-0.017**	-0.049***	0.002	0.023
<i>Performance adjusted ROA for Connected (C) =0</i>	0.002	0.012	0.017	0.013	0.012	0.011	0.025	0.023	0.020	0.026
<i>Number of observations</i>	214	214	214	214	214	214	214	214	214	214

In short, bidder firms in our sample outperform their control firms matched on industry and pre-event performance following acquisition. Also, bidders with non-connected deals have better performance than those with connected deals after mergers.

4.4.2 Regression results

In this section, we provide the results on the impact of both continuous connections and network centrality on the acquirer's post-merger performance.

Before performing multivariate regression analysis, Pearson correlation coefficients were calculated between the independent variables to ensure the validity of the regression results. Table 4.2 displays the resulting correlation matrix, which indicated no severe multicollinearity. We also compute the variance inflation factors (VIFs) for each regression.

As a rule of thumb, a variance whose VIF values are greater than ten may merit further investigation (Hair et al. 2009). Our VIF values are less than three together with the low correlation coefficients among independent variables in the Correlation matrix indicated that multicollinearity actually does not pose a problem to our results. We also formally check if there is any evidence of heteroscedasticity in the data. Using Breusch-Pagan/Cook-

Weisberg test for the null hypothesis that the variance of the residuals is homogenous, we find no evidence for heteroskedasticity in our data (*p-values* greater than 0.30).

Table 4.2: Correlations

This table shows Pearson correlation coefficients between the independent variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	VIF
1 Continuity	1																	1.37
2 Connected	0.81	1																1.40
3 Degree (C)	-0.01	0.03	1															2.14
4 nCloseness (C)	0	0.05	0.71	1														1.91
5 Degree (I)	0.01	0.06	0.83	0.79	1													2.08
6 nCloseness (I)	0	0.04	0.65	0.94	0.82	1												1.88
7 Firm size	0.1	0.12	0.35	0.2	0.26	0.19	1											2.19
8 Firm age	-0.01	0	0.38	0.28	0.3	0.22	0.16	1										1.96
9 Board tenure	0.14	0.04	0.03	0.03	0.05	0.1	0.23	0.13	1									2.33
10 Board size	0.06	0.1	0.39	0.34	0.43	0.32	0.41	0.3	-0.02	1								1.76
11 Independent directors	0.04	0.02	0	-0.02	-0.09	0.03	0.09	0.02	0.17	-0.11	1							1.56
12 > 3 directorships	-0.01	0.03	0.28	0.32	0.22	0.29	0.17	0.04	0.02	0.02	0.04	1						1.55
13 CEO duality	-0.1	-0.12	-0.21	-0.11	-0.14	-0.06	0.02	-0.08	0.1	-0.04	0.13	0.02	1					1.44
14 For. promoter own.	0	0.02	0.09	0.11	0.26	0.14	-0.03	0.08	-0.01	0.01	-0.3	-0.21	-0.11	1				1.61
15 Same industry	0.03	0.08	-0.04	-0.11	-0.04	-0.1	0.03	-0.06	-0.07	0	-0.06	-0.02	0.03	0.06	1			1.54
16 Toehold	0.06	0.15	0.03	0.03	0.01	0.06	0.13	-0.02	0.11	-0.01	0.07	0.08	0.06	-0.08	0.09	1		1.44
17 Same group	0.11	0.16	0.11	0.17	0.09	0.16	0.23	0.04	0.11	0.05	0.13	0.29	0.05	-0.14	0.11	0.07	1	1.52

Direct and continuous connections and acquirer's post-merger performance

Table 4.3 reports the effects of direct and continuous connection between bidder and target on bidder's post-M&A performance. Model 2 shows that bidder's post-merger performance is negatively related to the coefficient on Connected (C). Similarly, in Model 4, we observe that bidder's post-M&A performance decreases in continuously connected deals. The coefficient on continuity of connection is negative and statistically significant. In Model 8, when further controlling for board characteristics and deal characteristics, we obtain the same results ($p\text{-value} = 0.019$). Considering a one standard deviation increase in the continuity of connection, we find that bidders' post-merger performance decreases by 2.79%. Hence, we support Hypothesis 1a, and conclude that bidder's post-merger performance decreases with the level of direct and continuous connection between acquirer and target via shared board member.

Table 4.3: Bidder's post-M&A performance and direct connections (*via shared board members*).

This table presents results examining the impact of direct and continuous connection via shared director between bidder and target on bidder's post-M&A performance one year after merger (i.e. performance-adjusted ROA). Observations are drawn from bidder's non-overlapping and completed deals. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Connected	Connected	Continuity	Continuity	Connected	Connected	Continuity	Continuity
	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)
<i>Network measures</i>	-6.4865**	-7.1180**	-1.4223**	-1.5527**	-6.7849**	-8.1981***	-1.5058**	-1.8283**
	(2.6124)	(2.8802)	(0.5940)	(0.7608)	(2.6695)	(2.8485)	(0.6228)	(0.7694)
<i>Firm size</i>	-0.2310	-0.3295	-0.2620	-0.3342	-0.3781	-0.3169	-0.3518	-0.1974
	(0.7503)	(0.8564)	(0.7535)	(0.8587)	(0.8692)	(0.9965)	(0.8707)	(1.0042)
<i>Firm age</i>	0.0411	-0.8115	0.0643	-0.9508	-0.8019	-2.0084	-0.8908	-2.3841
	(1.3179)	(1.4568)	(1.3265)	(1.4533)	(1.4271)	(1.6133)	(1.4367)	(1.6177)
<i>Board tenure</i>					0.8293	0.6777	1.0323	1.0038
					(0.7651)	(1.0834)	(0.7533)	(1.0607)
<i>Board size</i>					3.4735	3.9880	3.3182	3.8403
					(3.7253)	(3.9333)	(3.7206)	(3.9556)
<i>Independent directors (%)</i>					0.0354	0.0313	0.0384	0.0409
					(0.0777)	(0.0788)	(0.0767)	(0.0775)
<i>More than 3 directorships</i>					-0.0591	-0.0643	-0.0629	-0.0711*
					(0.0409)	(0.0428)	(0.0412)	(0.0426)
<i>CEO duality</i>					-0.8218	-0.9055	-0.8579	-0.9637
					(2.3650)	(2.6327)	(2.3339)	(2.6130)
<i>Foreign promoter ownership</i>					0.1073*	0.1248**	0.1025*	0.1167**
					(0.0573)	(0.0561)	(0.0577)	(0.0557)
<i>Same industry</i>					-0.5392	-0.0376	-0.6567	-0.1013
					(2.0364)	(2.1988)	(2.0505)	(2.2043)
<i>Toehold</i>					2.5906	3.1399	2.1280	2.4786
					(2.1356)	(2.0533)	(2.1254)	(2.0608)
<i>Same group</i>					0.0290	0.4305	-0.2605	0.0791
					(2.1119)	(2.1292)	(2.1075)	(2.1674)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	No	Yes	No	Yes	No	Yes	No	Yes
<i>R-square</i>	0.0733	0.3153	0.0717	0.3133	0.1235	0.3681	0.1229	0.3666
<i>Number of observations</i>	214	214	214	214	214	214	214	214
<i>Mean VIF</i>	2.01	1.92	2.00	1.91	2.13	2.13	2.13	2.13
<i>Breusch-Pagan / Cook-Weisberg test</i>	0.32	0.39	0.35	0.40	0.50	0.37	0.48	0.38

We reach the same conclusion when a shared board member is an independent director (Table 4.4).

These results are supportive of our earlier finding that the transactions with a direct connection between bidder and target are associated with lower value creation measured by bidder's abnormal return around the announcement date. Our result is consistent with the finding of Ishii and Xuan (2014) based on the US mergers. Focusing on educational background and employment history as the basis of the social networks, they find that higher social connections between the acquirer and the target at the time of the acquisition are associated with a slightly bigger drop in return on assets (raw or industry-adjusted).

In Tables 4.3 and 4.4, we also find that bidder's post-M&A performance is positively related to foreign promoter ownership (Khanna and Palepu 2000; Sarkar and Sarkar 2000; Bhaumik and Selarka 2012).

Table 4.4: Bidder's post-M&A performance and direct connections (via shared independent directors).

This table presents results examining the impact of direct and continuous connection via shared independent director between bidder and target on bidder's post-M&A performance one year after merger (i.e. performance-adjusted EBITDA-to-total assets). Observations are drawn from bidder's non-overlapping and completed deals (i.e. if a bidder makes acquisitions within 3 years of a previous acquisition, the cases are considered "overlapping", otherwise, events are considered "non-overlapping" cases to prevent confounding effect. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Connected</i>	<i>Continuity</i>	<i>Connected</i>	<i>Continuity</i>
	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>
<i>Network measures</i>	-7.2982*	-3.2356*	-8.3966**	-3.8246**
	(3.7492)	(1.7281)	(4.0774)	(1.8154)
<i>Firm size</i>	-0.4259	-0.4775	-0.3892	-0.4631
	(0.8506)	(0.8444)	(0.9860)	(0.9852)
<i>Firm age</i>	-0.9556	-0.9529	-2.0159	-2.0854
	(1.4459)	(1.4460)	(1.6576)	(1.6681)
<i>Board tenure</i>			0.5089	0.5647
			(1.1231)	(1.1208)
<i>Board size</i>			3.6722	3.8793
			(4.0040)	(4.0010)
<i>Independent directors (%)</i>			0.0216	0.0232
			(0.0787)	(0.0784)
<i>More than 3 directorships</i>			-0.0614	-0.0575
			(0.0441)	(0.0438)
<i>CEO duality</i>			-0.0397	-0.0739
			(2.6254)	(2.5905)
<i>Foreign promoter ownership</i>			0.1236**	0.1300**
			(0.0564)	(0.0564)
<i>Same industry</i>			-0.3298	-0.3747
			(2.2369)	(2.2288)
<i>Toehold</i>			3.4498	3.2525
			(2.1422)	(2.1206)
<i>Same group</i>			-0.2777	-0.3397
			(2.1973)	(2.1867)
<i>Constant</i>	5.5867	6.1004	1.5712	1.9058
	(11.0952)	(11.0604)	(11.7489)	(11.6697)
<i>Year and industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.3028	0.3034	0.3530	0.3551
<i>Number of observations</i>	214	214	214	214
<i>Mean VIF</i>	1.91	1.91	2.13	2.13
<i>Breusch-Pagan / Cook-Weisberg test</i>	0.28	0.29	0.40	0.39

Network centrality and the acquirer's post-M&A performance

In Table 4.5, using a standard pooled OLS regression, we show that there is no statistically significant relation between bidder's network centrality at firm level and independent director level and post-M&A performance in our data.

We observe the same results, using a two-stage least squares instrumental variable regression (IV 2SLS). In detail, in Table 4.6, the second stage estimates of network centrality variables are presented (for brevity we do not tabulate the estimates for the additional regressors). Bidder's network centrality measures at both company level (Models 1-2) and independent director level (Models 3-4) are positively, albeit insignificantly, related to post-M&A performance.

Table 4.5: Bidder's post-M&A performance and Bidder's centrality at firm level and independent director level (*OLS*).

This table presents results examining the impact of bidder network centrality at firm level and independent director level on bidder's post-M&A performance one year after merger (i.e. performance-adjusted EBITDA-to-total assets), **using OLS estimation**. A set of firm-specific economic, corporate governance and deal controls (i.e. firm size, firm age, board tenure, board size, independent directors (%), CEO duality, foreign promoter ownership, same industry, toehold, same group) were included but are not reported for simplicity. Observations are drawn from bidder's non-overlapping and completed deals. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

Performance - adjusted ROA (+1)						
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Network centrality at firm level						
Degree (C)	-0.0590					
	(0.1934)					
nCloseness (C)		-2.7318				
		(8.1394)				
Panel B: Network centrality at independent director level						
Degree (I)			-0.1072			
			(0.0874)			
nCloseness (I)				-1.7595		
				(9.6610)		
Panel C: Alternative measures for network centrality at independent director level						
Degree (IX)					-0.1284	
					(0.1297)	
nCloseness (IX)						2.9839
						(9.4218)
Number of observations	214	214	214	214	214	214
R-square	0.330	0.330	0.335	0.330	0.333	0.330
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year and industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 4.6: Bidder's post-M&A performance and Bidder's centrality at firm level and independent director level (*IV 2SLS*).

This table presents results examining the impact of bidder network centrality at firm level and independent director level on bidder's post-M&A performance one year after merger (i.e. performance-adjusted EBITDA-to-total assets), **using IV 2SLS estimation**. A set of firm-specific economic, corporate governance and deal controls (i.e. firm size, firm age, board tenure, CEO duality, foreign promoter ownership, same industry, toehold, same group) were included but are not reported for simplicity. Observations are drawn from bidder's non-overlapping and completed deals. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. Variable definitions are provided in Appendix B.

Performance - adjusted ROA (+1)						
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Network centrality at firm level						
Degree (C)	0.8288					
	(0.9185)					
nCloseness (C)		44.5300				
		(45.9809)				
Panel B: Network centrality at independent director level						
Degree (I)			0.2803			
			(0.2888)			
nCloseness (I)				46.5087		
				(53.5808)		
Panel C: Alternative measures for network centrality at independent director level						
Degree (IX)					0.0961	
					(0.5172)	
nCloseness (IX)						51.0825
						(55.9291)
Number of observations	214	214	214	214	214	214
R-square	0.240	0.235	0.269	0.258	0.321	0.255
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year and industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
K-P LM statistic	8.233	10.294	17.689	9.305	8.698	8.475
(p-value)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Hansen J statistic	0.173	0.063	0.072	0.293	1.072	0.206
(p-value)	(0.68)	(0.80)	(0.79)	(0.59)	(0.30)	(0.65)

Using alternative measures for centrality at independent director level (i.e. Degree (IX) and nCloseness (IX)), we obtained the same findings (Models 5-6).

The Kleibergen-Paap LM statistic tests the null hypothesis that the model is underidentified, the test statistics are significant at the one percent level indicating that models are not

underidentified. In the last row, the Hasen J statistic tests the null hypothesis that the overidentification restrictions are valid. For Models (1)-(6), the J statistic p-values are above 0.30, indicating that the null cannot be rejected and that the instruments are appropriate and well identified in each model.

To sum up, we cannot find a significant relation between bidders' network centrality and their post-merger performance.

4.4.3 Other robustness checks

In this section, we conduct additional robustness checks for the relation between director networks and bidder's post-merger performance: First, we include extra variables of firm and deal characteristics. Second, we use alternative measures of post-merger performance (i.e. industry-adjusted ROA). Third, we control for other unobservable firm characteristics of the acquirer in connected transactions. For the third check, focusing only on completed and non-overlapping deals, we compare the post-merger performance of connected and non-connected deals made by the same acquirer. All of the robustness results are reported in Tables 4.7-4.11 below.

In Table 4.7, we re-estimate the regressions from Table 4.3 by including extra variables to further control for deal

characteristics (i.e. relative deal size (Moeller et al. 2004)), and for bidder characteristics including cash-to-total assets, leverage, RD-to-total assets (Banerjee et al. 2014; Renneboog and Zhao 2014; Lamin 2013). The coefficient on continuity of connection is consistently negatively related to bidders' post-merger performance (Model 2). In model 4, when further controlling for governance and deal characteristics, we reach the same conclusion. Considering a one standard deviation increase in the continuity of connection, we find that bidders' post-merger performance decreases by 3.08% ($p\text{-value} = 0.029$).

In Table 4.7, we also find that bidder's post-M&A performance is negatively related to relative deal size (Banerjee et al. 2014), and positively related to cash-to-total assets; foreign promoter ownership (Khanna and Palepu 2000; Sarkar and Sarkar 2000; Bhaumik and Selarka 2012). Other control variables are insignificant. Compared to other related studies in Indian context (Banerjee et al. 2014, Bhaumik and Selarka 2011), most of these variables are also not significant. In another robustness check, instead taking a log, we standardize variables and obtain the same results as in Table 4.4 (reported in Table 4.12, Appendix D)

Table 4.7: Bidder's post-M&A performance and direct connections (*more control variables*).

This table presents results examining the impact of direct and continuous connection between bidder and target on bidder's operating performance one year after mergers. Post-M&A performance is measured by performance-adjusted EBITDA-to-total assets. To prevent confounding effects, observations are drawn from bidder's non-overlapping and completed deals. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
Network measures	<i>Connected</i> (C)	<i>Continuity</i> (C)	<i>Connected</i> (C)	<i>Continuity</i> (C)
<i>Network measures</i>	-7.6934** (3.2833)	-1.3805* (0.8469)	-9.1522*** (3.3139)	-1.7955** (0.8119)
<i>Firm size</i>	-1.0880 (0.9978)	-1.1237 (1.0106)	-0.9739 (1.0857)	-0.7320 (1.1003)
<i>Firm age</i>	1.1700 (1.5955)	0.8500 (1.6136)	-1.4956 (1.6747)	-2.0257 (1.6873)
<i>Relative deal size</i>	-0.1100* (0.0640)	-0.1142* (0.0638)	-0.1420** (0.0619)	-0.1429** (0.0616)
<i>Cash-to-total assets</i>	0.4946* (0.2724)	0.4732* (0.2822)	0.7332** (0.2941)	0.7465** (0.2993)
<i>Leverage</i>	-0.0257 (0.0820)	-0.0354 (0.0825)	-0.0774 (0.0783)	-0.0673 (0.0779)
<i>RD-to-total assets</i>	-0.0688 (1.6729)	-0.2340 (1.6908)	0.2328 (1.5916)	-0.1322 (1.5774)
<i>Board tenure</i>			2.0219* (1.1198)	2.3895 (1.0524)
<i>Board size</i>			1.8178 (4.0329)	1.4937 (4.0547)
<i>Independent director (%)</i>			0.0039 (0.0783)	0.0117 (0.0742)
<i>More than 3 directorships</i>			-0.0857* (0.0497)	-0.0992* (0.0529)
<i>CEO duality</i>			-2.3477 (2.7101)	-2.0727 (2.7210)
<i>Foreign promoter ownership</i>			0.2271*** (0.0768)	0.2109*** (0.0793)
<i>Same industry</i>			-0.7921 (2.2911)	-1.0142 (2.2811)
<i>Toehold</i>			2.6606 (2.3782)	2.0147 (2.3579)
<i>Same group</i>			-0.7898 (2.7115)	-1.4095 (2.7265)
<i>Constant</i>	8.2060 (12.8423)	7.9023 (12.7600)	7.6876 (14.3165)	7.9308 (14.2906)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.4632	0.4531	0.5646	0.5576
<i>Number of observations</i>	160	160	160	160

Table 4.8: Bidder's post-M&A performance and direct connections (*alternative measure for operating performance*).

This table presents results examining the impact of direct and continuous connection between bidder and target on bidder's operating performance one year after mergers. Post-M&A performance is measured by industry-adjusted EBITDA-to-total assets. To prevent confounding effects, observations are drawn from bidder's non-overlapping and completed deals. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Connected</i>	<i>Connected</i>	<i>Continuity</i>	<i>Continuity</i>
	<i>(C)</i>	<i>(C)</i>	<i>(C)</i>	<i>(C)</i>
<i>Network measures</i>	-3.1807**	-3.1366*	-0.7914**	-0.8965*
	(1.4065)	(1.6626)	(0.3853)	(0.4782)
<i>Firm size</i>	-0.5602	-0.5270	-0.5431	-0.4623
	(0.5582)	(0.6869)	(0.5550)	(0.6906)
<i>Firm age</i>	0.4717	0.1225	0.4178	-0.1052
	(0.8331)	(1.0194)	(0.8340)	(1.0453)
<i>Board tenure</i>	0.7837	0.9404	0.8930*	1.1246
	(0.5133)	(0.8561)	(0.5038)	(0.8664)
<i>Board size</i>	1.7672	1.5081	1.7027	1.5558
	(2.2277)	(2.0898)	(2.1839)	(2.0392)
<i>Independent directors (%)</i>	0.0299	0.0186	0.0290	0.0140
	(0.0503)	(0.0471)	(0.0501)	(0.0476)
<i>More than 3 directorships</i>	-0.0205	-0.0081	-0.0221	-0.0115
	(0.0313)	(0.0317)	(0.0311)	(0.0309)
<i>CEO duality</i>	-0.7663	-0.4249	-0.7343	-0.5911
	(1.4643)	(1.4956)	(1.4395)	(1.4639)
<i>Foreign promoter ownership</i>	0.0585*	0.0702*	0.0562*	0.0665*
	(0.0350)	(0.0385)	(0.0351)	(0.0383)
<i>Same industry</i>	0.9920	0.5550	0.9822	0.6498
	(1.1244)	(1.3936)	(1.1216)	(1.4011)
<i>Toehold</i>	2.8657*	2.9625*	2.5107*	2.5276*
	(1.3909)	(1.4420)	(1.3531)	(1.4264)
<i>Same group</i>	-1.0971	-1.4086	-1.2017	-1.4435
	(1.4982)	(1.4251)	(1.4853)	(1.4279)
<i>Constant</i>	1.1744	-0.8724	0.8297	-1.2320
	(6.6643)	(7.3693)	(6.6402)	(7.3905)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	No	Yes	No	Yes
<i>R-square</i>	0.1672	0.3843	0.1708	0.3910
<i>Number of observations</i>	214	214	214	214

In Table 4.8, using industry-adjusted ROA instead of performance-adjusted ROA, we reach the same conclusion, controlling for firm, governance and deal characteristics. The coefficient on continuity of connection is negatively related to post-M&A performance.

Table 4.9: Univariate tests for post-M&A performance of bidders with both connected and not-connected deals.

This table presents post-M&A performance for a sub-sample including bidders with both connected and non-connected deals. The observations include only completed and non-overlapping deals. If a bidder makes acquisitions within 3 years of a previous acquisition, these cases are considered “overlapping”, otherwise, events are considered “non-overlapping” cases. ***, **, * indicate that differences in mean between connected and not-connected deals are significant at 1%, 5%, and 10%, respectively. a, b, c indicate differences in median between connected and non-connected deals at 1%, 5%, and 10%, respectively using Mann-Whitney-Wilcoxon nonparametric test.

		All	Connected	Not-connected
<i>Unadjusted ROA (+1)</i>	N	43	19	24
	Mean	0.154	0.127**	0.176
	St.dev.	0.077	0.054	0.086
	Med	0.14	0.120 ^b	0.16
<i>Industry-adjusted ROA (+1)</i>	N	43	19	24
	Mean	0.049	0.030*	0.068
	St.dev.	0.074	0.068	0.075
	Med	0.03	0.012 ^b	0.04
<i>Performance adjusted ROA (+1)</i>	N	43	19	24
	Mean	0.003	-0.072***	0.061
	St.dev.	0.13	0.121	0.106
	Med	0.002	-0.027 ^a	0.058

Table 4.9 reports the post-M&A performance for a sub-sample including bidders with both connected and non-connected deals. To avoid the confounding effects, only non-overlapping completed deals were included in this sub-sample. Consistent with

the whole sample, this sub-sample also reflects the similar trends in the levels of operating performance of bidder after merger. Bidders have higher levels of operating performance than their counterparts following the acquisitions, regardless of the operating performance measures employed. Additionally, in this sub-sample, bidders with non-connected deals outperform those with connected deals across all measures of performance.

Again, we continue to observe a negative impact of direct and continuous connection between bidder and target on post-deal performance in this sub-sample (Table 4.10).

In Table 4.11, we re-estimate the regressions in Table 4.5, using different measure of operating performance (i.e. industry-adjusted ROA). Again, bidder's network centrality measures at both company level (Models 1-2) and independent director level (Models 3-6) are positively, albeit insignificantly, related to post-M&A performance.

Thus, we cannot find a significant relation between connectedness measured by Degree and nCloseness at both firm level and independent director level and bidder's post-deal performance.

Table 4.10: Direct connections and post-M&A performance of bidders with both connected and non-connected deals.

This table presents results examining the impact of direct and continuous connection between bidder and target on bidder's operating performance one year after mergers. Bidders in this sub-sample have both connected and non-connected deals. To prevent confounding effects, observations are drawn from bidder's non-overlapping and completed deals. Post-M&A performance is measured by performance-adjusted EBITDA-to-total assets. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

	(1)	(2)	(3)	(4)
	<i>Connected</i>	<i>Continuity</i>	<i>Connected</i>	<i>Continuity</i>
	(C)	(C)	(C)	(C)
<i>Network measures</i>	-14.6384***	-2.3793*	-13.2543***	-2.0934***
	(4.4251)	(1.2101)	(3.1733)	(0.6920)
<i>Firm size</i>	1.6957	1.5266	3.3160	5.4287*
	(1.8755)	(1.9858)	(2.3002)	(2.6026)
<i>Firm age</i>	-3.6015	-3.1170	-3.4942	-3.4391
	(3.1900)	(3.5456)	(2.9748)	(3.5898)
<i>Board tenure</i>			-0.5796	-1.0636
			(1.6582)	(2.3466)
<i>Board size</i>			-7.8401	-18.4964
			(9.8200)	(11.5978)
<i>Independent directors (%)</i>			0.2116	0.1351
			(0.1879)	(0.2217)
<i>More than 3 directorships</i>			-0.3400***	-0.3771***
			(0.1070)	(0.1269)
<i>CEO duality</i>			-12.2277*	-12.0236*
			(5.8431)	(6.8181)
<i>Foreign promoter ownership</i>			0.0960	0.0952
			(0.0745)	(0.0847)
<i>Same industry</i>			10.2366*	8.6987
			(4.9615)	(5.9559)
<i>Toehold</i>			4.7337	-0.3427
			(4.5488)	(4.5921)
<i>Same group</i>			4.8897	3.6895
			(4.4448)	(4.4323)
<i>Constant</i>	4.2306	-0.7552	24.0721	25.3066
	(20.9670)	(24.4287)	(32.5431)	(38.0146)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.4718	0.3606	0.7669	0.7027
<i>Adj. R-square</i>	0.2078	0.0410	0.4847	0.3428
<i>Number of observations</i>	43	43	43	43

Table 4.11: Bidder's post-M&A performance and Bidder's centrality at firm level and independent director level (*alternative measure for operating performance*).

This table presents results examining the impact of bidder network centrality at firm level and independent director level on bidder's post-M&A performance one year after merger (i.e. industry-adjusted EBITDA-to-total assets), using IV 2SLS estimation. A set of firm-specific economic, corporate governance and deal controls (i.e. firm size, firm age, board tenure, CEO duality, foreign promoter ownership, same industry, toehold, same group) were included but are not reported for simplicity. Observations are drawn from bidder's non-overlapping and completed deals (i.e. if a bidder makes acquisitions within 3 years of a previous acquisition, the cases are considered "overlapping", otherwise, events are considered "non-overlapping" cases to prevent confounding effect. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively. All variable definitions are provided in Appendix B.

Industry - adjusted ROA (+1)						
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Network centrality at firm level						
Degree (C)	0.2845					
	(0.4488)					
nCloseness (C)		12.0309				
		(23.0089)				
Panel B: Network centrality at independent director level						
Degree (I)			0.0750			
			(0.1451)			
nCloseness (I)				19.3538		
				(27.2645)		
Panel C: Alternative measures for network centrality at independent director level						
Degree (IX)					0.2492	
					(0.2799)	
nCloseness (IX)						18.5591
						(28.2992)
Number of observations	214	214	214	214	214	214
R-square	0.3890	0.3831	0.3807	0.3706	0.3575	0.3684
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year and industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
K-P LM statistic	8.175	10.131	18.040	9.493	8.491	8.678
(p-value)	0.0168	0.0063	0.0001	0.0087	0.0143	0.0131
Hansen J statistic	0.4080	0.5248	0.5274	0.2370	0.0462	0.3066
(p-value)	0.5230	0.4688	0.4677	0.6264	0.8297	0.5798

4.5 Conclusions

There is a small but growing body of literature that addresses the impact of board connections on corporate performance. This study contributes to a part of that literature that has received less attention: the effect of direct and continuous board connections on a particularly important type of corporate decision (i.e. mergers and acquisitions).

Focusing first on the direct board ties between bidder and target and then on bidder's network centrality at the firm level and independent director level, we find that bidders with continuously connected deals perform worse than those with non-connected deals. With a one standard deviation increase in the continuity of connection, we find that bidders' post-merger performance decreases by 2.79%. The results are confirmed in both univariate comparisons and regressions controlling for a variety of firm, corporate governance and deal characteristics. Our findings also help to explain the averse reaction of the market to the continuously connected deals at the announcement date. Meanwhile, we cannot find a significant relation between bidders' network centrality and post-merger performance. It seems that the information-based effects (if any) from bidders' networks do not matter to their post-deal performance.

This study has significant implications for other scholars, as well as practitioners. Given the worse post-merger performance of bidders with continuously connected deals, this study highlights the potential reduction in both independence and effectiveness of shared directors (including independent directors) over time to corporate strategic decisions. Our results support the management friendliness hypothesis (Vafeas 2003) which argues that seasoned directors are more likely to befriend and less likely to monitor managers. Bidders might find it beneficial not to overlook the role of complete due diligence before making any decision on buying a target that shares at least one director with them.

Moreover, in showing that bidders' network centrality do not matter to their post-merger performance, this study highlights that deals performed by well-connected bidders are not necessarily more profitable than deals conducted by less-connected bidders. The viewpoint that well-connected bidders will have greater access to information about the target and will be able to better avoid the "lemons" problem (Akerlof 1970) in post-merger performance are not relevant in the context of this research. Outside investors might find it useful to be aware of this, so that top priority is not always given to deals conducted by better-connected bidders, while ignoring other deals performed by less-connected bidders.

A thorough investigation into the potential target before finalizing any deals is vital to post-merger performance.

As with all studies, this one has limitations that may provide the basis for future research in this context. First, the research involves a set of large Indian firms. Although these firms account for an overwhelming share of capitalization on the Bombay and National Stock Exchange, it raises the question of whether the findings are generalisable to other firm types that were not included in the sample (e.g. small firms). Second, due to data limitations, future studies might also explore directors with diverse networks (i.e. connections to other directors of different demographic backgrounds and skill sets) and their potential impact on corporate performance in general and on corporate strategic decisions in particular.

5. Director networks and external finance

This chapter focuses on the impact of busy independent boards on external finance. A firm with a busy independent board is one where at least half the independent directors serve on three or more boards. The research questions addressed are: (1) whether busy independent boards impact external finance; (2) whether intra-group loans affect external finance; (3) whether the impact of busy independent board on external finance differs between group and non-group firms. Using unbalanced panel data of 445 top firms sourced from the BSE 500 and the CNX 500 in India from 2000 to 2014, the answer is “yes” to these questions.

5.1 Introduction

Within the Jensen and Meckling's (1976) agency theory framework, debt stakeholders (creditors) face agency conflicts with borrowers' management and shareholders that increase the probability of default and, hence, reduce the values of creditors' claims. One of the main causes of such conflict is information asymmetry between borrowers and creditors. This refers to the situation in which borrowers know more about their prospects, profitability, potential risks as well as the quality of their

information disclosure than creditors (e.g. banks, financial institutions). Due to the information asymmetry, insiders may pursue their own interests at the expense of the external capital suppliers (i.e. moral hazard problems).

To restore outside investor recognition and trust in corporate performance and disclosure, further improvement in governance systems is hugely important (Bushman et al. 2004) to alleviate moral hazard problems. Among corporate governance mechanisms, the board of directors via its human capital (Coleman 1988) and relational capital (Jacobs 1965) is expected to improve the availability and reliability of information flow to investors in the market (Chuluun et al. 2014). Indeed, there has been growing evidence that board members, especially independent directors can help improve both firm performance and corporate transparency, which is critical to decreasing the information asymmetry between borrowers and external creditors (Ashbaugh-Skaife et al. 2006).

However, directors (particularly independent directors) usually have multiple directorships. In other words, this is when they concurrently hold a great number of outside directorships (i.e. director networks). On the one hand, well-connected directors are more visible to outside investors (Merton 1987; Fang and Peress

2009), and these directors may provide legitimacy and prestige for the firms they serve (Pfeffer and Salancik 1978; Certo 2003).

On the other hand, these directors may suffer from time constraints. Based on the average time commitment for board members with one directorship of 227.5 hours in 2011 (Lublin 2012), it is quite hard for directors with many outside directorships to have enough time to monitor and consult with management teams as effectively as expected. This is called the busyness hypothesis (Ferris et al. 2003). The implication of the busyness hypothesis is that the presence of overboarded directors in the boardroom adversely impacts the firm's market value as well as exacerbates agency problems (Ferris et al. 2003). Poor corporate performance and unreliable corporate disclosure documented in the vast literature lend strong support to the busyness hypothesis.

In a context dominated by family-owned business groups with ownership concentration of controlling shareholders as well as the opacity of insider control, the presence of independent directors is expected to reduce agency problems and to increase corporate transparency. Hence, the market particularly takes into account the important role of such directors. However, compared to developed markets, the average number of directorships per director in India is higher (i.e. roughly two versus five), and more

firms in India rely on external finance (e.g. bank, financial institution debt, bondholders). As a result, it is important to know whether such networks negatively impact the access to external finance of a firm due to the adverse reaction of outside capital suppliers to borrowers with busy boards.

Keeping this in mind, in this chapter, we examine the relation between board networks and external finance. More specifically, we question whether busy independent directors negatively impact external finance, and whether the impact of busy independent board on external finance differs between group and non-group firms. In addition, we examine the role of the internal capital market in corporate finance in Indian business groups, asking whether there is a negative relation between net intra-group loans and external finance for group firms.

To test our hypotheses, unbalanced panel data of 445 top firms (both group and non-group firms) in India over the period 2000-2014 was used. Using alternative measures of director networks, the fixed effects model and the system GMM model, the study shows a negative association between busy independent boards and firms' external finance. In addition, the result confirms the existence of an internal capital market in Indian business groups, and shows a negative relationship between net loan

receivers and external finance. The study also reveals that, compared to non-group firms, group firms with greater connectedness of independent directors face more limited access to external finance.

Our research makes several important contributions as follows: First, it contributes to the literature on the impact of director networks on corporate finance. In particular, it explores the link between director networks and external finance. Very few papers have examined this relationship. Chuluun et al. (2014) measure the impact of well-connected boards on publicly-traded corporate debt for US firms using social network measures. They find that having a more connected board leads to more debt. However, they only focus on corporate bonds and do not take into account the matter of independence (i.e. the networks of independent directors).

Recently, Chakravarty and Rutherford (2017) examine if busy directors influence the cost of bank loans for US firms through the lens of takeover vulnerability. They conclude that as the level of board busyness increases, the cost of debt decreases. Thus, both Chuluun et al. (2014) and Chakravarty and Rutherford (2017) show that busy boards favourably relate to external debt in developed markets.

Unlike these studies, our research focuses on independent directors and addresses the dynamic relation between independent board networks and external leverage. Moreover, we conduct the research in an emerging market which has a higher number of busy boards and less developed capital markets, compared to developed markets. As a result, companies rely more on external finance from banks and financial institutions for investment and performance.

The study also contributes to the literature on the internal capital markets that are a channel of capital allocation among group members in emerging countries. Internal markets play more crucial roles in firm financing in emerging markets than in developed markets given the significant differences in the institutional contexts between the two. The interdependence of group affiliates in the internal capital markets has been so far uncovered from different aspects such as: financial support (Gopalan et al. 2007); access to external finance (Shin and Park 1999; Lensink et al. 2003); risk sharing across group firms (Kali 2003; Khanna and Yafeh 2005). Focusing on the direct internal transactions (i.e. intra-group loan inflows and outflows of group affiliates) instead of indirectly relying on the cashflow-investment sensitivity approach (e.g. Lamont 1997; Khanna and Palepu

2000a), we examine the association between the internal capital markets and external finance of group affiliated firms.

Last, the study provides insights into one of the governance attributes (i.e. board busyness) that may increase or attenuate the potential conflict between creditors and borrowers.

The remainder of the chapter is organized as follows. Section 5.2 provides a literature review and hypothesis development. Section 5.3 presents a description of the data collection process as well as some summary statistics. Section 5.4 describes methods. Section 5.5 reports results. Section 5.6 reports robustness checks, and Section 5.7 concludes.

5.2 Literature review and hypothesis development

5.2.1 Agency problems, information asymmetry and the independent board

According to Jensen and Meckling's (1976) agency theory framework, debt stakeholders (creditors) face agency conflicts with borrowers' management and shareholders that increase the probability of default and, hence, reduce the values of their claims. One of the main causes of such conflict is the information asymmetry between borrowers and creditors.

In a lending relationship, through corporate disclosure, companies communicate their performance and governance to outside investors (Healy and Palepu 2001). However, as borrowers, companies know more about their prospects, profitability, potential risks and the quality of their information disclosure than creditors (e.g. banks, financial institutions). This is regarded as the information asymmetry problem (Stigler 1961; Akerlof 1970; and Spence 1973). Information asymmetry creates a moral hazard problem when managers and shareholders have incentives to pursue their own interests at the expense of external stakeholders.

This issue still exists between insiders and outsiders in developed markets (e.g. US) (Chuluun et al. 2014). In emerging countries like India, the information asymmetry is even more severe. For instance, in an investigation of the extent of both mandatory and voluntary disclosure by listed banking companies in India, Hossain (2008) finds that only 88 out of 101 mandatory items were disclosed. Meanwhile, the average score for voluntary disclosure is 25 out of 81. Another example is the financial statement fraud of one of the largest listed companies (i.e. Satyam Computer Services Limited) in India that came out in the open in January 2009, illustrating further the information asymmetry problem between firms and outside investors in this country. This badly influences corporate image and reduces the confidence of outside investors in companies' performance disclosure, and will, in turn, make it more difficult for firms to access external finance as well as increase the cost of such funds.

To restore outside investor recognition and trust in corporate performance disclosure, further improvement in governance systems is hugely important (Bushman et al. 2004) to alleviate moral hazard problems. Among corporate governance mechanisms, the board of directors via its human capital (Coleman 1988) and relational capital (Jacobs 1965) is expected to improve

the availability and reliability of information flow to investors in the market (Chuluun et al. 2014).

In fact, there has been growing evidence of the role of the board of directors, especially of independent boards to the effectiveness of corporate performance and corporate transparency, which, in turn, increases the belief of outside investors in corporate disclosure. In particular, through the advising and active monitoring roles (Fama and Jensen 1983a; Mace 1979), a more independent board can influence various aspects of corporate transparency on financial reporting and disclosure.

More specifically, independent directors are found to relate to effective financial accounting processes (Klein 2002); less financial statement fraud (Beasley 1996); lower earnings management in the global context (Pathak and Sun 2013); and fewer firm risks (Brick and Chidambaran 2007). In a similar vein, Petra (2007) and Ferreira et al. (2011) find positive relations between the ratio of independent directors and accounting quality and earnings informativeness, respectively. Beekes et al. (2004) and Ahmed and Duellman (2007) document that timely recognition of losses (a commonly used measure of earnings quality) is greater for companies with a higher percentage of independent directors.

Krishnan (2005) finds a negative relation between the proportion of independent audit committee directors and internal control weaknesses.

Recently, using board structure data for a broad sample of 1,849 firms, Armstrong et al. (2014) find that information asymmetry decreases in response to an increase in the ratio of independent directors. Specifically, an 18 percentage point increase in the proportion of independent directors translates to roughly a 6% decrease in information asymmetry. In short, an independent board plays an active role to communicate more accurate information on corporate performance to outside investors. Thus, it helps to improve the credit ratings of borrowers (Ashbaugh-Skaife et al. 2006) and trust from creditors, which facilitates borrowers' access to external finance.

Being aware of the important role of independent directors in the transparency of corporate disclosure and performance, the Indian government has continuously strengthened board independence over the past decade. The introduction and the revision of Clause 49 of SEBI is a typical example of this effort. Evidence of the favourable effect of Clause 49 is also found in a survey in 2009 of 500 mid-cap companies in India (FICCI and Thornton 2009). Accordingly, 84 percent of respondents pointed to

increased investor perception and 71 percent felt that compliance had a positive effect on the external valuations of companies. All of this reflects that a company's board independence really matters to its outside investors.

5.2.2 *Busy independent board and external finance*

Given the importance of independent directors to corporate transparency and firm performance, there are doubts over the effectiveness of directors who serve simultaneously on a number of boards. On the one hand, it may be true that firms with well-connected directors are more visible to investors, because media coverage is likely to be greater for these firms, and this coverage facilitates investor recognition (Merton 1987; Fang and Peress 2009). Reputed directors also provides legitimacy and prestige for the firms they serve (Pfeffer and Salancik 1978; Certo 2003). Hence, well-connected board members may possibly act as a link between firms and the external environment to facilitate access to capital for corporate operations.

On the other hand, it is highly possible that well-connected directors are too busy to perform their monitoring and advising role as effectively as expected, which will badly impact firm transparency and the perception of outside investors due to an

increase in agency problems. This argument is referred to as the busyness hypothesis (Ferris et al. 2003).

The starting point of this hypothesis is that directors must have enough time to duly perform the monitoring and advising roles (Conger et al. 1998). Being a firm's directors, they are required to actively participate in board and committee meetings and to carefully prepare before such meetings (National Association of Corporate Directors 1996).

According to the National Association of Corporate Directors, the time commitment for board members with one directorship was, on average, 227.5 hours in 2011 (Lublin 2012). Consequently, the busyness hypothesis argues that directors who serve on multiple boards become too busy to effectively monitor managerial behaviour. Thus, these directors may shirk their responsibilities. For instance, they may participate less often on board committees and board meetings.

The implication of the busyness hypothesis is that the presence of well-connected directors in the boardroom reduces management supervision, and hence increases agency problems (Ferris et al. 2003). A further consequence of this is the decline in

firm transparency and trust of outside investors in corporate performance disclosure.

There has been growing empirical support for the busyness hypothesis. Specifically, Young (1990) argues that outside directors do not have the time to investigate all complex business issues which they must face and often have to accept the CEO's explanations. Loderer and Peyer (2002) show that multiple directorships reduce firm value and point out possible explanation for this, including directors' conflicts of interests when sitting on several boards at the same time and the lack of time they dedicate to multiple mandates.

Consistent with this, Arranz-aperte and Berglund (2008) note that directors sitting on many boards do not have enough time to monitor and support managers in business development. Rosenstein and Wyatt (1994) report a decline in the value of nonfinancial firms that send directors to other firms, which suggests that the extra duties of an outside directorship distract corporate officers from their performance at their own firms. Jiraporn et al. (2009) point out that directors serving on several outside boards show an obvious tendency to be absent from board meetings. It is, therefore, clear that well-connected directors face time constraints in performing their tasks.

Due to the time constraints of well-connected directors and hence less oversight of management, a firm with such directors may experience a number of adverse issues: lower sensitivity of CEO turnover to corporate performance (Fich and Shivdasani 2006; Devos et al. 2009); higher compensation for CEO (Renneboog and Zhao 2011); decline in firm performance and value (Cashman et al. 2012; Jiraporn et al. 2008); higher level of financial risks as board busyness increases (Tarkovska 2012); more likelihood to commit financial statement fraud (Beasley 1996); and higher earnings management (Sarkar et al. 2008).

Thus, it is clear that busy directors are detrimental to the monitoring capability of the board on which they sit (Falato et al. 2014; Mendez et al. 2015), which can then badly impact corporate transparency: a requirement to facilitate debt contracts (Armstrong et al. 2010). This partly explains why firms with busy directors face lower market-to-book ratios (Fich and Shivdasani 2006). There is also evidence that outside investors disapprove of inside directors having three or more independent directorship appointments (Masulis and Mobbs 2011). Indeed, Bar-Hava et al. (2013) find that outside investors support the resignation of such busy directors.

Being aware of the possible negative effects of busy boards on corporate performance and disclosure, a number of organizations offer guidelines on the number of outside directorships that should be held by corporate officers to help avoid “director over-commitment” (e.g. guidelines of National Association of Corporate Directors 1996; Council of Institutional Investors 2014; Financial Reporting Council 2014).

Having witnessed a reduction in value and profitability of firms, and a decline in financing reporting transparency with well-connected directors, it is likely that creditors will be more cautious when offering loans to such firms. In other words, creditors will be unwilling to provide loans for firms with busy directors to prevent possible adverse situations occurring to their money (e.g. when borrowers are in default on the loans or go bankrupt). We, therefore, argue that it is more difficult for firms with busy boards to access external finance. This leads to the following testable hypothesis:

Hypothesis 1: Firms with busy independent directors are associated with less external debt. In other words, firms with greater connectedness of independent directors face more limited access to external finance.

The outside directors' monitoring of managers has been seen as the most important function of the corporate board (Winter 1977). Independent directors on Indian boards are fewer in number, but much busier than those in the US or the UK¹⁷ and operate under a weaker corporate governance regime. Understanding how outside investors react to such board features, can provide useful implications for corporate governance practices and policies in emerging economies.

5.2.3 Internal capital market and external finance

In this section, we examine whether firms, which are net loan receivers from their groups, rely less on external finance. To do this, we first provide an overview of the internal capital markets in which intra-group loans are circulated among group members, and then point out the relation between group loans and external finance.

Internal capital markets in Indian business groups

Indian business groups are collections of publicly traded firms in various industries, with a substantial amount of common

¹⁷ The mean board seats for outside independent directors of the US companies range from 1.6 to 3 (Ferris et al. 2003; Fich and Shivdasani 2006). Meanwhile, this estimated number is around five for top firms in India (Jackling and Johl 2009).

ownership and control, often by a family (Khanna and Palepu 2000). Typically, a family exercises control on a group of firms through equity channels and non-equity channels (i.e. administrative control through board of directors, interlocking directorships and related parties transactions) (Sarkar 2010).

The beginning of Indian family-owned business groups in industry activity dates back to the second-half of the nineteenth century. The transaction cost theory initiated by Coase (1937) suggests that the optimal structure of a firm depends on its institutional context. Also, from an institutional theoretical perspective pioneered by Leff (1978), later adopted by Chang and Choi (1988) and Khanna and Palepu (1997, 1999, 2000b), business groups emerge as a response to underdeveloped institutions.

Compared to the US with the institutional context characterized by well-functioning capital markets, in emerging countries, such as India, there are market failures due to information and agency problems (Khanna and Palepu 2000a) (details in Section 2.1.2). The absence of well-developed financial markets was cited as one of the key reasons for the presence of Indian business groups with family and community ties (Khanna and Palepu 2006). In this context, the group structures could

perform the role of missing institutional intermediaries in capital markets between individual entrepreneurs and imperfect markets. Through this internal capital market, capital is allocated among group affiliates in the form of intra-group loans.

Intra-group loans and external finance

The literature identifies two main motives for intra-group loans: tunnelling and financing advantage.

Tunnelling occurs when controlling shareholders transfer wealth from firms in which their cashflow rights are lower to firms where they have higher cashflow rights (CFRs). Under this tunnelling motive, loans are expected to go from group affiliates with low CFRs to members with high CFRs, and the minority shareholders of the lending firms will be badly affected due to this action of the controlling shareholders in these firms (e.g. shortage of funds to finance good projects).

The alternative motive is that intra-group loans are a remedy for under-developed capital markets (Khanna and Yafeh 2007) where the cost of accessing external capital could be relatively high (Gopalan et al. 2007). Compared to other sources of funds, intra-group loans are easier to renegotiate in cases of financial distress and can help firms avoid excessive reliance on outside financial

markets (Buchuk et al. 2014). This source of financing also helps the controlling shareholders to avoid scrutiny and monitoring from banks if firms have bank debt (Lin et al. 2013).

Empirical studies on intra-group loans in emerging markets reveal that there is little evidence in favour of tunneling being the key motive for this source of funds. For example, Buchuk et al. (2014), focusing on intra-group lending in Chile over the period 1990-2009, find no robust evidence of minority shareholders losing out to intra-group loans as tunnelling predicts. Instead, the authors find firms that borrow internally have higher investment and return on equity than other firms.

In Indian business groups, intra-group loans are an important means of intra-group transfer (Khanna and Palepu 2000a). Group loan inflows account for 59% of operating profit in the year a firm receives loans, and the primary function of these loans is to support financially weaker members of a business group (Gopalan et al. 2007). Accordingly, firms receive group loans at an interest rate that is much lower than the corresponding borrowing rate in the external market. Also, a large number of cases have no interest obligations (Gopalan et al. 2007). Thus, firms, which are net receivers from group loans, may rely less on loans from banks

and other financial institutions. This leads to the following hypothesis:

Hypothesis 2: Firms that are net receivers from intra-group loans rely less on external finance than other firms.

In other words, there is a negative relationship between intra-group loans and external finance.

5.2.4 The moderation role of busy independent boards across group and non-group firms in the context of external finance

We hypothesize that firms with greater connectedness of independent directors face more limited access to external finance. However, it is also worth examining whether there is any difference in the potential impact of busy independent board on external finance for group-affiliated firms and non-group firms in India.

There are a number of characteristics that may possibly lead to different impacts of a busy independent board on these two types of Indian firms.

First, family business groups are ubiquitous in India (Khanna and Yafeh 2007). Having high share ownership¹⁸ (Chakrabarti et al. 2008) and holding key positions in the boardroom¹⁹ (Sarkar and Sarkar 2012), promoters (i.e. founding family shareholders) in such groups tend to control the board of directors.

Second, family firms are prone to unfair business transactions, such as related-party transactions (Cheung et al. 2006). Promoter managers may act in the interests of the controlling family, sometimes at the expense of minority shareholders and/or other stakeholders (Morck and Yeung 2003). This implies that independent directors encounter more difficulties when performing their duties in family business groups than in non-group firms. Thus, family control may reduce the monitoring effectiveness of independent directors (Jaggi et al. 2009). Hence, more agency problems may arise in such firms.

The effectiveness of independent directors in family business group may reduce further due to time constraints, if they

¹⁸ For example, the average promoter stakes are more than 48% and nearly 50% in BSE 100 and in BSE 500 respectively (Mathew 2007).

¹⁹ 95% of top 500 Indian corporate boards have promoters acting as chairman or managing director (Sarkar and Sarkar 2012).

simultaneously serve on multiple corporate boards (i.e. a busy independent board).

All of these may lead to a further decline in firm transparency and the trust of outside investors in corporate performance disclosure. Thus, lenders may become more cautious to borrowers who belong to family business groups and have busy independent boards. Therefore, we formulate the following hypothesis:

Hypothesis 3: Group-affiliated firms with busy independent boards face more limited access to external finance than non-group firms with busy independent boards.

5.3 Data description

5.3.1 Sample design

To test our hypotheses, we use unbalanced panel data of 445 top firms sourced from the BSE 500 and the CNX 500 in India from 2000 to 2014. Our sample has 5,616 firm-year observations with 3,937 group firm-year observations and 1,679 stand-alone firm-year observations.

In 2000, the Securities and Exchange Board of India (SEBI) incorporated Clause 49 into the listing agreement, which requires all listed firms in India to file a corporate governance report with detailed information on board functions. More importantly, this

clause strongly emphasizes the role of independent directors in the boardroom.

Data²⁰ for network measures and board characteristics are manually collected from corporate governance (CG) reports in Prowess. We extract all directors' names, categories (e.g. executive, non-executive, independent, non-independent) and directorships. For director category not tabulated with director name (i.e. the director category scattered across different sections in the CG report), we read each CG report to obtain this specific information.

Data on firm characteristics are also collected from Prowess. Ownership and business-group affiliation were sourced from the Prowess IQ database. This database is the latest online version of CMIE and was launched on the 1st of January 2016. As opposed to the previous versions, Prowess IQ is the first to reflect time-series data on ownership classification (i.e. whether a firm is group-affiliated or non-affiliated on a yearly basis) from 1989 onwards. This renders research results relating to group affiliation more

²⁰ The panel data for network measures and board characteristics in this chapter were sourced from the CG reports of 445 top Indian firms from 2000 to 2014. Meanwhile, the data for network measures in Chapters 3-4 were extracted from the CG reports of all bidders and targets over the research period.

reliable. Our sample includes 445 firms, 302 of which are group affiliated and 143 unaffiliated (i.e. stand-alone firms).

5.3.2 Descriptive statistics

Table 5.1 reports the summary financials for all group and non-group firms in our sample. On average, group firms are larger, more profitable, and older than stand-alone firms. Also, both the leverage and external leverage are higher for the group firms than non-group firms. Following Buchuk et al. (2014), we define leverage as total debt over book assets, and external leverage as financial debt (bank and financial institution debt, bonds, commercial paper) over book assets. For group firms in the sample, on average, net loans represents 0.65% of book assets.

Table 5.2 presents summary statistics for board networks and other board characteristics. Consistent with Jackling and Johl (2009), we find that an average director in our sample holds about five directorships, while an average director in developed markets only holds around two directorships (e.g. Fich and Shivdasani 2006; Jiraporn et al. 2008; Cashman et al. 2012).

Table 5.1: Summary financials of all firms, group firms, and non-group firms.

This table reports the summary financials of all the firms in the sample. Data are for the period 2000-2014. Variable definitions are provided in the Appendix B. ***, **, * indicate that differences in mean between group and non-group firms are significant at 1%, 5%, and 10%, respectively. a, b, c indicate differences in median between group and non-group firms at 1%, 5%, and 10%, respectively, using Mann-Whitney-Wilcoxon nonparametric test.

		<i>Mean</i>	<i>St.dev.</i>	<i>Median</i>
<i>Total assets (in millions of rupees)</i>	All	39,273.69	130,809.50	10,390.00
	Group	49,468.87***	152,950.10	14,452.50 ^a
	Non-group	15,367.53	39,608.12	5,462.40
<i>EBIT</i>	All	3,940.94	13,631.55	1,039.40
	Group	4,854.50***	15,660.66	1,314.50 ^a
	Non-group	1,798.78	6,321.48	605.80
<i>EBIT/total assets (in percent)</i>	All	13.22	9.04	11.84
	Group	12.62	8.42	11.36
	Non-group	14.63***	10.23	13.27 ^a
<i>PPE/total assets (in percent)</i>	All	27.93	18.17	25.86
	Group	28.70***	18.23	27.20 ^a
	Non-group	26.14	17.90	22.90
<i>Sales growth (in percent)</i>	All	22.37	42.22	15.31
	Group	21.69	41.89	14.91
	Non-group	23.95*	42.96	16.15 ^b
<i>Leverage (in percent)</i>	All	25.53	19.70	24.53
	Group	26.63***	19.23	27.07 ^a
	Non-group	21.75	20.38	17.45
<i>External leverage (in percent)</i>	All	18.29	17.69	15.05
	Group	19.27***	17.68	16.84 ^a
	Non-group	15.99	17.52	10.49
<i>Net group loans/total assets</i>	Group	0.65	22.08	0.00
	All	34.85	24.15	27.00
	Group	36.41***	25.20	28.00 ^a
<i>Age (in years)</i>	Non-group	31.18	21.06	23.00

Table 5.2: Board network measures and other board characteristics.

This table reports board network measures and other board characteristics for all firms, groups, and non-group firms. Variable definitions are provided in the Appendix B. ***, **, * indicate that differences in mean between group and non-group firms are significant at 1%, 5%, and 10%, respectively. a, b, c indicate differences in median between group and non-group firms at 1%, 5%, and 10%, respectively, using Mann-Whitney-Wilcoxon nonparametric test.

<i>Panel A. Board network measures</i>				
		Mean	St.dev.	Median
<i>Directorships per director</i>	All	4.46	2.91	4.13
	Group	4.94***	2.91	4.58 ^a
	Non-group	3.34	2.61	2.80
<i>Directorships per independent director</i>	All	4.62	3.26	4.25
	Group	4.72***	2.89	4.50 ^a
	Non-group	4.39	3.99	3.67
<i>Busy board dummy</i>	All	0.58	0.49	1
	Group	0.67***	0.47	1 ^a
	Non-group	0.37	0.48	0
<i>Busy independent board dummy</i>	All	0.62	0.49	1
	Group	0.66***	0.47	1 ^a
	Non-group	0.52	0.50	1
<i>Panel B. Other board characteristics</i>				
		Mean	St.dev.	Median
<i>Independent directors (in percent)</i>	All	51.28	14.26	50.00
	Group	51.63	14.20	50.00
	Non-group	50.45	14.39	50.00
<i>Non-executive directors (in percent)</i>	All	73.93	13.45	75.00
	Group	75.42	13.01	76.47
	Non-group	70.43	13.83	71.43
<i>Board size</i>	All	9.75	2.95	10.00
	Group	10.22	2.98	10.00
	Non-group	8.63	2.52	9.00
<i>Institutional ownership (in percent)</i>	All	17.00	13.86	15.05
	Group	18.75	14.06	16.98
	Non-group	12.89	12.43	10.12

Around 58% of all boards in our sample are classified as busy, whereas, percentage of busy boards of US firms ranges from 16% to 21% (Chakravarty and Rutherford 2017; Fich and Shivdasani 2006).

With regard to independent directors, the average ratio of independent directors is approximately 51% of the total number of directors, which is lower than the ratio of around 70% of US boards (Bhojraj and Sengupta 2003; Ashbaugh-Skaife et al. 2006). 62%

of all independent boards in the sample are classified as busy. This ratio is even higher for group firms (i.e. 66%).

Overall, compared with the US, directors in India have more directorships (i.e. they are busier), and the ratio of busy boards is extremely higher. However, the average ratio of independent directors in the boardroom is lower. Moreover, directors in group firms are better-connected than those in non-group firms.

5.4 Methods

We test the relation between director networks and external leverage for a sample of 445 top firms (groups and non-groups) in India, using unbalanced panel data over the period 2000-2014. Panel estimation procedures allow us to control for unobserved firm-level heterogeneity, and thus diminish the likelihood of biased parameter estimates and spurious results (Greene 1997). In addition, the frequency of changes in director network over the period of research suggests that there is enough time-series variation in the key variable to effectively use panel-data estimation techniques.²¹

²¹ The method applied to Chapter 5 is different from the one used in the previous chapters. Specifically, Chapters 3 and 4 examine the impact of direct connection between bidder and target and network centrality on M&A announcement and operating performance, respectively. The research in chapters 3 and 4 is related to and based on the studies by Cai and Sevilir (2012) and Renneboog and Zhao (2014). These two studies use pooled regressions in the analyses. Thus, this method was applied to Chapters 3 and 4 so that the results can be comparable.

In Table 5.3, on average, over the period 2000-2014, 12.09% of the sample firms experienced a change in the busy independent board. By the end of the sample period, this ratio was 15.12%.

Table 5.3: Changes in busy independent boards.

<i>Year</i>	<i>Change in busy independent board (%)</i>
2001	7.86
2002	13.56
2003	12.54
2004	14.70
2005	16.72
2006	13.99
2007	13.20
2008	12.17
2009	11.75
2010	13.24
2011	13.68
2012	13.69
2013	14.87
2014	15.12
2001-2014	12.09

Following Fich and Shivdasani (2006) and Field et al. (2013), the main measurement of director networks in this analysis is busy independent board (i.e. a board in which 50% or more of the independent directors hold three or more board seats). Additionally, other alternative network measures were computed: directorships per independent director (Ferris et al. 2003); dummy variables for directorships per independent director greater than three (IndDirect1) and greater than four (IndDirect2); busy

independent board with 60% or more independent directors holding three or more total directorships (*busy_ind1*).

With regard to external leverage, we focus on the ratio of financial debt (bank, institution debt, bonds, commercial paper) over book assets (Buchuk et al. 2014).

In the analysis, we control for the following variables that impact the external leverage of a firm: EBIT/total assets (Buchuk et al. 2014; Chuluun et al. 2014; Chakravarty and Rutherford 2017); sales growth (Gopalan et al. 2007); PPE/total assets (Buchuk et al. 2014); firm size (Buchuk et al. 2014; Chuluun et al. 2014); firm age (Gopalan et al. 2007); institutional ownership (i.e. ownership percentage of institutional investors), board size (Chakravarty and Rutherford 2017); and percentage of non-executive directors (Chuluun et al. 2014). We also include year fixed effects in all regressions to control for potential systematic differences in time. All variables are defined in details in the Appendix B.

To test the hypotheses, we first start with the static fixed effects model and then extend to the dynamic fixed-effects model (the two-step system GMM).

5.4.1 Fixed effects model

We first carry out the Breusch-Pagan Lagrange multiplier (LM) test, and then the Hausman test (details in Table 5.4). The null hypothesis in the LM test is that variances across entities are zero. Here we reject the null, thus the simple pooled OLS is not appropriate in this study. We use the Hausman test to distinguish between the fixed and random effects models. The null hypothesis of no individual heterogeneity-regressor correlation in the Hausman test is rejected ($p\text{-value} = 0.0000$), thus the fixed effects model below is chosen:

$$y_{i,t} = \alpha + \beta X_{i,t} + f_i + \varepsilon_{it}$$

where y is external leverage (Extlev). X includes director network (Network), ROA, sales growth (SaleGrow), PPE/total assets (Tangi), firm size (Size), firm age (Age), institutional ownership (Insti), Log board size (LogBsize), and percentage of non-executive directors (Nonex). f_i is firm heterogeneity (fixed effects) and ε_{it} is the error term.

Table 5.4: Breusch-Pagan and Hausman tests.

<i>Well-connected directors measured by</i>	<i>Breusch and Pagan Lagrangian multiplier test for random effects</i>	<i>Hausman test for individual heterogeneity-regressor correlation</i>
<i>Busy independent board</i>	$\text{external_assets}[\text{id},t] = Xb + u[\text{id}] + e[\text{id},t]$ Test: $\text{Var}(u) = 0$ $\text{chibar2}(01) = 7548.84$ $\text{Prob} > \text{chibar2} = 0.0000$	Test: H_0 : difference in coefficients not systematic $\text{chi2}(9) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 143.68$ $\text{Prob}>\text{chi2} = 0.0000$

Within the fixed effects regression model, all t-statistics are based on robust, firm-clustered standard errors. This results from the fact that our data have both heteroscedasticity and first-order autocorrelation (*p-value* = 0.0000) based on modified Wald test (Greene 2008) and Wooldridge test (Wooldridge 2010), respectively. Using `xttest3` (Baum 2001) and `xtserial` (Drukker 2003) commands in Stata, the test results are displayed as follows:

Table 5.5: Modified Wald test and Wooldridge test.

<i>Well-connected directors measured by</i>	<i>Modified Wald test for groupwise heteroscedasticity</i>	<i>Wooldridge test for autocorrelation in panel data</i>
<i>Busy independent board</i>	$H_0: \sigma(i)^2 = \sigma^2 \text{ for all } i$ $\text{chi2} (445) = 1.0\text{e}+06$ $\text{Prob}>\text{chi2} = 0.0000$	H_0 : no first order autocorrelation $F(1, 436) = 613.050$ $\text{Prob} > F = 0.0000$

5.4.2 Dynamic fixed effects model

The static fixed effects approach is robust to the presence of omitted firm-specific variables that would lead to biased estimates

in an ordinary least-squares framework. However, it cannot deal with the important source of endogeneity that arises because the relations among a firm's observable characteristics are likely to be dynamic.

In the context of corporate governance research, current financial leverage may affect future governance choices (such as the ratio of well-connected independent directors in the boardroom, the upper limit of directorships per board member) and these may, in turn, affect future firm financial leverage. To control for the dynamic aspects of the empirical relationship in this research, we may wish to include lagged external leverage as a further explanatory variable. However, with a lagged dependent variable on the right hand side of the external leverage, the use of the fixed effects model may lead to inconsistent estimates as the lagged dependent variable will be correlated with the error term (Wooldridge 2002; Cameron and Trivedi 2005). Meanwhile, the generalized method of moments (GMM) provides a framework for estimating an equation with such endogenous variables.

The GMM model was introduced by Holtz-Eakin et al. (1988) and Arellano and Bond (1991). The estimation procedure consists of two important steps: first-differencing (to eliminate any potential bias that may arise from time-invariant unobserved

heterogeneity), and estimating first-differenced equation via GMM using lagged values of the explanatory variables as instruments for the current explanatory variables. This is called the difference GMM. Despite the advantage of this model compared to the fixed effects model in studying dynamic empirical relationship, it also has at least three econometric shortcomings.

Beck et al. (2000) show that if the original model is conceptually in levels, differencing may reduce the power of the tests by reducing the variation in the explanatory variables. Second, Arellano and Bover (1995) suggest that variables in levels may be weak instruments for first-differenced equations. In addition, Griliches and Hausman (1986) note that first-differencing may exacerbate the influence of measurement errors on the dependent variables.

To mitigate these shortcomings of the difference GMM, Arellano and Bover (1995) and Blundell and Bond (1998) introduce the system GMM model by also including the equations in levels in the estimation procedure. The first-differenced variables can be used as instruments for the equations in levels in a “stacked” system of equations that includes the equations in both levels and differences.

The system GMM model helps to obtain efficient estimates while controlling for time-invariant unobserved heterogeneity, simultaneity, and the dynamic relationship between current values of the explanatory variables and past values of the dependent variable. In particular, this model enables us to measure the board network/leverage relation while including both past leverage and fixed-effects to account for the dynamic aspects of the board network/leverage relation and time-invariant unobservable heterogeneity, respectively. Wintoki et al. (2012) provided economic justification for the use of dynamic panel data estimation in corporate governance research, and Lemmon et al. (2008) suggested the use of dynamic model to estimate the determinants of firm leverage.

To obtain the appropriate system GMM model, a number of issues need to be addressed: which of the regressors are to be treated as potentially endogenous and which strictly exogenous? how many lags of dependent variables are enough to capture the dynamic completeness? what instruments are to be used? These questions are addressed below.

Endogenous and exogenous explanatory variables

To determine endogenous and exogenous explanatory variables in the GMM model, following Wintoki et al. (2012), a number of tests are conducted. The first set of tests involve OLS regression of (1) current levels of director network measure, firm-specific variables and (2) changes in these levels on past external leverage and historical values of the firm-specific variables. The second is the test of strict exogeneity as recommended by Wooldridge (2002).

The results of the first set of tests are shown in Table 5.6. In Panel A, results from OLS regressions of the levels of director network and firm-specific variables on leverage from one year before are presented. Director network is significantly negatively related to past external leverage. This finding is different from that of Chuluun et al. (2014), who document that more connected directors lead to more external debt for US firms.

Panel B of Table 5.6 shows the results of OLS regressions of changes in director network and firm characteristics on the external leverage levels and characteristics from one year before. The results are similar to those obtained from using the levels as dependent variables. There is a negative relationship between the

change in director network and past external leverage. Table 5.6 also highlights that not only director networks and past external leverage are significantly negatively related, but most of the firm-specific variables are also significantly associated with past external leverage. In particular, both the current levels and changes in ROA, sales growth, PPE/total assets, firm size, institutional ownership, and percentage of non-executive directors are all significantly related to past external leverage. This reflects that it is not only the director network, but almost all the control variables are likely to be endogenous as well.

In the second test of strict exogeneity, we examine whether future realizations of director network and control variables are unrelated to current external leverage with the following model:

$$y_{i,t} = \alpha + \beta X_{i,t} + \Omega W_{i,t+1} + f_i + \varepsilon_{it}$$

where $W_{i,t+1}$ is a subset of forward values of director network variable and the control variables, X . y is external leverage (Extlev). X includes busy independent board (busy_ind), ROA, sales growth (SaleGrow), PPE/total assets (Tangi), firm size (Size), firm age (Age), institutional ownership (Insti), Log board size (LogBsize), and percentage of non-executive directors (Nonex). $\Omega=0$ is the null hypothesis of strict exogeneity.

The results of these tests are demonstrated in Table 5.7. In every specification in which they are included, the coefficient estimates for the future values of almost all control variables (i.e. $ROA(t+1)$, $SaleGrow(t+1)$, $Tangi(t+1)$, $Size(t+1)$, $Insti(t+1)$, $Nonex(t+1)$) are significantly different from zero. The F-test of the joint significance of the coefficient estimates of all the future values is also significant ($F=4.16$; $p-value = 0.0000$).

In short, the results from Tables 5.6-5.7 suggest that neither the network variable nor firm-specific control variables (except Firm Age) are strictly exogenous.

Table 5.6: Director networks, firm-specific variables, and past external leverage (Panel A).

In this table we report the results of OLS regression of current director network measured by busy independent board (*busy_ind*), and current firm characteristics variables on past external leverage, historical values of the firm characteristics variables. External leverage is measured by financial debt divided by the book value of total assets. The firm characteristics variables include ROA, sales growth (*SalGrow*), PPE/total assets (*Tangi*), firm size (*Size*), firm age (*Age*), institutional ownership (*Insti*), Log board size (*LogBsize*), percentage of non-executive directors (*Nonex*). Panel A reports the results of the regressions in which the dependent variables are current levels.

Robust standard errors are in parentheses. Year dummies are included in all specifications. Items in boldface are significant at the 10% level or higher.

	<i>Busy_ind</i>	<i>ROA</i>	<i>SalGrow</i>	<i>Tangi</i>	<i>Size</i>	<i>Age</i>	<i>Insti</i>	<i>LogBsize</i>	<i>Nonex</i>
Panel A: Dependent variable is level at time <i>t</i>									
<i>ExtLev (t-1)</i>	-0.0029 (0.0014)	-0.1878 (0.0178)	-0.0017 (0.0541)	0.4482 (0.0378)	0.0121 (0.0028)	0.0099 (0.0709)	-0.0968 (0.0245)	0.0005 (0.0006)	-0.1103 (0.0276)
<i>ROA (t-1)</i>	-0.0006 (0.0025)		-0.5314 (0.0997)	0.0924 (0.0568)	-0.0081 (0.0050)	0.1844 (0.0848)	0.0798 (0.0366)	0.0021 (0.0010)	-0.1150 (0.0502)
<i>SalGrow (t-1)</i>	0.0007 (0.0006)	0.0120 (0.0043)		-0.0173 (0.0070)	0.0013 (0.0005)	-0.0632 (0.0128)	-0.0045 (0.0045)	-0.0001 (0.0001)	0.0071 (0.0051)
<i>Tangi (t-1)</i>	-0.0010 (0.0011)	0.0358 (0.0145)	-0.0775 (0.0469)		-0.0031 (0.0024)	-0.0194 (0.0578)	0.0076 (0.0230)	0.0010 (0.0006)	0.0548 (0.0276)
<i>Size (t-1)</i>	0.0473 (0.0181)	-0.8724 (0.2777)	-1.7932 (0.7828)	-0.4370 (0.5310)		1.6961 (0.8410)	4.4706 (0.3513)	0.0891 (0.0084)	0.5059 (0.4679)
<i>Age (t-1)</i>	-0.0000 (0.0008)	0.0253 (0.0118)	-0.1462 (0.0388)	-0.0116 (0.0302)	0.0031 (0.0020)		0.0544 (0.0185)	0.0011 (0.0004)	0.0022 (0.0241)
<i>Insti (t-1)</i>	-0.0007 (0.0016)	0.0307 (0.0192)	-0.1323 (0.0593)	0.0245 (0.0468)	0.0396 (0.0032)	0.2443 (0.0733)		0.0016 (0.0008)	0.0519 (0.0382)
<i>LogBsize (t-1)</i>	0.1499 (0.0714)	1.7483 (0.8955)	0.2816 (2.5503)	4.0499 (2.1360)	1.4800 (0.1518)	8.3724 (3.1225)	3.8510 (1.3851)		-0.4070 (1.7502)
<i>Nonex (t-1)</i>	0.0042 (0.0015)	-0.0322 (0.0195)	-0.0033 (0.0496)	0.0870 (0.0417)	0.0021 (0.0032)	0.0031 (0.0713)	0.0364 (0.0280)	-0.0003 (0.0007)	
<i>Busy_ind (t-1)</i>	0.8581 (0.0109)								
<i>R-square</i>	0.7822	0.1476	0.0547	0.2005	0.4915	0.0955	0.3195	0.2330	0.0225
<i>Number of observations</i>	5169	5169	5169	5169	5169	5169	5169	5169	5169

Table 5.6: Director networks, firm-specific variables, and past external leverage (Panel B).

In this table we report the results of OLS regression of current director network measured by busy independent board (*busy_ind*), and current firm characteristics variables on past external leverage, historical values of the firm characteristics variables. External leverage is measured by financial debt divided by the book value of total assets. The firm characteristics variables include ROA, sales growth (*SalGrow*), PPE/total assets (*Tangi*), firm size (*Size*), firm age (*Age*), institutional ownership (*Insti*), Log board size (*LogBsize*), percentage of non-executive directors (*Nonex*). Panel B reports the results of the regressions in which the dependent variables are the change from *t-1* to *t*.

Robust standard errors are in parentheses. Year dummies are included in all specifications. Items in boldface are significant at the 10% level or higher.

	$\Delta busy_ind$	ΔROA	$\Delta SaleGrow$	$\Delta Tangi$	$\Delta Size$	ΔAge	$\Delta Insti$	$\Delta LogBsize$	$\Delta Nonex$
Panel B: Dependent variable is change from <i>t-1</i> to <i>t</i>									
<i>ExtLev (t-1)</i>	-0.0029 (0.0014)	-0.0282 (0.0060)	-0.0210 (0.0501)	0.0386 (0.0086)	0.0002 (0.0003)	-0.0009 (0.0006)	-0.0177 (0.0064)	0.0000 (0.0001)	-0.0202 (0.0056)
<i>ROA (t-1)</i>	-0.0006 (0.0025)	-0.2687 (0.0198)	-0.5674 (0.0949)	-0.0277 (0.0143)	0.0025 (0.0007)	0.0008 (0.0004)	0.0302 (0.0119)	0.0005 (0.0002)	-0.0205 (0.0107)
<i>SalGrow (t-1)</i>	0.0007 (0.0006)	0.0017 (0.0027)	-0.9031 (0.0297)	-0.0009 (0.0029)	0.0006 (0.0001)	-0.0001 (0.0001)	0.0074 (0.0025)	-0.0000 (0.0001)	0.0010 (0.0023)
<i>Tangi (t-1)</i>	-0.0010 (0.0011)	0.0112 (0.0050)	-0.0657 (0.0437)	-0.1031 (0.0080)	-0.0006 (0.0003)	0.0006 (0.0004)	-0.0047 (0.0060)	0.0001 (0.0001)	0.0044 (0.0048)
<i>Size (t-1)</i>	0.0473 (0.0181)	-0.4313 (0.0969)	-1.8893 (0.7317)	0.0607 (0.1007)	-0.0233 (0.0047)	0.0086 (0.0048)	0.9007 (0.1000)	0.0107 (0.0017)	0.1578 (0.0830)
<i>Age (t-1)</i>	-0.0000 (0.0008)	0.0077 (0.0040)	-0.1248 (0.0371)	-0.0022 (0.0042)	-0.0008 (0.0002)	-0.0012 (0.0006)	0.0035 (0.0042)	0.0001 (0.0001)	0.0011 (0.0034)
<i>Insti (t-1)</i>	-0.0007 (0.0016)	0.0078 (0.0075)	-0.1130 (0.0543)	-0.0032 (0.0083)	0.0000 (0.0004)	0.0001 (0.0003)	-0.1484 (0.0100)	-0.0000 (0.0001)	0.0078 (0.0075)
<i>LogBsize (t-1)</i>	0.1499 (0.0714)	0.4997 (0.3223)	0.4835 (2.3864)	0.4581 (0.3813)	0.0297 (0.0161)	-0.0129 (0.0178)	1.1414 (0.3369)	-0.1293 (0.0086)	-0.4224 (0.3510)
<i>Nonex (t-1)</i>	0.0042 (0.0015)	-0.0020 (0.0070)	-0.0102 (0.0466)	0.0083 (0.0074)	-0.0006 (0.0003)	-0.0007 (0.0003)	0.0059 (0.0069)	-0.0003 (0.0001)	-0.1406 (0.0078)
<i>Busy_ind (t-1)</i>	-0.1419 (0.0109)								
<i>R-square</i>	0.0904	0.1452	0.5024	0.0681	0.0976	0.0652	0.2975	0.0723	0.0779
<i>Number of observations</i>	5169	5169	5169	5169	5169	5169	5169	5169	5169

Table 5.7: Tests of strict exogeneity of control variables.

This table provides the tests of strict exogeneity of control variables.

Results are reported from the fixed effects estimation of the model:

$$y_{i,t} = \alpha + \beta X_{i,t} + \Omega W_{i,t+1} + f_i + \varepsilon_{it}$$

where $W_{i,t+1}$ is a subset of forward values of director network variable and the control variables, X . y is external leverage (Extlev). X includes busy independent board (busy_ind), ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), firm age (Age), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). $\Omega=0$ is the null hypothesis of strict exogeneity. Robust standard errors are in parentheses. Year dummies are included in all specifications. Items in boldface are significant at the 10% level or higher.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fixed effects regression. Dependent variable is Extlev (t)										
<i>Busy_ind(t)</i>	-0.1632 (0.1127)	-0.1811 (0.1355)	-0.1835 (0.1353)	-0.1768 (0.1350)	-0.1718 (0.1354)	-0.1789 (0.1353)	-0.1855 (0.1352)	-0.1808 (0.1355)	-0.1857 (0.1359)	-0.1582 (0.1128)
<i>ROA (t)</i>	-0.3095 (0.0374)	-0.3344 (0.0331)	-0.3127 (0.0377)	-0.3008 (0.0368)	-0.3028 (0.0368)	-0.3115 (0.0375)	-0.3039 (0.0375)	-0.3093 (0.0375)	-0.3090 (0.0374)	-0.3275 (0.0317)
<i>SalGrow (t)</i>	0.0033 (0.0047)	0.0028 (0.0047)	0.0032 (0.0047)	0.0030 (0.0046)	0.0037 (0.0047)	0.0034 (0.0048)	0.0035 (0.0047)	0.0032 (0.0047)	0.0032 (0.0047)	0.0029 (0.0048)
<i>Tangi(t)</i>	0.1960 (0.0352)	0.1944 (0.0350)	0.1962 (0.0352)	0.1216 (0.0304)	0.1949 (0.0349)	0.1955 (0.0351)	0.1952 (0.0352)	0.1960 (0.0352)	0.1960 (0.0351)	0.1182 (0.0302)
<i>Size(t)</i>	4.0170 (0.6837)	4.1141 (0.6986)	3.9478 (0.6927)	3.9468 (0.6880)	5.3757 (0.8494)	3.9674 (0.6847)	4.3271 (0.6987)	4.0263 (0.6882)	4.0311 (0.6832)	4.7766 (0.9063)
<i>Age (t)</i>	-0.2442 (0.9817)	-0.2487 (0.9801)	-0.2397 (0.9857)	-0.2518 (0.9870)	-0.2255 (0.9725)	-2.8889 (2.3756)	-0.2345 (0.9815)	-0.2420 (0.9813)	-0.2541 (0.9778)	-2.9152 (2.4570)
<i>Insti (t)</i>	-0.1237 (0.0367)	-0.1235 (0.0366)	-0.1245 (0.0366)	-0.1239 (0.0368)	-0.1218 (0.0368)	-0.1234 (0.0367)	-0.0571 (0.0302)	-0.1239 (0.0367)	-0.1241 (0.0367)	-0.0587 (0.0299)
<i>LogBsize (t)</i>	0.0912 (1.6618)	0.0765 (1.6614)	0.1002 (1.6634)	0.0079 (1.6610)	0.2287 (1.6589)	0.0788 (1.6620)	0.2824 (1.6657)	0.5233 (1.3984)	0.0779 (1.6599)	0.5754 (1.3853)
<i>Nonex (t)</i>	0.0026 (0.0333)	0.0019 (0.0331)	0.0027 (0.0332)	0.0009 (0.0331)	0.0012 (0.0332)	0.0026 (0.0332)	0.0047 (0.0334)	0.0026 (0.0332)	-0.0160 (0.0280)	-0.0167 (0.0276)
<i>Busy_ind (t+1)</i>	-0.0311 (0.1070)									-0.0408 (0.1103)
<i>ROA (t+1)</i>		0.0547 (0.0330)								0.0664 (0.0334)
<i>SalGrow (t+1)</i>			-0.0043 (0.0052)							-0.0043 (0.0050)
<i>Tangi(t+1)</i>				0.1166 (0.0270)						0.1180 (0.0274)
<i>Size (t+1)</i>					-1.7535 (0.8639)					-0.6319 (0.9201)
<i>Age (t+1)</i>						2.7064 (2.5077)				2.7389 (2.5910)
<i>Insti (t+1)</i>							-0.1141 (0.0318)			-0.1114 (0.0320)
<i>LogBsize (t+1)</i>								-0.6814 (1.2277)		-0.5398 (1.2616)
<i>Nonex(t+1)</i>									0.0338 (0.0245)	0.0335 (0.0244)
<i>R-square</i>	0.2030	0.2037	0.2032	0.2082	0.2042	0.2034	0.2068	0.2030	0.2033	0.2146
<i>Observations</i>	5169	5169	5169	5169	5169	5169	5169	5169	5169	5169

Lags of the dependent variable

For consistent estimation using the dynamic panel GMM estimator, it is essential to figure out how many lags of external leverage are needed to capture all information from the past because of the following reasons: First, failure to capture all influences of the past on the present could lead to omitted variable bias. Second, we argue that all older lags are exogenous with respect to the residuals of the present, thus they can be used as instruments.

To determine the number of lags needed to ensure dynamic completeness, following Wintoki et al. (2012), we estimate a regression of current leverage on up to six lags of past external leverage, controlling for other firm-specific characteristics. The results are presented in Table 5.8. Columns 1-3 in this table suggest that including two lags is sufficient to capture the dynamic aspect of the network/external leverage relation. The first two lags in all the three columns are statistically significant, while older lags are insignificant. Thus, two lags of external leverage are included in the GMM model.

Table 5.8: The number of lags of external leverage and dynamic completeness.

In this table, the results are presented from the OLS estimation of the model:

$$y_{it} = \alpha_1 + \sum_{p=1}^6 k_p y_{it-p} + k Z_{it} + \eta_i + \varepsilon_{it}$$

y_{it} is external leverage. Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), firm age (Age), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. t-statistics are reported in parentheses. Robust standard errors are in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% level, respectively. Year dummies and firm fixed effects are included in all specifications.

	(1)	(2)	(3)
<i>Extlev (t-1)</i>	0.5939*** (0.0338)	0.5939*** (0.0351)	0.6278*** (0.0315)
<i>Extlev (t-2)</i>	-0.0719** (0.0301)	-0.0579** (0.0274)	-0.0523** (0.0264)
<i>Extlev (t-3)</i>	-0.0354 (0.0223)	-0.0316 (0.0217)	-0.0304 (0.0213)
<i>Extlev (t-4)</i>	0.0008 (0.0287)	0.0031 (0.0260)	-0.0409 (0.0179)
<i>Extlev (t-5)</i>	-0.0507 (0.0309)	-0.0660 (0.0222)	
<i>Extlev (t-6)</i>	-0.0342 (0.0260)		
<i>ROA</i>	-0.2273*** (0.0288)	-0.2276*** (0.0268)	-0.2207*** (0.0274)
<i>SalGrow</i>	0.0023 (0.0051)	0.0050 (0.0054)	0.0064 (0.0053)
<i>Tangi</i>	0.0443** (0.0224)	0.0547** (0.0218)	0.0591** (0.0198)
<i>Size</i>	2.8883*** (0.6712)	2.5249*** (0.5859)	2.4803*** (0.4995)
<i>Age</i>	0.8539 (0.6548)	0.7133 (0.7635)	0.7403 (0.6476)
<i>Insti</i>	-0.1027*** (0.0300)	-0.0650** (0.0278)	-0.0653*** (0.0250)
<i>LogBsize</i>	-1.3066 (1.1251)	-1.1084 (1.0820)	-0.9441 (0.9914)
<i>Nonex</i>	-0.0094 (0.0233)	-0.0033 (0.0229)	-0.0042 (0.0201)
<i>R-square</i>	0.8759	0.8629	0.8599
<i>Number of observations</i>	3022	3430	3854

The two-step system GMM model

After determining endogenous variables, exogenous variables, and the number of lags of the dependent variable, we arrive at the following system GMM model to examine the relationship between external leverage and director network:

$$y_{it} = a_1 + k_1y_{it-1} + k_2y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (busy_ind). Z_{it} includes ROA, sales growth (SaleGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), and percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term.

In this GMM model, the two lags of the external leverage are included. This makes historical external leverage and historical firm-specific characteristics, lagged three periods or more, available for use as instruments. Variables lagged three and four periods (t-3 and t-4, respectively) are applied as the instruments for all the endogenous variables in the GMM estimates.

Diagnostic tests for the validity of the chosen system

GMM model

The key exogeneity assumption in the model is that the firm's historical leverage and characteristics are exogenous with respect to current shocks or innovations in leverage. Arellano and Bond (1991) suggest two main tests for this assumption. The first test is a test of second-order serial correlation. For the GMM estimates, if the assumption of our specifications is valid, the residuals in first differences (AR(1)) should be correlated, but there should be no serial correlation in second differences (AR(2)).

The second test is a Hansen (1982) test. The J statistic has a null hypothesis for exogenous instruments and refers to all of the instruments collectively. Low p-values mean that the instruments are not exogenous. Besides the two abovementioned tests, difference-in-Hansen (or C) tests are also conducted. These are diagnostic tests that inspect the exogeneity of a particular subset of instruments. Thus, this means that we can check the model validity that results from the choices of endogenous and exogenous variables. This decision is essential since it can affect the overall J test result, and can alter somewhat the coefficients obtained for the independent variables. This C test is well

explained in Baum et al. (2003). All of these diagnostic tests are performed by `xtabond2` in Stata. Also, a specific explanation on how to use `xtabond2` in the system GMM model is provided by Roodman (2009b).

Number of instruments used in the GMM model

The GMM estimator applies multiple lags as instruments. Thus, there is a growing concern about the consequences of instrument proliferation in the GMM model. In particular, the proliferation of instruments possibly results in overfitting endogenous variables (i.e. numerous instruments can overfit instrumented variables, failing to expunge their endogenous components and biasing coefficient estimates toward those from non-instrumenting estimators); downward bias in two-step standard errors, weak Hansen test of instrument validity (Roodman 2009a). Thus, in this research, we apply the collapse option in `xtabond2`, and limit the number of the instruments used to mitigate the instrument proliferation problem (Roodman 2009b). Specifically, the lags from period $t-3$, and $t-4$ are used as instruments. The choice of instruments from these two periods is based on the empirical analysis from Table 5.8 that suggests two lags are needed to make the model dynamically complete.

Potential endogeneity

There is a concern that the busyness of directors and the choice to belong to a group-affiliation may be jointly determined.

In India, multiple directorships are quite pervasive in both business groups and non-group firms due to the shortage of industrial leadership with adequate experience to serve on corporate boards. Thus, independent directors serve on different groups and non-group firms simultaneously. Put differently, they are “overboarded” and too busy.

Moreover, the corporate sector in this country is dominated by business groups (more details in Chapter 2). The majority of listed firms on the stock exchanges and in the Prowess database are group-affiliated firms. Previous studies on the impact of the busyness of directors on different aspects of corporate performance in India (e.g. Sarkar and Sarkar 2009; Jackling and Juhl 2009; Sarkar et al. 2008, among others) all focus on a sample including both group and non-group firms. Above three-quarters of which are group-affiliated firms. The issue that the busyness of directors and the choice to belong to a group-affiliation may be

jointly determined has not been discussed and addressed in their research.

The study in Chapter 5 includes 445 firms, 302 of which are group affiliated and 143 unaffiliated (i.e. non-group firms). On average, in group firms, each independent director has around 5 directorships. In non-group firms, an independent director also serves on around 5 other boards. Similarly, the ratio of busy independent boards in group and non-group firms is above 50% each (Table 5.2). Thus, independent directors in the sample are busy regardless of whether they serve on boards of groups or of non-group firms.

In a sub-sample that includes only non-group firms, we also obtain the same result as reported for the whole sample, when examining the impact of multiple directorships on external finance (Table 5.21).

5.5 Results

This section reports the results of: the reaction of outside creditors to the independent directors' networks (Table 5.9); the association between intra-group loans and external finance (Table 5.10); and the moderation role of busy independent board across group and non-group firms in the context of external finance (Table 5.11).

5.5.1 Independent director networks and external leverage

Table 5.9 reports the results of both the fixed effects model and the system GMM model. Both the fixed effects and GMM estimates report a negative relation between director network and external leverage. However, there is an increase in both the magnitude and the level of significance of the estimated coefficient on the network variable when moving from the fixed effects model to the system GMM model. In particular, the coefficient on busy independent board is an insignificantly negative -0.3886 in the fixed effects model (Column 1), but is significant in the system GMM model ($\beta = -3.1872$, $p\text{-value} = 0.05$), (Column 2).

The rise in the magnitude and the level of significance of the estimated coefficient on the network variable in the GMM model

may arise from controlling for the dynamic relation between director network and past external leverage. Since director network is negatively related to past external leverage (as shown in Table 5.6). Failing to control for this dynamic relation, the fixed effects model is unable to fully reflect the impact of director network on external leverage. Overall, busy independent directors appear to have an unfavourable impact on the firm's external finance. Hence, we provide evidence to support hypothesis 1. Firms with greater connectedness of independent directors face more limited access to external finance. Our finding is different from that of Chuluun et al. (2014), who document that firms with greater connectedness of directors leads to more external debt for US firms.

In column 2, Table 5.9, we also report the results of the specification tests (i.e. the AR(2) second-order serial correlation tests, the Hansen J test of over-identifying restrictions, and the Difference in Hansen test of exogeneity). In detail, the AR(2) test has a p-value of 0.26 which means that the null hypothesis of no second-order serial correlation cannot be rejected. The Hansen test of over-identification yields a p-value of 0.36, thus we cannot reject the hypothesis that our instruments are valid. The

Difference in Hansen test of exogeneity has a *p-value* of 0.42, which means that the null that instruments used for the equations in levels are exogenous cannot be rejected. Overall, the tests reflect that the instruments are appropriate and well identified in each model.

Table 5.9: The effect of director network (*denoted by busy_ind*) on external leverage.

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1y_{it-1} + k_2y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (busy_ind). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. For the fixed effect model, it is assumed that $k_1=k_2=0$. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	Fixed effects model (1)	GMM model (2)
<i>Busy_ind</i>	-0.3886 (0.5792)	-3.1872** (1.7763)
<i>ROA</i>	-0.3065*** (0.0359)	-0.0558 (0.0903)
<i>SalGrow</i>	0.0041 (0.0045)	-0.0184 (0.0286)
<i>Tangi</i>	0.1990*** (0.0344)	0.0098 (0.0434)
<i>Size</i>	4.0833*** (0.6668)	2.3220*** (0.8275)
<i>Age</i>	-0.1703 (0.8653)	-0.0194 (0.0159)
<i>Insti</i>	-0.1306*** (0.0359)	-0.1235** (0.0548)
<i>LogBsize</i>	-0.1508 (1.6207)	4.7391 (3.1281)
<i>Nonex</i>	0.0180 (0.0324)	-0.1079 (0.0798)
<i>Extlev (t-1)</i>		0.5501** (0.2367)
<i>Extlev (t-2)</i>		0.2165 (0.2087)
<i>R-square</i>	0.2033	
<i>AR (2) test p (value)</i>		0.26
<i>Number of observations</i>	5616	4724
<i>Hansen test of over-identification (p-value)</i>		0.36
<i>Diff-in Hansen tests of exogeneity (p-value)</i>		0.42

5.5.2. Intra-group loan and external leverage

Table 5.10 provides the relation between intra-group loan and external leverage. We argue that if member firms are net loan receivers from their corresponding group, they may less rely on external finance. Indeed, we find a negative association between net receiver variable and external finance. Specifically, the coefficient on the net receiver variable is an insignificantly negative -1.2999, using a fixed effects model (Model 1). In the system GMM model, it is negative and significant ($\beta = -2.8490$, $p\text{-value} = 0.1$) (Model 2).

In Column 2, the results of the specification tests are also reported. Specifically, the AR (2) test has a p-value of 0.47 which means that the null hypothesis of no second-order serial correlation cannot be rejected. The Hansen test of over-identification yields a p-value of 0.23, thus we cannot reject the hypothesis that our instruments are valid. The Difference in Hansen tests of exogeneity with a p-value of 0.34 which mean that the null that instruments used for the equations in levels are exogenous cannot be rejected. In short, the tests for instrumental variables show that the instruments are appropriate and well identified in each model.

The results lend support to Hypothesis 2 that indicates a negative relation between net intra-group loan and external leverage. Receiving financial support from other firms within a group, a group member less relies on external leverage for funding. When a member firm faces financial difficulties, other group members may provide subsidized support to that weaker firm to prevent that firm's default. Group insiders may wish to avoid the negative signal about future prospects or damage to their reputation to the provider of external capital (see, for example, the borrower reputation model of Diamond (1989)).

Looking closely at the sample firms, it is quite common to observe a reduction in external leverage for a net receiver firm within a group (such as 63 Moons Technologies Ltd in the years 2005 and 2007, Akzo Nobel India Ltd in 2010, among others). This result is also consistent with that of Buchuk et al. (2014). Accordingly, the authors find a decline in external leverage for net loan receivers in non-financial Chilean group firms from 1990 to 2009. The result also emphasizes the existence and the role of the internal capital markets to corporate financing within business groups in India (Khanna and Palepu 2000a; Gopalan et al. 2007).

Table 5.10: Intra-group loans and external finance

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1 y_{it-1} + k_2 y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (busy_ind). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes Net receiver (NetRec), firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. For the fixed effect model, it is assumed that $k_1=k_2=0$. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	Fixed effects model	System GMM model
	(1)	(2)
NetRec	-1.2999 (1.6091)	-2.8490* (1.5909)
Busy_ind	-0.2184 (0.7021)	-4.9985** (1.9540)
ROA	-0.3379*** (0.0440)	-0.1459 (0.1433)
SalGro	0.0080 (0.0056)	-0.0089 (0.0341)
Tangi	0.1915*** (0.0371)	0.0821 (0.0552)
Size	4.7711*** (0.7811)	0.8216 (1.0600)
Age	-0.1648 (0.9029)	0.0065 (0.0153)
Insti	-0.1389*** (0.0377)	-0.0132 (0.0421)
LogBsi	0.6568 (1.8404)	-1.2221 (1.4070)
Nonex	-0.0137 (0.0383)	-0.2028* (0.1056)
Extlev (t-1)		0.7051*** (0.2506)
Extlev (t-2)		0.0620 (0.2246)
R-square	0.2311	
Number of observations	3937	3333
AR (2) test (p-value)		0.47
Hansen test of over-identification (p-value)		0.23
Diff-in-Hansen tests of exogeneity (p-value)		0.34

5.5.3 The moderation role of busy independent board across the group and non-group firms in the context of external finance

We hypothesize that group firms with busy independent board will probably face more limited access to external finance than non-group firms with busy boards. Table 5.11 presents the regression results of the analysis.

Model 4 includes interaction between busy independent board and group dummy, enabling analysis of the moderating effect of busy board on the relationship between group-affiliated firms and external finance (Hypothesis 3). The coefficient on this interaction is negative and significant ($\beta=-7.347$, $t=-2.16$, $p\text{-value}=0.031$). This lends support to Hypothesis 3. Group-affiliated firms with busy independent boards face more limited access to external finance than non-group firms with busy independent boards.

Table 5.11: The moderation role of busy independent board and external leverage.

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1y_{it-1} + k_2y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (busy_ind). Z_{it} includes Group, the interaction term busy_ind x Group, ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	(1)	(2)	(3)	(4)
<i>Busy_ind</i>	-3.1872* (1.7763)		-2.9967* (1.7291)	1.6567 (2.7508)
<i>Group</i>		-1.1904 (6.5956)	-0.0863 (6.6402)	6.7851 (6.3825)
<i>Busy_ind x Group</i>				-7.3470** (3.3966)
<i>ROA</i>	-0.0558 (0.0903)	-0.0059 (0.1027)	-0.0394 (0.0971)	-0.0504 (0.1020)
<i>SalGrow</i>	-0.0184 (0.0286)	-0.0357 (0.0330)	-0.0278 (0.0308)	-0.0199 (0.0297)
<i>Tangi</i>	0.0098 (0.0434)	0.0127 (0.0466)	0.0109 (0.0437)	0.0183 (0.0454)
<i>Size</i>	2.3220*** (0.8275)	2.2982*** (0.7861)	2.0334** (0.7872)	1.3511 (0.8410)
<i>Age</i>	-0.0194 (0.0159)	-0.0306** (0.0145)	-0.0205 (0.0153)	-0.0188 (0.0166)
<i>Insti</i>	-0.1235** (0.0548)	-0.1380** (0.0536)	-0.1102** (0.0558)	-0.0867 (0.0579)
<i>LogBsize</i>	4.7391 (3.1281)	6.3686* (3.3938)	4.3100 (3.5775)	3.5422 (3.5920)
<i>Nonex</i>	-0.1079 (0.0798)	-0.0850 (0.0784)	-0.0861 (0.0807)	-0.1162 (0.0824)
<i>Extlev (t-1)</i>	0.5501** (0.2367)	0.7611*** (0.2307)	0.6974*** (0.2220)	0.7265*** (0.2360)
<i>Extlev (t-2)</i>	0.2165 (0.2087)	0.0272 (0.2073)	0.0842 (0.1994)	0.0637 (0.2093)
<i>Number of observations</i>	4724	4724	4724	4724
<i>AR (2) test p (value)</i>	0.174	0.714	0.489	0.56
<i>Hansen test of over-identification (p-value)</i>	0.361	0.204	0.280	0.281
<i>Diff-in Hansen tests of exogeneity (p-value)</i>	0.423	0.307	0.263	0.202

5.6 Robustness checks

In this section, we conduct robustness checks for the results reported in Section 5.5. First, a number of different measures of busy independent board are used including directorships per independent director (IndDirec) (Ferris et al. 2003); dummy variables for directorships per independent director greater than three (IndDirect1) and greater than four (IndDirect2); busy independent board with 60% or more independent directors hold three or more total directorships (busy_ind1). Second, one lag of the dependent variable is used in the GMM model instead of the current two lags.

5.6.1 Independent director networks and external leverage

As shown in Column 1 (Table 5.12), the coefficient on IndDirec is negative but statistically insignificant (-0.1855, *p-value* = 0.16) in the fixed effects model. In the system GMM model, this coefficient is negative and significant (-0.4116, *p-value* = 0.05) (Column 2).

Table 5.13 also reports a negative association between independent director networks and external leverage, using IndDirec1 and IndDirec2 as measures of director networks.

Specifically, these two coefficients are both negative and significant ($p\text{-value} = 0.05$).

The results also hold when using other measures of busy independent board. When the percentage of independent directors who hold three or more total directorships, and the total directorships per independent directors exceed their mean values, the same findings are obtained. For instance, boards with 75% or more independent directors hold three or more total directorships, and boards with 50% or more independent directors hold five or more total directorships both negatively impact external leverage ($\beta = -3.2483$, $p\text{-value} = 0.05$; $\beta = -4.1622$, $p\text{-value} = 0.05$, respectively).

The results persist when one lag of the dependent variable was applied to the GMM model. Specifically, in Tables 5.14-5.15, the coefficients on the measures of independent directors' networks (i.e. *busy_ind*, *IndDirec*) are all negative and significant at 5% level in the GMM model. Using *IndDirec1* and *IndDirec2* as alternative measures of independent directors' networks, we also obtain the same findings (Table 19, Appendix D).

Table 5.12: The effect of director network (*denoted by IndDirec*) on external leverage.

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1 y_{it-1} + k_2 y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes directorships per independent director (IndDirec). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. For the fixed effect model, it is assumed that $k_1=k_2=0$. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	<i>Fixed effects model</i>	<i>GMM model</i>
	(1)	(2)
<i>IndDirec</i>	-0.1855 (0.1318)	-0.4116** (0.2060)
<i>ROA</i>	-0.3056*** (0.0357)	-0.0466 (0.0990)
<i>SalGrow</i>	0.0039 (0.0045)	-0.0201 (0.0290)
<i>Tangi</i>	0.1995*** (0.0345)	0.0045 (0.0453)
<i>Size</i>	4.1186*** (0.6662)	2.4212*** (0.8147)
<i>Age</i>	-0.1659 (0.8679)	-0.0199 (0.0147)
<i>Insti</i>	-0.1314*** (0.0359)	-0.1347*** (0.0512)
<i>LogBsize</i>	-0.2590 (1.6322)	5.1769* (2.9420)
<i>Nonex</i>	0.0180 (0.0324)	-0.1371* (0.0799)
<i>Extlev (t-1)</i>		0.5368** (0.2667)
<i>Extlev (t-2)</i>		0.2279 (0.2328)
<i>R-square</i>	0.2041	
<i>Number of observations</i>	5616	4724
<i>AR (2) test p (value)</i>		0.34
<i>Hansen test of over-identification (p-value)</i>		0.27
<i>Diff-in Hansen tests of exogeneity (p-value)</i>		0.49

Table 5.13: The effect of director network (*denoted by IndDirec1 and IndDirec2*) on external leverage.

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1y_{it-1} + k_2y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes directorships per independent director greater than 3 and 4 (IndDirec1; IndDirec2). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)
<i>IndDirec1</i>	-4.6470** (2.0990)	
<i>IndDirec2</i>		-2.8757** (1.4822)
<i>ROA</i>	-0.0526 (0.0948)	-0.0364 (0.0924)
<i>SalGrow</i>	-0.0194 (0.0281)	-0.0266 (0.0296)
<i>Tangi</i>	-0.0138 (0.0466)	-0.0027 (0.0451)
<i>Size</i>	2.4568*** (0.8535)	2.4637*** (0.7951)
<i>Age</i>	-0.0184 (0.0166)	-0.0211 (0.0149)
<i>Insti</i>	-0.1337** (0.0547)	-0.1385*** (0.0509)
<i>LogBsize</i>	5.5711* (3.0900)	5.4000* (2.9843)
<i>Nonex</i>	-0.1045 (0.0814)	-0.1098 (0.0806)
<i>Extlev (t-1)</i>	0.4753* (0.2537)	0.5816** (0.2474)
<i>Extlev (t-2)</i>	0.2816 (0.2206)	0.1904 (0.218)
<i>Number of observations</i>	4724	4724
<i>AR (2) test p (value)</i>	0.377	0.253
<i>Hansen test of over-identification (p-value)</i>	0.267	0.296
<i>Diff-in Hansen tests of exogeneity (p-value)</i>	0.336	0.294

Table 5.14: The effect of director network (*denoted by busy_ind*) on external leverage (*one-lag dependent variable*).

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + ky_{it-1} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (busy_ind). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. For the fixed effect model, it is assumed that $k=0$. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	Fixed effects model	System GMM
	(1)	(2)
<i>busy_ind</i>	-0.3886 (0.5792)	-3.2311* (1.7382)
<i>ROA</i>	-0.3065*** (0.0359)	-0.0123 (0.0745)
<i>SalGrow</i>	0.0041 (0.0045)	-0.0252 (0.0304)
<i>Tangi</i>	0.1990*** (0.0344)	0.0196 (0.0421)
<i>Size</i>	4.0833*** (0.6668)	1.8551** (0.7647)
<i>Age</i>	-0.1703 (0.8653)	-0.0171 (0.0156)
<i>Insti</i>	-0.1306*** (0.0359)	-0.1085** (0.0517)
<i>LogBsize</i>	-0.1508 (1.6207)	4.2127 (3.0528)
<i>Nonex</i>	0.0180 (0.0324)	-0.0842 (0.0675)
<i>Extlev (t-1)</i>		0.7933*** (0.0306)
<i>R-square</i>	0.2033	
<i>Number of observations</i>	5616	5169
<i>AR (2) test p (value)</i>		0.541
<i>Hansen test of over-identification (p-value)</i>		0.589
<i>Diff-in Hansen tests of exogeneity (p-value)</i>		0.447

Table 5.15: The effect of director network (*denoted by IndDirec*) on external leverage (*one-lag dependent variable*).

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + ky_{it-1} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes directorships per independent director (IndDirec). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. For the fixed effect model, it is assumed that $k=0$. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	Fixed effects model	System GMM
	(1)	(2)
IndDirec	-0.1855 (0.1318)	-0.3849** (0.1984)
ROA	-0.3056*** (0.0357)	0.0031 (0.0758)
SalGrow	0.0039 (0.0045)	-0.0277 (0.0318)
Tangi	0.1995*** (0.0345)	0.0053 (0.0432)
Size	4.1186*** (0.6662)	1.9239** (0.7465)
Age	-0.1659 (0.8679)	-0.0182 (0.0147)
Insti	-0.1314*** (0.0359)	-0.1207** (0.0486)
LogBsize	-0.2590 (1.6322)	4.7770* (2.8894)
Nonex	0.0180 (0.0324)	-0.1128* (0.0658)
Extlev (t-1)		0.7952*** (0.0312)
R-square	0.2041	
Number of observations	5616	5169
AR (2) test p (value)		0.537
Hansen test of over-identification (p-value)		0.497
Diff-in Hansen tests of exogeneity (p-value)		0.456

Overall, both the fixed effects model and the two-step system GMM reflect a negative relationship between independent

directors' networks and external leverage. However, the results are insignificant in the fixed effects model ²², and are significant in the GMM model, using alternative measures of director networks.

5.6.2. Intra-group loan and external leverage

Table 5.16 shows the robustness check for the association between intra-group loan and external finance. The coefficient on net receiver variable is an insignificantly negative -1.2961 using a fixed effects model (Model 1). In the system GMM model, it is significantly negative (-3.4678, *p-value* =0.05 (Model 3)). When extending Model 3 by adding directorships per independent director (i.e. IndDirec) as an alternative measure for director network, the coefficient on net receiver variable is also significantly negative (-2.7408, *p-value* =0.1 (Model 4)). Additionally, the tests for the instrumental variables show that the instruments are appropriate and well identified in the GMM model.

²² For fixed effects model, the results are again negative but insignificant when alternative measure of firm size (i.e. net sales, Chuluun et al. (2014)) is used.

Table 5.16: Intra-group loans and external finance (*IndDirec*).

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1 y_{it-1} + k_2 y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (*Extlev*). X_{it} includes directorships per independent director (*IndDirec*). Z_{it} includes ROA, sales growth (*SalGrow*), PPE/total assets (*Tangi*), firm size (*Size*), institutional ownership (*Insti*), Log board size (*LogBsize*), percentage of non-executive directors (*Nonex*). D_{it} includes Net receiver (*NetRec*), firm age (*Age*) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. For the fixed effect model, it is assumed that $k_1=k_2=0$. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively.

	<i>Fixed effects model</i>		<i>GMM model</i>	
	(1)	(2)	(3)	(4)
<i>NetRec</i>	-1.2961 (1.6102)	-1.2952 (1.6137)	-3.4678** (1.8017)	-2.7408* (1.7320)
<i>IndDirec</i>		-0.0030 (0.1612)		-0.5080* (0.2961)
<i>ROA</i>	-0.3383*** (0.0441)	-0.3383*** (0.0440)	-0.0398 (0.1566)	-0.1346 (0.1784)
<i>SalGro</i>	0.0080 (0.0056)	0.0080 (0.0056)	-0.0133 (0.0368)	-0.0173 (0.0307)
<i>Tangi</i>	0.1918*** (0.0372)	0.1918*** (0.0372)	0.0902* (0.0534)	0.0600* (0.0583)
<i>Size</i>	4.7615*** (0.7775)	4.7621*** (0.7800)	1.5760 (1.1225)	1.1279 (1.1089)
<i>Age</i>	-0.1623 (0.9043)	-0.1623 (0.9044)	-0.0030 (0.0148)	-0.0055 (0.0147)
<i>Insti</i>	-0.1392*** (0.0377)	-0.1392*** (0.0376)	-0.0403 (0.0428)	-0.0362 (0.0429)
<i>LogBsi</i>	0.7076 (1.8252)	0.7048 (1.8345)	-1.7797 (1.4023)	-1.2996 (1.4676)
<i>Nonex</i>	-0.0139 (0.0383)	-0.0139 (0.0383)	-0.1679 (0.1164)	-0.2101* (0.1116)
<i>Extlev (t-1)</i>			0.9186*** (0.3244)	0.7125** (0.3743)
<i>Extlev (t-2)</i>			-0.1240 (0.2915)	0.0664 (0.3364)
<i>R-square</i>	0.2311	0.2311		
<i>Number of observations</i>	3937	3937	3333	3333
<i>AR (2) test (p-value)</i>			0.87	0.64
<i>Hansen test of over-identification (p-value)</i>			0.24	0.18
<i>Diff-in-Hansen tests of exogeneity (p-value)</i>			0.27	0.29

In short, the results again support Hypothesis 2 that indicates a negative relationship between net intra-group loan and external leverage.

5.6.3 The moderation role of busy independent board across the group and non-group firms in the context of external finance

In Table 5.17, we re-estimate the regressions from Table 5.11, using *Busy_Ind1* (i.e. boards with 60% or more independent directors hold three or more total directorships) as a measure of busy independent board. The interaction term, *Busy_ind1 x Group*, is negatively related to external finance ($\beta = -8.5796$, $p\text{-value} = 0.05$, Model 3).

The results also hold in Table 5.18 and Table 5.20 (Appendix D) when one lag of dependent variable was applied to the GMM model. The interaction terms, *Busy_ind x Group* and *Busy_ind1 x Group* are negatively related to external finance ($\beta = -7.2714$, $p\text{-value} = 0.05$; $\beta = -7.4446$, $p\text{-value} = 0.05$, respectively).

Additionally, the tests for the instrumental variables show that the instruments are appropriate and well identified in each model in these tables.

Table 5.17: The moderation role of busy independent board (denoted by *busy-ind1*) and external leverage.

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1y_{it-1} + k_2y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (*Extlev*). X_{it} includes busy independent board (*busy_ind1*). Z_{it} includes Group, the interaction term *busy_ind1* x Group, ROA, sales growth (*SalGrow*), PPE/total assets (*Tangi*), firm size (*Size*), institutional ownership (*Insti*), Log board size (*LogBsize*), percentage of non-executive directors (*Nonex*). D_{it} includes firm age (*Age*) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	(1)	(2)	(3)
<i>busy_ind1</i>	-3.5628* (1.9936)		3.1424 (3.2073)
<i>Group</i>		0.8173 (6.3383)	5.6711 (7.7458)
<i>busy_ind1</i> x <i>Group</i>			-8.5796** (4.2604)
<i>ROA</i>	-0.0243 (0.1051)	0.0372 (0.0999)	-0.0593 (0.1150)
<i>SalGrow</i>	-0.0251 (0.0334)	-0.0313 (0.0377)	-0.0207 (0.0276)
<i>Tangi</i>	0.0207 (0.0457)	0.0303 (0.0443)	0.0064 (0.0469)
<i>Size</i>	2.5710*** (0.8929)	2.7271*** (0.8577)	1.4998* (0.8666)
<i>Age</i>	-0.0115 (0.0136)	-0.0216* (0.0129)	-0.0240 (0.0169)
<i>Insti</i>	-0.0847** (0.0420)	-0.1026** (0.0455)	-0.0982 (0.0644)
<i>LogBsize</i>	-1.9663 (1.3126)	-2.4918 (1.9473)	4.3277 (3.8384)
<i>Nonex</i>	-0.0615 (0.0844)	-0.0277 (0.0832)	-0.1297 (0.0908)
<i>Extlev</i> (t-1)	0.6439** (0.2520)	0.8739*** (0.2259)	0.6181** (0.2821)
<i>Extlev</i> (t-2)	0.1247 (0.2218)	-0.0743 (0.2009)	0.1650 (0.2505)
<i>Number of observations</i>	4724	4724	4724
<i>AR (2) test p (value)</i>	0.403	0.843	0.343
<i>Hansen test of over-identification (p-value)</i>	0.133	0.098	0.125
<i>Diff-in Hansen tests of exogeneity (p-value)</i>	0.421	0.789	0.18

Table 5.18: The moderation role of busy independent board (*denoted by busy_ind*) and external finance (*one-lag dependent variable*)

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + ky_{it-1} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (*busy_ind*). Z_{it} includes Group, the interaction term *busy_ind* x Group, ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	(1)	(2)	(3)	(4)
<i>Busy_ind</i>	-3.2311* (1.7382)		-3.1186* (1.7246)	1.4253 (2.7185)
<i>Group</i>		-0.9216 (6.1031)	-0.3101 (5.9016)	6.1740 (5.7340)
<i>Busy_ind</i> x <i>Group</i>				-7.2714** (3.3495)
<i>ROA</i>	-0.0123 (0.0745)	-0.0087 (0.0748)	-0.0241 (0.0738)	-0.0378 (0.0746)
<i>SalGrow</i>	-0.0252 (0.0304)	-0.0401 (0.0324)	-0.0354 (0.0309)	-0.0282 (0.0315)
<i>Tangi</i>	0.0196 (0.0421)	0.0138 (0.0432)	0.0165 (0.0417)	0.0243 (0.0431)
<i>Size</i>	1.8551** (0.7647)	2.0058*** (0.7471)	1.7812** (0.7512)	1.1522 (0.7993)
<i>Age</i>	-0.0171 (0.0156)	-0.0296** (0.0148)	-0.0191 (0.0155)	-0.0169 (0.0167)
<i>Insti</i>	-0.1085** (0.0517)	-0.1263** (0.0529)	-0.1005* (0.0535)	-0.0788 (0.0557)
<i>LogBsize</i>	4.2127 (3.0528)	5.9742* (3.3974)	4.0679 (3.5561)	3.2297 (3.5651)
<i>Nonex</i>	-0.0842 (0.0675)	-0.0938 (0.0708)	-0.0803 (0.0692)	-0.1114 (0.0696)
<i>Extlev</i> (t-1)	0.7933*** (0.0306)	0.7940*** (0.0320)	0.7909*** (0.0315)	0.7946*** (0.0329)
<i>Number of observations</i>	5169	5169	5169	5169
<i>AR (2) test p (value)</i>	0.541	0.585	0.559	0.509
<i>Hansen test of over-identification (p-value)</i>	0.589	0.337	0.503	0.555
<i>Diff-in Hansen tests of exogeneity (p-value)</i>	0.447	0.328	0.361	0.367

5.7 Discussion and conclusions

In this chapter, we examine the relation between independent director networks and corporate external leverage in a panel of 445 top Indian firms from 2000 to 2014.

Using alternative measures of director networks and the two-step system GMM model, the study shows a negative association between busy independent boards and firms' external finance. In addition, the result confirms the existence of the internal capital market in Indian business groups, and shows a negative relationship between net loan receivers and external finance. The study also reveals that, compared to non-group firms with busy independent boards, group firms with such boards face more limited access to external finance.

The findings in our study have both theoretical and practical implications. With regard to theoretical implications, our study emphasizes the impact of agency problems in the relationship between borrowers and creditors. Due to agency conflicts, creditors are cautious toward borrowers' unfavourable signals (i.e. a busy independent board in this instance) that can cause a decline in corporate performance and transparency. In addition,

the study also stresses the importance of good corporate governance in lending. Accordingly, deterioration in corporate governance quality can adversely impact the lending relationship.

Not limited to the lending relationship, these findings also indicate that improved governance of business groups may be needed to ensure that management is doing what is best for shareholders and that minority shareholders' rights are protected.

With regard to methods of research, our study takes into account an important source of endogeneity that arises because the relations among a firm's observable characteristics are likely to be dynamic. Specifically, in the context of corporate governance, current firm external leverage will affect future governance choices and these may, in turn, affect future firm leverage.

Regarding practical implications, through the negative association between a busy independent board and external finance, it seems that outside investors do pay attention to independent directors and put their trust in this type of director when evaluating the likelihood of default of a borrower. For firms with higher information asymmetry, the marginal impact of board

capital (such as board independence, board network) on external finance is likely to be greater (Botosan 1997; Butler 2008; Mansi et al. 2011).

Therefore, further enhancement in the roles of independent directors in corporate strategic activities should be considered. To do this, Indian firms, first, should follow appropriate procedures in the nomination process for this type of director. Second, they should create more room for independent directors to actively participate in firm strategic activities. According to the review of corporate governance practices by FICCI and Thornton (2009), the most reputed accountancy firm in this country, 59% of the respondent companies think that the involvement of independent directors in the annual planning and strategy development was moderate, while 13% agreed that the involvement was minimal. In addition, Indian firms should limit the number of busy independent directors in the boardroom, because under the lens of outside investors in this study, it seems that the costs of a 'too-busy' independent board far outweigh its benefits. Coincidentally, FICCI and Thornton (2009) also note that independent directors face time constraints, thus they are not

ultimately involved in the companies' strategic decision-making process as one may expect.

Since director networks and board independence are among the criteria to determine a high-quality board (Paige Fields et al. 2012), policymakers should re-examine the appropriate upper limit of directorships per independent director so that this type of director can devote enough time and effort to corporate performance and transparency as expected. In the meantime, strict enforcement of Clause 49 should be conducted to improve the quality of corporate governance of Indian listed firms.

This study focuses on director network, external leverage and its dynamic relation. It may be interesting for future research to explore the dynamic relation between different aspects of corporate governance and capital structure, because these two areas have a major impact on a firm's performance in a highly competitive market.

6. Conclusions

6.1 Summary and overview of the main findings

This thesis expands existing academic research on the impact of director networks on corporate strategic activities. It focuses on connections via shared board members among firms rather than on other social ties such as alumni networks from educational institutions or memberships from other activities (e.g. clubs or charitable organizations).

It identifies gaps in the literature relating to: i) the impact of the continuity of connections between bidders and targets on M&A short-term and long-term performance in group and non-group firms; ii) the role of independent directors' network centrality on M&A short-term and long-term performance; iii) the impact of independent directors' networks on corporate external leverage; iv) the operation of the internal capital market among business groups; v) the insights into the impact of director networks on corporate strategic decisions in emerging markets.

In particular, Chapter 3 examines how continuity of connection between bidder and target impacts bidding firms at the

deal announcement date. Additionally, it investigates if bidder's network centrality, at the firm level and at the independent director level, matters to outside investors when M&A deals are announced. The analysis involves M&A transactions of the top 450 non-financial Indian firms during the period 2000-2012. The results suggest that the market adversely reacts to continuously connected deals as indicated by lower abnormal returns for bidding firms around the announcement periods. The findings are robust to adding more control variables, changing event windows and using a sub-sample including only bidders who have both connected and not-connected deals. The results also persist after addressing the endogeneity issues of the impact of direct connections on M&A performance. Meanwhile, the attitude of outside investors towards deals in which bidders and independent directors are well-connected is not entirely clear at announcement periods. Both OLS and IV 2SLS estimations report a statistically insignificant relation between bidder's network centrality at the firm level and independent director level and bidder's CARs.

Chapter 4 investigates the impact of the continuity of connection between bidders and targets on post-merger performance. It also examines if independent directors' network

centrality affects post-merger performance. Using a sample of non-overlapping and completed deals from large Indian firms between 2000 and 2012, the study reveals that bidders with continuously connected deals perform worse than those with non-connected deals. With a one standard deviation increase in the continuity of connection, bidders' post-merger performance decreases by 2.79%. The results hold in both univariate comparisons and regressions, after addressing endogeneity issues of the impact of direct connections on M&A performance. However, no significant relationship is found between bidders' network centrality and post-merger performance, after addressing the reverse causality of the relationship between director network centrality and M&A performance.

Chapter 5 examines the relation between independent director networks and corporate external leverage in a panel of 445 top Indian firms from 2000 to 2014. Using the two-step system GMM model, the study, first, shows that outside financiers negatively react to firms (both group and non-group) in which independent boards are busy. Second, they react more negatively to group firms with busy independent boards than to non-group firms with such boards. Third, it finds that group-affiliated firms

that are net receivers from intra-group loans rely less on external finance than other firms. The results are robust to using a number of different measures for the busy independent board, and applying one lag of external leverage instead of two.

6.2 Implications

This study has implications for other scholars and practitioners

6.2.1 Implications for scholars

The findings presented in Chapter 3 and Chapter 4, first, shed light on the possibility that director quality (i.e. the level of independence and the effectiveness of participation in corporate decisions) may reduce over time if they serve as a link between bidders and targets for a long period of time. Thus, the results of this study fit well with the management friendliness hypothesis (Vafeas 2003) which argues that seasoned directors are more likely to befriend and less likely to monitor managers. In emerging markets where exist intensely powerful inside management, it is more likely that the level of independence and the effectiveness of long-term shared directors may be reduced further.

Second, in family business group firms, the concern is that managers may act for the controlling family, but not for

shareholders in general (referred as Type II- Agency Problems (Morck and Yeung 2003)). The finding that the ratio of independent directors is positively related to bidder's CARs reflects that independent directors are expected to protect shareholders' rights in countries where exist ubiquitous family business group firms. Thus, this internal governance mechanism is believed to be a remedy for Type II- Agency problems in emerging markets.

Third, the results highlight that the benefits (if any) from independent directors' network centrality do not outweigh their costs which are reflected in the insignificant relationship between independent directors' network centrality and M&A performance for Indian bidders. Thus, the findings presented in Chapters 3-4 do not fit with the resource dependency view which suggests that via linkages to external parties, well-connected directors provide firms with valuable resources, which, in turn, help to improve corporate performance.

The results reported in Chapter 5 emphasize the adverse impact of agency problems in the relationship between creditors and borrowers who have busy independent boards. Due to agency conflicts, creditors show their caution and negative

reaction to borrowers' unfavourable signals (i.e. busy independent board in this instance) that possibly cause a decline in firm performance and transparency. Thus, the study stresses the importance of good corporate governance in lending. Accordingly, the deterioration in the quality of corporate governance will possibly adversely impact the lending relationship.

In showing that outside financiers react more negatively to borrowers who are group-affiliated firms and have busy independent boards, this study highlights that for firms with higher information asymmetry, the impact of board capital (such as board independence, board network) on external finance is likely to be greater (Botosan 1997; Butler 2008; Mansi et al. 2011).

Not limited to the lending relationship, the findings also indicate that improved governance of business groups may be needed to ensure that management is doing what is best for shareholders and that their rights are protected.

With regard to research methods, the results presented in Chapter 5 highlight the important source of endogeneity that arises because the relations among a firm's observable

characteristics are likely to be dynamic. Specifically, in the context of corporate governance, current firm external leverage will affect future governance choices, and these may, in turn, affect future firm leverage.

6.2.2 Implications for practitioners

The findings in Chapters 3-4 suggest that continuously connected deals perform worse than non-connected deals. In the first place, this highlights the importance of thorough due diligence on targets before making a decision on this type of deal. The results remind bidders that connections should not be regarded as substitutes for a complete investigation in terms of compatibility and potential synergy between the two companies.

Second, the findings draw the attention of outside investors to the issue of the effectiveness of shared directors between bidder and target. They highlight the potential reduction in both independence and effectiveness of shared directors (including independent directors) over time to corporate strategic decisions. Thus, this study provides practical trading strategies for investors around announcements of continuously connected M&A transactions.

Third, the positive impact of independent directors on bidders' returns around M&A announcement reflects that the market does take into account the role of these directors to corporate strategic decisions, and has acknowledged the recent effort of the Indian government on strengthening board independence (i.e. Clause 49). This result stresses the important role of independent directors in countries with weaker legal protection for shareholders as opposed to countries with strong shareholder protection (Dahya et al. 2008). As a result, to have a more favourable assessment from outside investors, Indian companies are encouraged to comply tightly with the requirement on independent directors' ratio in the boardroom as specified in Clause 49. Currently, there are still a number of firms that have not yet obeyed this rule. Specifically, despite an improvement in the compliance ratio compared to the period 2003-2004, the level of non-compliance among Indian firms was around 12% in 2008 (Sarkar and Sarkar 2012).

Fourth, in showing that bidders' network centrality does not matter to their post-merger performance, this study highlights that deals performed by well-connected bidders are no more profitable than deals conducted by less-connected bidders. The

viewpoint that well-connected bidders will have greater access to information about the target and will be able to better avoid the “lemons” problem (Akerlof 1970) in post-merger performance is not relevant in this context of research. Outside investors might find it useful to be aware of this, so that top priority will not always be given to deals conducted by better-connected bidders, while ignoring other deals performed by other bidders.

In showing a negative association between the busy independent board and external finance, Chapter 5 reflects that outside investors do pay attention to independent directors and put their trust in the presence of this type of director when evaluating the likelihood of a borrower defaulting. Therefore, further enhancement in the roles of independent directors in firm strategic activities should be considered.

To do this, Indian firms, first, should follow appropriate procedures in the nomination process for this type of director. Second, they should create more room for independent directors to actively participate in firm strategic activities. According to the review of corporate governance practices by FICCI and Thornton (2009), the most reputed accountancy firm in India, 59% of the respondent companies think that the involvement of

independent directors in the annual planning and strategy development was moderate, while 13% agreed that the involvement was minimal. Third, firms should limit the number of busy independent directors in the boardroom, because under the lens of outside investors in our study, it seems that the costs of busy independent boards far outweigh the benefits. Coincidentally, the survey of FICCI and Thornton (2009) also reflects that independent directors face time constraints, thus they are not ultimately involved in the companies' strategic decision-making process as one may expect.

Since director networks and board independence are among the criteria to determine a high-quality board (Paige Fields et al. 2012), policymakers should re-examine the appropriate upper limit of directorships per independent director so that this type of directors can devote enough time and effort to corporate performance and transparency as expected. In the meantime, the strict enforcement of Clause 49 should be conducted to improve the quality of corporate governance of Indian listed firms.

The abovementioned implications regarding independent directors in Indian firms may also be applied to firms in other emerging markets. Given their weak shareholder rights, and low

corporate transparency (Sarkar and Sarkar 2012), independent directors in such markets may become a powerful internal mechanism that outside investors can rely on to protect their rights. Like Indian firms, companies in other emerging markets should re-examine whether they have paid proper attention to this type of director.

6.3 Limitations and suggestions for future research

As with all studies, this study has limitations that might form the basis for future research in this context. First, the thesis focused on a single country (i.e. India). The results should be reasonably generalizable to other emerging markets as they may share common governance mechanisms and institutional frameworks, but generalisability to the rest of the world may be limited.

Second, the research involves a set of large Indian firms. Although these firms account for an overwhelming share of capitalization on the Bombay and National Stock Exchange, it raises the question of whether the findings are generalizable to other firm types that were not included in the sample (e.g. small firms).

Third, the analysis of this thesis was based on companies that survived long enough to be included in the research sample (Brown et al. 1995). Survivorship bias is a concern because the sample covered the financial crisis of 2007-2008.

Fourth, due to data limitations, the study presented in Chapters 3-4 focused on the impact of director networks via board ties on M&A performance. Future studies might explore directors with diverse networks (i.e. connections to other directors of different demographic backgrounds and skill sets) and their potential impact on firm performance in general and on corporate strategic decisions in particular.

Fifth, given the obvious impact of long-term shared directors between bidder and target in M&A transactions, future research might examine the influence of such directors in other corporate strategic decisions.

Sixth, this thesis mainly focuses on the network centrality of independent directors and its influence on M&A deals and external finance. Further research should be conducted to analyse if there is any difference in the effect of non-independent directors' and independent directors' network centrality on specific

strategic decisions in particular and on corporate performance in general.

Last, given the dynamic relation between director networks and corporate external finance presented in Chapter 5, it may be interesting for future research to explore the dynamic relation between the different aspects of corporate governance and capital structure, because these two areas have a major impact on corporate performance in a highly competitive market.

6.4 Final remarks

In conclusion, this thesis represents an important step toward a better understanding of the impact of director networks on M&A performance and external finance. It provides insights into the distinct governance mechanisms and institutional frameworks of emerging markets as opposed to those of developed economies and how these distinctions may lead to different reactions of the market to director networks and corporate performance. The findings of the studies presented in the thesis point to several promising avenues for future research in the field of director networks and corporate strategic decisions.

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Appendix A: Independent directors: Definition and composition in the US, UK and India.

Panel A. Independent director definitions under the US and UK corporate governance regulations/codes

NYSE Listing standards, 2004 (US) "No director qualifies as "independent" unless the board of directors affirmatively determines that the director has no material relationship with the listed company (either directly or as a partner, shareholder or officer of an organization that has a relationship with the company). Companies must identify which directors are independent and disclose the basis for that determination"

The Combined Code on Corporate Governance, 2003 (UK) "...The board should determine whether the director is independent in character and judgement and whether there are relationships or circumstances which are likely to affect, or could appear to affect, the director's judgement. The board should state its reasons if it determines that a director is independent notwithstanding the existence of relationships or circumstances which may appear relevant to its determination..."

Clause 49 of Stock Exchange Listing Agreement, SEBI, 2004, (India) *Original version of Clause 49, 2000* "Independent directors" mean directors who apart from receiving director's remuneration, do not have any other material pecuniary relationship or transactions with the company, its promoters, its management or its subsidiaries, which in judgment of the board may affect independence of judgment of the director"

Revised Clause 49, 2004

For the purpose of the sub-clause (ii), the expression "independent director" shall mean a non-executive of the company who:

- apart from receiving director's remuneration, do not have any other material pecuniary relationship or transactions with the company, its promoters, its directors, its senior management or its holding company, its subsidiaries and associates which may affect independence of the director;
 - is not related to promoters or persons occupying management positions at the board level or at one level below the board;
 - has not been an executive of the company in the immediately preceding three financial years
 - is not a partner or an executive or was not partner or an executive during the preceding three years, of any of the following: (i) the statutory audit firm or the internal audit firm that is
-

Clause 49 of Stock Exchange Listing Agreement, SEBI, 2004, (India)

associated with the company, and (ii) the legal firm(s) and consulting firm(s) that have a material association with the company

- is not a material supplier, service provider or customer or a lessor or lessee of the company, which may affect independence of the director; and is not a substantial shareholder of the company, that is, owning 2% or more of the block of voting shares

Panel B. Board compositions under the US and UK corporate governance regulations/codes

NYSE Listing standards, 2004 (US)

Majority of independent directors

The Combined Code on Corporate Governance, 2003 (UK)

Majority of independent directors

Clause 49 of Stock Exchange Listing Agreement, SEBI, 2004, (India)

Board composition (February 2000); (October 2004)

The number of independent directors would depend on whether the chairman is executive or non-executive. In case of non-executive chairman, at least one-third of board should comprise of independent directors and in case of an executive chairman, at least half of the board should comprise of independent directors.

Board composition (April 2008)

Additional qualification for boards with non-executive chairman "if the non-executive chairman is a promoter or is related to promoter or persons occupying management positions at the board level or at one level below the board, at least one-half of the board of the company should consist of independent directors"

Appendix B: Variable definitions

Variable names	Description	Source
<i>CAR(-1,1)</i>	Cumulative abnormal stock returns over a 3 day event window around the announcement date	CMIE Prowess, BSE, calculation
<i>Performance-adjusted ROA</i>	Performance-adjusted ROA is the paired differences between the ROA of the sample firms and the ROA of their respective performance matched control firms.	CMIE Prowess, calculation
<i>Industry-adjusted ROA</i>	Industry-adjusted ROA is the paired difference between ROA of the sample firms and the median figure for firms with the same three-digit industry.	CMIE Prowess, calculation
<i>Connected (C)</i>	A dummy variable that takes a value of 1 if a bidder and a target share at least one director at the M&A announcement date.	CMIE Prowess, Thomson One, Capital IQ,
<i>Connected (I)</i>	A dummy variable that takes a value of 1 if a bidder and a target share at least one independent director at the M&A announcement date.	CMIE Prowess, Thomson One, Capital IQ,
<i>Continuity (C)</i>	Average of the number of years a bidder and a target share directors at the M&A announcement date.	CMIE Prowess, Thomson One, Capital IQ, calculation
<i>Continuity (I)</i>	Average of the number of years a bidder and a target share independent directors at the M&A announcement date.	CMIE Prowess, Thomson One, Capital IQ, calculation

Variable names	Description	Source
<i>Degree (C)</i>	Number of companies a bidder is connected to by common directors.	CMIE Prowess, Capital IQ, calculation
<i>Degree (I)</i>	Number of directors is connected to the bidder independent director. We take the average Degree value of independent directors in bidder board	CMIE Prowess, Capital IQ, calculation
<i>Degree (IX)</i>	The sum of the degree value of all independent directors in a bidder board divided by board size.	CMIE Prowess, Capital IQ, calculation
<i>nCloseness (C)</i>	The inverse of the sum of geodesic distances from a bidder to all other companies, scaled by total number of reachable companies in the network.	CMIE Prowess, Capital IQ, calculation
<i>nCloseness (I)</i>	Average of the inverse of the sum of geodesic distances from a bidder's independent directors to all other directors, scaled by total number of reachable directors in the network.	CMIE Prowess, Capital IQ, calculation
<i>nCloseness (IX)</i>	The weighted average of individual independent director's nCloseness (I), and the weight is the number of connections of each independent director	CMIE Prowess, Capital IQ, calculation
<i>Firm size</i>	Natural logarithm of total assets.	CMIE Prowess, calculation
<i>Firm age</i>	Number of years since incorporation	CMIE Prowess IQ, calculation
<i>Cash-to-total assets</i>	Cash and bank balances divided by total assets	CMIE Prowess, calculation

Variable names	Description	Source
<i>Leverage</i>	Sum of short-term and long-term debt divided by total assets	CMIE Prowess, calculation
<i>R&D-to-total asset</i>	Research and development expenditure divided by total assets	CMIE Prowess, calculation
<i>Board tenure</i>	Average number of years directors have served on the board	CMIE Prowess, Thomson One, Capital IQ, calculation
<i>Board size</i>	The number of directors on a board.	CMIE Prowess, Thomson One, Capital IQ, calculation
<i>Independent directors (%)</i>	Number of independent directors divided by board size	CMIE Prowess, calculation
<i>More than 3 directorships (%)</i>	Percentage of directors that hold more than 3 directorships	CMIE Prowess, calculation
<i>CEO duality</i>	Dummy variable that takes a value of 1 if a bidder's CEO is also the chairman of the board and to 0 otherwise.	CMIE Prowess
<i>Foreign promoter ownership</i>	% ownership of foreign promoter in the company at the quarter end preceding the acquisition announcement	CMIE Prowess IQ
<i>Same industry</i>	Dummy variable that takes a value of 1 if a bidder and a target are within the same 2-digit industry and to 0 otherwise.	CMIE Prowess IQ
<i>Relative deal size</i>	Ratio of deal value to bidder's market value of equity, where the market value of equity is at the end of the fiscal year prior to the acquisition announcement date.	CMIE Prowess, RBI, Thomson One

Variable names	Description	Source
<i>Toehold</i>	Dummy variable that takes a value of 1 if a bidder has some stake in the target prior to the M&A and to 0 otherwise	Thomson One
<i>Same group</i>	Dummy variable that takes a value of 1 if the bidder and target belong to the same business group and to 0 otherwise.	CMIE Prowess IQ
Extlev (External leverage)	Financial debt over book assets	Prowess, calculations
Busy_ind	Boards coded with a one if 50% or more independent directors hold three or more total directorships	Prowess, calculations
IndDirec	The average number of directorships per independent director	Prowess, calculations
Netrec (Net receiver)	Net receiver is coded with a one if net intra-group loan is greater than 0. Net intra-group loans are the difference between loans received from and loans provided to group members	Prowess, calculations
ROA (EBITDA/total assets)	Earnings before interest, taxes, depreciation and amortization divided by the book value of total assets	Prowess, calculations
Tangi (PPE/total assets)	Ratio of book value of net property plant and equipment to the book value of total assets	Prowess, calculations
Insti ownership) (Institutional ownership)	The ownership percentage of institutional investors	Prowess

Appendix C: Promoter definitions

I. Promoters as defined under Regulation 2(h) of SEBI (Substantial Acquisition of Shares and Takeovers) Regulations, 1997.

“Promoter” means

- (1) (i) the person or persons who are in control of the company, or
 - (ii) person or persons named in any offer document as promoters;
- (2) a relative of the promoter within the meaning of section 6 of the Companies Act, 1956; and
- (3) In case of a corporate body,
 - (i) a subsidiary or holding company of that body, or
 - (ii) any company in which the “Promoter” holds 10% or more of the equity capital, or
 - (iii) any corporate body in which a group of individuals or corporate bodies or combinations thereof who hold 20% or more of the equity capital in that company also hold 20% or more of the equity capital of the “Promoter”;and

- (4) In case of an individual,
- (i) any company in which 10% or more of the share capital is held by the “Promoter” or a relative of the “Promoter” or a firm or Hindu undivided family (HUF) in which the “Promoter” or his relative is a partner or co-partner or a combination thereof,
 - (ii) any company in which a company specified in (i) above, holds 10% or more of the share capital, or
 - (iii) any HUF or firm in which the aggregate share of the Promoter and his relatives is equal to or more than 10% of the total.

II. Promoter as defined under Regulation 2(h) of SEBI (Substantial Acquisition of Shares and Takeovers) (Second Amendment) Regulations, 2004.

“Promoter”, unless otherwise provided elsewhere, means

- (i) any person who is directly or indirectly in control of the company; or
- (ii) any person named as promoter in any document for offer of securities to the public or existing shareholders or in the shareholding pattern disclosed

by the company under the provision of the Listing Agreement, whichever is later, or

(iii) any person named as persons acting in concert with the promoter in any disclosure made in terms of the Listing Agreement with the stock exchange or any other regulations or guidelines made or issued by the Board under the Act and includes,

(a) where such person is an individual,

(i) his spouse, parents, brothers, sisters or children;

(ii) any company in which twenty six percent or more of the equity share capital is held by him or by the persons mentioned in sub-clause (i) or any firm or HUF in which he or any of the persons mentioned in sub-clause (i) is a partner or member;

(iii) any company in which a company specified in sub-clause (ii), holds more than fifty percent of the equity share capital;

(iv) any firm in which the aggregate of his holding and the holdings of the persons mentioned in sub-clause (i) is more than fifty percent.

(b) where such person is a body corporate,

(i) a subsidiary or holding company of that body corporate;

(ii) any company in which the said body corporate holds twenty six percent or more of the equity share capital;

(iii) any company which holds twenty six percent or more of the equity share capital of the said body corporate;

(iv) any company in which persons acting in concert hold twenty six percent or more of the equity share capital and those persons acting in concert also hold twenty six percent or more of the equity share capital in such body corporate;

(v) any other body corporate under the same management as the said body corporate within the meaning of sub-section (1B) of section 370 of the Companies Act, 1956;

Appendix D: Further robustness checks

Table 3.13: Bidder's announcement CARs (-1, 1) and direct connections (sub-sample of Chapter 4)

This table shows the impact of the continuous connection between bidder and target on bidder's CAR (-1, 1). Observations are drawn from bidder's non-overlapping and completed deals (i.e. if a bidder makes acquisitions within 3 years of a previous acquisition, the cases are considered "overlapping", otherwise, events are considered "non-overlapping" cases to prevent confounding effect. Robust standard errors are between brackets. ***, **, * represent significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)	(4)
	<i>Connected (C)</i>	<i>Continuity (C)</i>	<i>Connected (C)</i>	<i>Continuity (C)</i>
<i>Network measures</i>	-0.3397* (1.0707)	-0.1602** (0.2451)	-0.4854** (1.0611)	-0.1179** (0.2335)
<i>Firm size</i>	-0.2593 (0.2620)	-0.2483 (0.2637)	-0.1702 (0.3223)	-0.1631 (0.3224)
<i>Firm age</i>	-0.0051 (0.0137)	-0.0058 (0.0137)	-0.0001* (0.0155)	-0.0007** (0.0157)
<i>Board tenure</i>			-0.3766 (0.2778)	-0.3575 (0.2797)
<i>Board size</i>			-0.8643 (1.3390)	-0.8756 (1.3335)
<i>Independent directors (%)</i>			0.0267* (0.0267)	0.0259** (0.0266)
<i>More than 3 directorships</i>			-0.0183* (0.0157)	-0.0188 (0.0158)
<i>CEO duality</i>			0.8990 (0.8605)	0.8932 (0.8663)
<i>Foreign promoter ownership</i>			0.0475** (0.0216)	0.0469** (0.0217)
<i>Same industry</i>			0.4625 (0.8195)	0.4363 (0.8292)
<i>Toehold</i>			0.2077 (0.7870)	0.1738 (0.7806)
<i>Same group</i>			1.0756 (0.7443)	1.0702 (0.7390)
<i>Constant</i>	2.2235 (3.3673)	2.0907 (3.3745)	2.0593 (4.0655)	2.0149 (4.0662)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.3399	0.3414	0.3922	0.3923
<i>Number of observations</i>	214	214	214	214

Table 4.12: Bidder's post-M&A performance and direct connections (*using standardized variables*).

This table presents results examining the impact of direct and continuous connection via shared independent director between bidder and target on bidder's post-M&A performance one year after merger (i.e. performance-adjusted EBITDA-to-total assets). Observations are drawn from bidder's non-overlapping and completed deals. Robust standard errors are between brackets. ***, **, * stand for statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)
	<i>Connected</i>	<i>Continuity</i>	<i>Connected</i>	<i>Continuity</i>
	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>	<i>(I)</i>
<i>Network measures</i>	-7.5495**	-3.3501*	-8.7002**	-3.9842**
	(3.7107)	(1.7138)	(4.0606)	(1.8021)
<i>Firm size</i>	-0.3385	-0.3907	-0.3902	-0.4775
	(0.8383)	(0.8325)	(0.9953)	(0.9968)
<i>Firm age</i>	-1.3998	-1.4054	-1.9160	-1.9684
	(1.1622)	(1.1617)	(1.2215)	(1.2278)
<i>Board tenure</i>			0.9234	1.0359
			(2.3246)	(2.3207)
<i>Board size</i>			1.1678	1.2548
			(1.1909)	(1.1937)
<i>Independent directors (%)</i>			0.2140	0.2324
			(1.0617)	(1.0584)
<i>More than 3 directorships</i>			-1.4029	-1.3018
			(1.0467)	(1.0420)
<i>CEO duality</i>			-0.1010	-0.1409
			(2.6151)	(2.5748)
<i>Foreign promoter ownership</i>			2.3785**	2.5072**
			(1.0757)	(1.0762)
<i>Same industry</i>			-0.4479	-0.4937
			(2.1987)	(2.1908)
<i>Toehold</i>			3.3772	3.1724
			(2.1407)	(2.1194)
<i>Same group</i>			-0.2998	-0.3631
			(2.2014)	(2.1908)
<i>Constant</i>	1.3754	1.9052	1.7013	2.8535
	(10.6382)	(10.5774)	(11.7932)	(11.8159)
<i>Year and industry fixed effects</i>	Yes	Yes	Yes	Yes
<i>R-square</i>	0.3077	0.3084	0.3581	0.3605
<i>Number of observations</i>	214	214	214	214

Table 5.19: The effect of director network (*denoted by IndDirec1 and IndDirec2*) on external leverage (*one-lag dependent variable*).

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + ky_{it-1} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes directorships per independent director greater than three and four (IndDirec1; IndDirec2). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)
<i>IndDirec1</i>	-3.9041** (1.9660)	
<i>IndDirec2</i>		-2.8660** (1.4695)
<i>ROA</i>	0.0062 (0.0778)	0.0007 (0.0761)
<i>SalGrow</i>	-0.0219 (0.0302)	-0.0363 (0.0316)
<i>Tangi</i>	0.0033 (0.0439)	0.0062 (0.0435)
<i>Size</i>	1.8878** (0.7961)	2.0461*** (0.7514)
<i>Age</i>	-0.0164 (0.0163)	-0.0199 (0.0153)
<i>Insti</i>	-0.1174** (0.0521)	-0.1251** (0.0489)
<i>LogBsize</i>	5.0385* (3.0384)	4.8975* (2.9466)
<i>Nonex</i>	-0.0789 (0.0697)	-0.0915 (0.0688)
<i>Extlev (t-1)</i>	0.7956*** (0.0312)	0.7970*** (0.0313)
<i>Number of observations</i>	5169	5169
<i>AR (2) test p (value)</i>	0.41	0.656
<i>Hansen test of over-identification (p-value)</i>	0.407	0.524
<i>Diff-in Hansen tests of exogeneity (p-value)</i>	0.278	0.40

Table 5.20: The moderation role of busy independent board (denoted by *busy_ind1*) and external finance (one-lag dependent variable)

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + ky_{it-1} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (*busy_ind1*). Z_{it} includes Group, the interaction term *busy_ind1* x Group, ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)
<i>busy_ind1</i>	-3.5665* (2.0166)		2.4421 (3.0346)
<i>Group</i>		2.0417 (5.4678)	3.5882 (6.1021)
<i>busy_ind1</i> x <i>Group</i>			-7.4446** (3.7670)
<i>ROA</i>	0.0013 (0.0775)	0.0110 (0.0714)	-0.0106 (0.0747)
<i>SalGrow</i>	-0.0286 (0.0348)	-0.0196 (0.0290)	-0.0286 (0.0294)
<i>Tangi</i>	0.0269 (0.0446)	0.0333 (0.0415)	0.0176 (0.0425)
<i>Size</i>	2.1917** (0.8895)	2.5204*** (0.8245)	1.2603 (0.8182)
<i>Age</i>	-0.0105 (0.0136)	-0.0200 (0.0134)	-0.0202 (0.0155)
<i>Insti</i>	-0.0777* (0.0401)	-0.0996** (0.0463)	-0.0880 (0.0575)
<i>LogBsize</i>	-1.4421 (1.4230)	-2.4985 (1.9974)	4.1420 (3.7150)
<i>Nonex</i>	-0.0579 (0.0733)	-0.0503 (0.0746)	-0.1061 (0.0718)
<i>Extlev</i> (<i>t</i> -1)	0.7865*** (0.0313)	0.7833*** (0.0316)	0.8001*** (0.0333)
<i>Number of observations</i>	5169	5169	5169
<i>AR (2) test p (value)</i>	0.531	0.695	0.435
<i>Hansen test of over-identification (p-value)</i>	0.277	0.107	0.33
<i>Diff-in Hansen tests of exogeneity (p-value)</i>	0.241	0.184	0.212

Table 5.21: The effect of director network (*denoted by busy_ind*) on external leverage (*non-group firms*).

In this table, we report the results from the estimation of the model:

$$y_{it} = a_1 + k_1 y_{it-1} + k_2 y_{it-2} + \beta X_{it} + \lambda Z_{it} + \theta D_{it} + \eta_i + \varepsilon_{it}$$

Where y_{it} is external leverage (Extlev). X_{it} includes busy independent board (busy_ind). Z_{it} includes ROA, sales growth (SalGrow), PPE/total assets (Tangi), firm size (Size), institutional ownership (Insti), Log board size (LogBsize), percentage of non-executive directors (Nonex). D_{it} includes firm age (Age) and year dummies. η_i is firm heterogeneity (fixed effects) and ε_{it} is the error term. For the fixed effect model, it is assumed that $k_1=k_2=0$. All t-statistics are based on robust, firm-clustered standard errors. ***, **, * represent significance at the 1%, 5%, 10% level, respectively. AR(2) are tests for second-order serial correlation in the first-differenced residuals, under the null of no serial correlation, The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous. The instruments used in the GMM estimation are: differenced equations: y_{it-3} , y_{it-4} , X_{it-3} , X_{it-4} , Z_{it-3} , Z_{it-4} , ΔD_{it} ; level equations: Δy_{it-2} , ΔX_{it-2} , ΔZ_{it-2} , D_{it} .

	Fixed effects model	GMM model
	(1)	(2)
<i>Busy_ind</i>	-0.1454 (0.0963)	-0.1727** (0.1241)
<i>ROA</i>	-0.2561*** (0.0639)	-0.1523** (0.0694)
<i>SalGrow</i>	-0.0053 (0.0069)	0.0197 (0.0361)
<i>Tangi</i>	0.2206** (0.0746)	-0.0809 (0.0640)
<i>Size</i>	2.3004* (1.3418)	2.6983** (0.9800)
<i>Age</i>	-3.1743 (1.9314)	-0.0679*** (0.0218)
<i>Insti</i>	-0.1078 (0.0886)	-0.1505** (0.0748)
<i>LogBsize</i>	0.9088 (3.1714)	7.2625** (3.4933)
<i>Nonex</i>	0.0915 (0.0596)	0.0577 (0.0950)
<i>Extlev (t-1)</i>		0.8078*** (0.0522)
<i>Extlev (t-2)</i>		0.0284 (0.0474)
<i>R-square</i>	0.1621	
<i>Number of observations</i>	1679	1391
<i>AR (2) test p (value)</i>		0.86
<i>Hansen test of over-identification (p-value)</i>		0.42
<i>Diff-in Hansen tests of exogeneity (p-value)</i>		0.62