ESSAYS ON CORPORATE GOVERNANCE IN LISTED ASIAN FIRMS

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Publication Date:
2017

DOI:
https://doi.org/10.26190/unsworks/3300

ESSAYS ON CORPORATE GOVERNANCE IN LISTED ASIAN FIRMS

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A dissertation in fulfillment of the requirements for the degree of

Doctor of Philosophy

School of Banking and Finance

UNSW Business School

October 2017

THE UNIVERSITY OF NEW SOUTH WALES
Thesis/Dissertation Sheet

Surname or Family name: **ANG**

First name: **Ser-Keng** Other name/s:

Abbreviation for degree as given in the University calendar: **PhD**

School: **School of Banking and Finance** Faculty: **UNSW Business School**

Title: **ESSAYS ON CORPORATE GOVERNANCE IN LISTED ASIAN FIRMS**

Abstract 350 words maximum: (PLEASE TYPE)

This dissertation comprises three essays on corporate governance in listed Asian firms. The first essay investigates founder-successions across 11 countries in Asia using a unique dataset that has been hand-collected. The study finds older founder firms with better performance prior to succession tend to select family successors. Founder firms gain better access to potential successors and improve organization capability via succession planning since it lays the foundation for the delivery of superior performance by family and unrelated successors. The study finds strong evidence of superior post-succession operating and stock market performance for family successors when succession occurs for the first time, after controlling for endogeneity. This result is contrary to international evidence which generally include multi-generational succession.

The second essay utilizes a unique dataset for listed firms in Hong Kong and Singapore to extend the study of the impact of boardroom networks on firm performance, by linking it to the concept of *Guanxi* (关系). *Guanxi* is an extensive network of personal relationships that can be transferred from individual directors to the corporate levels via the boardroom. Using centrality scores as a measure of connectivity of the board, the study finds that well-connected board is associated with positive firm performance, even after controlling for a wide array of factors including endogeneity. Further investigation into the reasons for such results reveal that highly connected directors facilitates corporate activities such as acquisitions, strategic alliances as well as expand the pool of suppliers. However, the effect of highly connected directors is not compatible with the existence of founder-chairman.

The third essay uses a novel representation of board connectedness to the inner circle of the directors' network (cliques) to study the effect that cliques have on borrowing decisions for Asian firms. We find that these inner circle connections help to lower borrowing costs, reduce the level of bank borrowing, increase the use of unsecured debt and decrease the amount of short-term debt used by these firms. The results suggest that cliques connectivity affect firms' borrow decisions via the reduce information asymmetry and/or the increase monitoring of management.

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ABSTRACT

Ser-Keng Ang: Essays on Corporate Governance in Listed Asian Firms

This dissertation comprises three essays on corporate governance in listed Asian firms. The first essay investigates founder-successions across 11 countries in Asia using a unique dataset that has been hand-collected. The study finds older founder firms with better performance prior to succession tend to select family successors. Founder firms gain better access to potential successors and improve organization capability via succession planning since it lays the foundation for the delivery of superior performance by family and unrelated successors. The study finds strong evidence of superior post-succession operating and stock market performance for family successors when succession occurs for the first time, after controlling for endogeneity. This result is contrary to international evidence which generally include multi-generational succession.

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suppliers. However, the effect of highly connected directors is not compatible with the existence of founder-chairman.

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ACKNOWLEDGEMENTS

I would like to thank everyone who contributed in some way to the work described in this dissertation. First and foremost, I am truly grateful to my supervisors, Associate Professor Jo-Ann Suchard and Dr. Sian Owen, for their patient training and guidance through my journey as a research student. Most importantly, both of you had equipped me with the necessary tools and mindset to be an independent researcher which are critical for my career as an academic. I am thankful to you for being open to changes necessary to supervise an off campus research student. The weekly skype calls really made a huge difference.

I am also indebted to Dr. Jack Hong who rendered his selfless assistance as my research assistant at SMU. Thank you so much for the friendship!

Special thanks to my wonderful family who has made sacrifices as well as given me support and strengths throughout my long journey as a research student.

I am grateful to the admissions committee at the School of Banking and Finance, and the Dean of Graduate Research School, Professor Laura Poole-Warren, for admitting me into the PhD program at UNSW. In addition, I would like to extend my appreciation to the faculty and staff at School of Banking and Finance at UNSW Business School for their assistance and guidance during my stay in Sydney.

Finally, I would like to express my gratitude to my home institution, Singapore Management University (SMU) that has sponsored my PhD study, including giving me the opportunity to study at UNSW in Sydney for the PhD coursework in 2012. There are also colleagues at SMU and the UOB-SMU Asian Enterprise Institute that have given me support and encouragement throughout my PhD journey.

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CHAPTER 1

INTRODUCTION

1.1 Motivation of the dissertation

Over the last several decades, significant growth in the Asian economies has transformed some of the stock markets in Asia to be a significant part of the highly integrated global financial markets. China now ranks as the second largest economy and stock market in the world, ranking just behind the US (WorldBank, 2012). In tandem with China's growth, other regional stock markets in Hong Kong, Korea and Singapore have also grown rapidly. The rise of the Asian economies and the rapid development of the markets have therefore attracted the attention of investors from around the world.

To fuel such rapid growth, listed Asian firm have to continue to attract and compete for finite investments from the global financial markets. A significant determinant of their success in doing so depends on the quality of corporate governance practices that are adopted by these firms. Interest in corporate governance in Asia heightened in response to the Asian Financial Crisis in 1997-98, which led to massive outflows of capital from foreign investors (Claessens, Djankov et al., 2000a; Cheung & Chan, 2004). The result of investor apprehensions led to intense liquidity crunch in the domestic capital markets, which severely damaged the real economy. However, the imperative to develop high standards of corporate governance varies across Asia, largely due to the relative importance of the stock markets to their respective economies. The stock market capitalization to GDP ratio varies across Asia: Hong Kong (312.8%), Singapore (137%), Indonesia (17.5%), the Philippines (28.9%) and Thailand (31.3%) (Cheung & Chan, 2004). In comparison, the ratios for the US and the UK are 137.1% and 152.2%, respectively. In addition, the standard of corporate governance differ across Asia as countries in the region are very diverse in terms of their stage of economic development and institutional setup (Claessens, Djankov et al., 2000a).

Asian firms have a number of distinct characteristics compared to their counterparts in developed markets. The presence of a controlling blockholder, which could be a family or government, is common across Asian markets (Claessens, Djankov et al., 2000b; Lemmon & Lins, 2003). A more recent study by Holderness (2009) finds that average blockholder ownership ranges from 37% in South Korea to 73% in Thailand. In addition to actual ownership, a blockholder can control a firm even without being a majority shareholder, often via pyramid structures as well as cross-holdings.

Another unique feature of Asian markets is the dominance of Chinese cultural influence. Overseas Chinese, those with Chinese ancestry that have migrated from the People's Republic of China, possess significant economic powers in their respective jurisdictions in Asia even though they are minorities in terms of numbers (Kao, 1993; Seagrave, 1995; Chua, 2004a). For example, in the Philippines, Overseas Chinese control 60% of wealth even though they account for only 1% of the population (Chua, 2004a). As a result, some Chinese beliefs, practices and norms are deeply ingrained in the Asian business environment, such as the strong influences of Confucianism as well as *Guanxi* (关系).

Furthermore, Asian family firms have just begun to experience founder-succession, while those in the US, Europe and the UK have undergone successions over several generations. Many founders of family firms are past retirement age, so this trend is likely to continue in the foreseeable future. This presents a unique opportunity to study corporate successions that happen for the first time. Together with the prevalence of controlling shareholding, founders may choose to leave their firms in the hands of their family successors as their legacy, rather than handing them to unrelated external successors (DeAngelo & DeAngelo, 1985; Smith & Amoako-Adu, 1999; Anderson & Reeb, 2003a).

The aim of this dissertation is to explore and expand our understanding of several aspects of corporate governance in listed Asian firms. In particular, the dissertation focuses on founder-succession as well as the impact of director networks on firm performance and borrowing decisions.

We first investigate the issue of founder-succession in Asia. Founder-succession is a critical event for family firms as the identity of the founder is more tightly linked to firm identity than that of any subsequent successors. The current generational change from CEO founder to successor across a large number of Asian firms provides a unique opportunity to investigate the factors that drive the likelihood of the appointment of a family successor and the impact of founder-succession on firm performance. Asian family firms are characterized by close shareholder control and a strong influence of Confucianism on business and family practices. We examine Asian family firms across 11 countries and find that older founder firms and those with superior performance prior to succession are more likely to appoint family successors. Founder firms can extend their access to potential successors and enhance organizational capability via succession planning. We control for endogeneity and find strong evidence of superior post-succession performance for family successors. Firms that engage in succession planning by building organization capital, leave their family or unrelated successors a firm that is in good stead to deliver better performance. The results are in contrast to most of the international evidence which generally include multi-generational succession rather than focusing on the initial succession event where the founder steps down as CEO.

We next examine the concept of *Guanxi* (关系), an important concept in Asia because it is the life blood of doing business in Asia. *Guanxi*, an extensive network of relationships, is viewed as a means of facilitating business dealings in Asia. *Guanxi* can be transferred from the individual level to the corporate level through board

connectivity. We study the impact of boardroom networks for Hong Kong and Singapore firms. Using centrality scores as indications of the extent of connectivity of the board, we find that well-connected board is associated with positive firm performance, even after controlling for a wide array of factors including endogeneity. We also show that board connections help to facilitate corporate activities, such as acquisitions, strategic alliances and expand the pool of suppliers for the firm. However, we find that a highly connected board may not be congruent with the existence of a founder-chairman.

Finally, we use a novel representation of board connectedness to the inner circle of the directors' network (cliques) to study the effects that cliques have on borrowing decisions for Asian firms. We find strong evidence that these inner circle connections help to lower borrowing costs, reduce the level of bank borrowing, increase the use of unsecured debt and decrease the amount of short-term debt used by these firms. Our findings can be attributed to the fact that cliques result in a reduction in information asymmetry and/or better monitoring of management that translate to higher level of security for their lenders.

1.2 Contributions to the literature

The dissertation contributes to the literature through the use of unique and comprehensive Asian data and/or through refining conventional methods.

The first essay extends our understanding of founder-succession in Asia – the first time succession occurs for Asian firms. The emergence of this phenomena is highlighted by the study by Ang (2010) that finds rapid wealth transfer to the next generation in the Asia in recent years. With family wealth inextricably tied to corporate matters in Asia, the transfer of control over Asian corporations would likewise be occurring. We contribute to the understanding of Asian corporate culture in the context of founder-succession, given the unique cultural influences in Asian corporations and the dominance of family firms.

Mainland China has emerged as the second largest economy in the world and Overseas Chinese own significant wealth in their respective localities across Asia. Hence, in chapter three we examine the concept of *guanxi* that is rooted in Chinese culture. Using this concept, we investigate board connections and the conduct of business relationships in Asia. We contribute to existing knowledge about the functioning of boards in Asia. In addition, we extend the existing literature by examining the channels through which the benefits of a highly connected board can translate into advantages to firms via acquisition activities, strategic alliances as well as extension of customer and supplier relationships.

In chapter four, we advance the study of board connectedness by using a clique measure that reflects connections to a grouping in which everyone must know everyone else. We use the clique measure to study the effects of having access to the inner circle of the directors' network on firms' borrowing decisions, including, borrowing costs,

bank borrowing and the use of unsecured debt as well as short-term debt. In addition, the use of a mixture model (specifically the zero and one inflated beta (ZOIB) model) presents a meaningful improvement on the approach used in prior studies on borrowing decisions.

1.3 Structure of the dissertation

This dissertation investigates corporate governance in listed Asian firms in three different settings. Chapters 2 to 4 contain their respective introduction, literature review and hypotheses development, empirical results and conclusion.

Chapter 2 explores a rapidly emerging trend of founder-succession in Asia, which represents the first time the firm is experiencing succession in its history. The widespread family ownership and control across Asia and the strong influence of Confucianism on business and family practices, offers a unique opportunity to study the effect of choice of successor on the firm performance post succession.

Chapter 3 investigates the impact of level of board connectivity on firm performance by relating it to the Chinese concept of *guanxi*, which is fundamental to the conduct of business relationships across Asia. While g*uanxi* is an extensive network of personal relationships, it can be transferred to corporates via the boardrooms.

Chapter 4 expands the methods used in prior studies on director network connectivity by investigating the effect of directors cliques (the inner circle of the directors' network) on borrowing decisions for Asian firms. A clique being a cluster of relationships, in which everyone must know everyone else, acts to augment the director's and firm's overall connectivity scores.

Chapter 5 concludes with a summary of the main findings, a discussion of the implications, and suggestions for future research.

1.4 Dissertation-related presentations

The research papers in this dissertation have been presented and defended at several conferences or seminars:

Chapter 2: Building A Legacy: Founder-Succession in Hong Kong and Singapore

2016 EIASM Family Firm Conference, Zwolle, the Netherlands.

2016 Asian Finance Association Conference, Bangkok, Thailand.

Chapter 3: *Guanxi* (关系) and board connectivity in Hong Kong and Singapore

2017 Singapore Management University (SMU), Lee Kong Chian School of Business Brown Bag Seminar, Singapore.

Chapter 4: Within the inner circle of the directors' network: The effects of cliques connectedness on borrowing decisions in Asia

2017 UNSW Business School Brown Bag Seminar, Sydney, Australia.

CHAPTER 2

BUILDING A LEGACY: FOUNDER-SUCCESSION IN ASIA

2.1 Introduction

The impact of family ownership and control on the performance of family firms has attracted increasing international attention. However, there is little evidence on effects of initial founder-succession on firm performance[1]. Extant literature has focused on multi-generational succession events rather than the change in control where a founder CEO transfers the management of the firm to a successor who can be a family member, unrelated insider or outsider. This is most likely due to the older age of family firms in developed markets, where subsequent generations of the family or outsiders are involved in firm management.

Founder-successions are substantially different in that these firms are highly dependent on their founders for vision, drive, commercial connections as well as technical skill sets. Founder-succession is the most critical event in any firm (Hofer, 1980; Carroll, 1984). The importance and persistent effects of founders underlie the study by Dobrev and Barnett (2005), who find that the identity of the founder is more tightly linked to the firm than that of any subsequent successors. This makes founder-succession more important than any subsequent successions, as failure to manage this process may rob the firm of vital organizational assets (Danco, 1975; Whetten, 1980; Beckhard & Dyer, 1983). Therefore, a good outcome for founder-succession can determine a firm's long term survival and success. However, founders themselves may become a hindrance to succession due to the fear of facing their own demise (Becker, 2007) and the fear of losing control of the firm that they built (Tashakori, 1980).

We focus on Asian family firms, since many family firms in this region have been encountering succession for the first time in the last decade. In recent years, Asia has been experiencing rapid wealth transfer from the family patriarchs to their offspring

[1] The exception is Cucculelli and Micucci (2008) for Italian firms and Molly et al (2011) for Belgian firms.

(Ang, 2010). Given that family wealth and corporate matters are inextricably linked in family firms in Asia, the transfer of control over family wealth also translates to the transfer of control with respect to the family business. Many family patriarchs in Asia are already well past retirement age[2], so it is crucial that they begin to think about building and leaving a legacy to their families. A recent study on Asian business succession finds that Asian founders tend to relinquish the CEO role in family business in their 70s (Deloitte & SMU, 2013). Founders also tend to continue to stay on with the business to offer strategic advice after succession, sometimes as Chairman of the Board (Wasserman, 2003). The peculiarity of succession in Asia is that founders of Asian firms and their families have an added cultural reluctance to confront the topic of succession (Boyde, 2013), as open discussion of this matter gives the impression that one wishes either ill health or demise of a relative in order to take over the family business. Regardless of the circumstance, succession in emerging markets usually involves handing both management and ownership to family members (Burkart, Panunzi et al., 2003). For the retiring founders, it is their way of leaving their legacy to their offspring.

The generational change from CEO founder to successor across a large number of Asian firms provides a unique opportunity to investigate the factors that drive the likelihood of the appointment of a family successor and the impact of founder-succession on firm performance[3]. Asian firms have a number of distinct characteristics compared to their counterparts in developed markets. The presence of a controlling shareholder is at the core of the corporate landscape in Asia. Many firms, especially smaller firms, are controlled by a single shareholder (Claessens, Djankov et al., 2000a)

[2] Retirement age ranges between 62 in Singapore and 65 in Hong Kong.
[3] We include China, Hong Kong, India, Indonesia, Japan, the Philippines, Malaysia Singapore, South Korea, Taiwan and Thailand in our sample.

who are generally family or the government. Controlling shareholders in Asian family firms own a higher percentage of the firms than family firms in developed markets such as the US and UK (Lemmon & Lins, 2003). In addition to close shareholder control, family firms, particularly those controlled by Overseas Chinese families[4], engage in traditional business practices which Ahlstrom, Young et al. (2004) describe as "excluding outsiders from management and the board, maintaining secrecy and tight control of information, and eschewing transparency". Even though they are the minorities in other parts of Asia, Overseas Chinese wield significant, if not dominant, economic influence in their respective jurisdictions (Kao, 1993; Seagrave, 1995; Chua, 2004b). As an illustration, Overseas Chinese account for 1% of the population in the Philippines but control 60% of the wealth in that country (Chua, 2004b). Similarly, migrants account for 10% of the population in Thailand but control 80% of the market capitalization of listed firms in Thailand (Vatikiotis, 1998).

Further, there is a strong influence of Confucianism on the business and family practices of Overseas Chinese and Korean family firms (Yan & Sorenson, 2006). First, there is a strong emphasis on the success of the family as well as achieving harmony within the family. Descendants in the family line are expected to unreservedly serve the interests of the family, and to uphold the reputation and prestige of the family name. Harmony is achieved by equal distribution of founder's wealth regardless of the ranking of the son in the family, even though executive positions are usually passed on to the eldest son. As a result, descendants in Asian family firms are initiated into the family business very early in their lives to learn the ropes of managing the family business. The relationships between father and sons are very well defined and are guided by filial piety. As such, regardless of the successor age and position held in the family firm,

[4] Overseas Chinese are those with Chinese ancestry that have migrated from the People's Republic of China.

Asian family successors are expected to seek guidance from the founder-patriarch on major issues that could affect the family. These unique attributes suggest that CEO successors have the full support of their entire family. To ensure continuity, the family would have a strong interest in building a strong organization to support the family successor in the role of CEO of the family business.

Our study provides several insights on founder-succession. First, we find no evidence that the level of family ownership of the founder firm drives the choice of a family successor. This is consistent with the findings in Cucculelli and Micucci (2008). We also find that founder firms can extend their access to potential successors and enhance organizational capability via succession planning. Furthermore, we find older founder firms and those with superior performance prior to succession are more likely to appoint family successors. In terms of both operating (ROA) and stock price (Tobin's Q) performance, we find that, contrary to international studies that generally consider family succession, family successors who replace the founder in Asia outperform unrelated successors. We also find that founders in firms that engage in succession planning by investing heavily in the building of organization capital leave their family or unrelated successors, a firm that is in good stead to deliver superior operating performance.

The remainder of this paper is structured as follows. Section 2.2 reviews the current literature and develops hypotheses. Section 2.3 outlines the data, sample and experimental design. Section 2.4 discusses the empirical results. The paper concludes in Section 2.5.

2.2 Literature review and hypotheses development

2.2.1 The appointment of family successors

Grossman and Hart (1986) and Jensen and Meckling (1992) argue that firm decision rights should be given to the person who maximizes the productivity of firm assets. If family members can provide contributions to firm value beyond what non-family managers (outside successors) can contribute, then a firm is best managed by founding family members (Bennedsen, Fan et al., 2015).

Bennedsen, Fan et al. (2015) argue that founding family members have specialized abilities (referred to as family assets) that allow them to lower transaction costs with various stakeholders. The sources of these abilities are usually intangible (such as beliefs, values, customs) and founding family members are able to preserve and share these family assets because of interactions and family governance mechanisms that are not available to outsiders. Thus, the authors suggest that the likelihood of family succession increases with the ability of family members to preserve family assets and use them to make the firms more competitive.

Given the control that founders have over the firm, they are in a position to exercise considerable influence in the firm. In succession, this involves the founder making a decision between appointing a family member or an unrelated successor. The process of appointing a successor could create family conflicts and this tension is particularly pronounced at the time of succession (Lansberg, 1988). Bennedsen, Fan et al. (2015) argue that the founder likely imposes higher ideological/value factors in firm decisions as the family asset level is high.

The appointment of a founder successor who can successfully manage the firm is particularly important to Asian family firms. First, most Asian families have the majority of their wealth locked in their listed vehicles (Boyde, 2013) and so the

incorrect choice of CEO could endanger the entire family wealth. Second, in an age of increased shareholder activism and emphasis on corporate governance, the failure of a family CEO could result in the withdrawal of support from institutional investors, which could adversely affect future growth of the firm if the family firm is reliant on external sources of financing.

2.2.2 Family ownership

The presence of blockholders is widespread in Asian markets and the average level of shareholding ranges from 37% in South Korea to 73% in Thailand (Holderness, 2009). More than two-thirds of firms in East Asia are controlled by a single shareholder (Claessens, Djankov et al., 2002). Additionally, a blockholder can control a firm even without being a majority shareholder, often via pyramid structures as well as cross-holdings. These firms, therefore, exhibit the most divergence between cash flow rights and voting rights and this is particularly so in family controlled firms.

The level of family ownership of the firm can affect the founder's choice of the type of successor. Bertrand and Schoar (2006) suggest that founders with a large shareholding in the firm tend to favor kin over talent, which becomes a constraint to the growth of their firm. This is also the reason why family members gain an unfair advantage over unrelated parties for top positions in the firm (Schulze, Lubatkin et al., 2001). Lee, Lim et al. (2003) find that if the family firm has high exposure to idiosyncratic risk, then the founder prefers to appoint a related successor, even though that successor may be less qualified or suitable. The higher the level of family ownership at the time of founder-succession, the higher would be the likelihood of this tendency, since at a higher level of ownership, the control over the firm resides with the founder.

There are several possible counter-arguments that can be made to refute the view that higher family ownership will necessarily lead to the appointment of family successors. First it may be argued that publicly listed family firms being monitored by the global financial market may have a higher sense of professionalism and would therefore select the best candidate to succeed the founder since it would be in the best interest of other public shareholders. This view was advanced by Bocatto, Gispert et al. (2010) in their study of listed Spanish family firms. Another counter-argument could be poor prior performance. While there is no conclusive evidence that poor prior performance, per se, leads to the appointment of an unrelated successors (Bocatto, Gispert et al., 2010), Smith and Amoako-Adu (1999) find that this condition results in family members electing not to participate in the management of the family firm. As a corollary, there is an absence or shortage of family successor. Finally, it is also possible that there is indeed a shortage of family successor, in which case regardless of the level of ownership, the founder will be forced to select a successor who is unrelated to the family. This view is advanced by Morck and Yeung (2004). The authors argue that family successors may lack the entrepreneurial aptitude and interest in the family business, and may elect to use their inherited wealth to engage in activities other than the business the founder built. Accordingly, if one were to subscribe to the socio-emotional wealth thesis, when there is no suitable successor, an unrelated external successor will be selected (Gómez-Mejía, Haynes et al., 2007).

While there are valid arguments on both sides with respect to the role of family ownership in the choice of successor, we took into consideration several factors when formulating the testable hypothesis. More specifically, we considered the cultural perspective for succession in Asia (Bertrand & Schoar, 2006), the nascent stage of Asian economies and founder-succession, as well as the tightly held share ownership

structure of Asian firms (Claessens, Djankov et al., 2002). These make testing of the positive effects of the level of family ownership on the appointment of family succession a compelling proposition. Hence, we hypothesize that:

H1-1: The higher the family ownership, the greater the likelihood of the appointment of a family member as CEO successor.

2.2.3 Family influence via founders' chairmanship of the board

While the level of ownership of the firm by the founder and the family can affect the choice of successors, it is possible that influence over successor appointments can also be asserted via the founder's continued influence as the Chairman of the board. This may be the case where control over the firm is conducted via means other than direct equity ownership. A study by Bertrand and Schoar (2006) finds that founders who are still in control may have a dynastic mindset, preferring to cede control of the firm to members of the family rather than unrelated successors even when the latter is more qualified and suitable.

The counter-arguments for family influence via the Founder-Chairman are similar to that of *H1-1*. They relate to the absence or lack of suitable family successors. In such cases, the application of the socio-emotional thesis suggests that an outside successor will selected. This is consistent with the findings by Gómez-Mejía, Haynes et al. (2007). In addition, Ansari, Goergen et al. (2014) find that family power does not influence the likelihood of the appointment of family successors.

In formulating the testable hypothesis we took into account the nuances of the founder-succession in the Asian market. Given that succession is happening for the first time in the firms' corporate history, founders being so close to the origin of the firms'

history are likely to exhibit strong emotional attachment to the business therefore the choice of the first successor. Hence, we hypothesize that:

H1-2: The greater the family influence on the board via the founders' chairmanship of the board, the greater the likelihood of the appointment of a family member as CEO successor.

2.2.4 Investing in organization capital – succession planning

The literature on succession planning places importance on firms as well as family having a succession plan. Both Handler (1989b) and Kets de Vries (1993) argue that the high mortality rate of family firms is due to the lack of succession planning. The low survival rates amongst family firms are well documented in literature. Ward's (1987) seminal study on family firm succession shows that 30% of firms survive through the second generation, 13% survive the third generation, and only 3% survive beyond that. Chu and MacMurray (1993) and Weidenbaum (1996) observe that most Overseas Chinese family firms are not able to last beyond the second generation.

Recent studies find positive effects of building and investing in organization capital (Corrado, Hulten et al., 2005; Eisfeldt & Papanikolaou, 2013b). Firms with higher organization capital achieve average returns of 4.6% higher than comparable firms with lower organization capital (Eisfeldt & Papanikolaou, 2013b). Organization capital refers to the building of soft infrastructure of the firm, as opposed to hard, physical production capacities. These include building organization capability and an environment that that is conducive to the attraction, motivation and retention of talents in the organization. It is the agglomeration of these talents and physical assets, organization capital that generates positive outcomes. This suggests that firms with

organization capital have a greater talent pool to draw from for succession. The use of SG&A as a proxy for organization capital has been adopted by a number of recent studies including Lev and Radhakrishnan (2005), Tronconi and Marzetti (2011), Carlin, Chowdhry et al. (2012), Falato, Kadyrzhanova et al. (2013), and Li, Qiu et al. (2016).

H1-3: The higher the investment in building organization capital, the lower the likelihood of the appointment of a family member as CEO successor.

2.2.5 Post-succession performance of Asian successors

Most studies on the efficacy of family successors in US and European family firms conclude that unrelated successors perform better or that family successors destroy value (Morck & Strangeland, 1994; Yermack, 1996; Smith & Amoako-Adu, 1999; Morck, Stangeland et al., 2000; Burkart, Panunzi et al., 2003; Bhattacharya & Ravikumar, 2004; Pérez-González, 2006; Villalonga & Amit, 2006; Cucculelli & Micucci, 2008; Hillier & McColgan, 2009). Fama (1980a) advocates the appointment of unrelated CEOs because they are highly motivated individuals, who are constantly subject to the strict scrutiny of the labor market. There is similar evidence for Asian family firms: Mehrotra, Morck et al. (2013) examine Japanese succession and find that non-biological family successors that are brought into the family by marriage increase the talent pool for the family succession. This has positive effect on firm performance as these successors are typically star performers in the firm, who marry the daughters of the founders, renounce their biological family ties and adopt the founder's name (e.g. Suzuki Motors). The practice of adopting outsiders into the family in Japan highlights the limitation of a dynastic approach to succession (Bennedsen, Nielsen et al., 2007).

Bertrand, Johnson et al. (2008) find that descendant successors are associated with lower performance for Thai firms, especially when the founder is deceased. Similarly, Bennedsen, Fan et al. (2015) find evidence of value destruction in succession for Chinese firms. These studies suggest that entrenchment arising from family control over the firm, unduly protects the family CEO from the ramifications of poor firm performance.

Conversely, there are a few studies that find the appointment of family CEOs does not necessarily destroy value for shareholders. Barontini and Caprio (2006) provide evidence that family control or a descendent CEO does not result in lower valuation and reduced firm performance for European firms. Similarly, Anderson and Reeb (2003a) find that family businesses represent a substantial proportion of S&P500 firms, and firms with family CEOs perform better than those that appoint outside CEOs. Yoo, Schenkel et al. (2014) investigate inherited succession in Korean family firms. The authors find that only family firms with non-first son successors deliver superior performance post-succession, as these successors do not have to conform to, and be constraint by, strict family traditions that operate within the family business system in Korea.

We argue that given the influence of Confucius values on many Asian family firms, founders will exercise care to ensure that family successors succeed. This is especially so when it is the first succession in their corporate history. Hence, we hypothesize that:

H2-1: A family successor of a founder firm experiencing succession for the first time achieves better post-succession performance than unrelated successor.

2.2.6 Impact of successor age on post-succession performance

A successor's age would have a bearing on post-succession performance to the extent that it indicates the level of experience and maturity of the successor. Smith and Amoako-Adu (1999) as well as Ferris, Jagannathan et al. (2003), Sternberg (2005), and Fisher, Orkin et al. (2009) use this variable to reflect managerial experience which they posit should be positively related to firm performance.

A possible counter-argument to the proposition that age is positively associated with firm performance is that a much older CEO, while very experienced may lack the energy or will to make significant reforms necessary after post-succession.

Given our study is on founder-succession which is in the nascent stage in Asia, the possibility of a founder appointing a much older CEO successor is low. Hence, we hypothesize that:

H2-2: A successor of a founder firm experiencing succession for the first time achieves better post-succession performance if the successor is older in age at appointment as CEO.

2.2.7 Effects of organization capital on post-succession performance

Given the importance of succession planning on the survival of founder firms (Handler, 1989a; de Vries, 1993), it could be argued that firms that invest heavily in organization capital via Selling, General and Administrative (SG&A) expenses, would perform better than those that do not. This view is also supported by Eisfeldt and Papanikolaou (2013a), albeit not in a succession situation. There has been an increase acceptance and use of SG&A expenses as a measure of organization capital in Finance and Economics in

recent years (Lev & Radhakrishnan, 2005; Tronconi & Marzetti, 2011; Carlin, Chowdhry et al., 2012; Eisfeldt & Papanikolaou, 2013b; Li, Qiu et al., 2016).

While building organization capital may be positive for succession planning, the use of SG&A may be subject to a possible counter-argument that building of SG&A expenses can be seen as a manifestation of extravagance in building luxurious offices/facilities, and thus an measure of agency problem (Chen & Yur-Austin, 2007).

However, our study focuses on the founder building organization capital as part of succession planning. Hence, the agency problem in same vein as Chen and Yur-Austin (2007) would not apply. As such, we hypothesize that:

H2-3: A successor of a founder firm experiencing succession for the first time achieves better post-succession performance if the firm invests more in building organization capital.

2.3 Data, sample and experimental design

2.3.1 Data and sample selection

The data used for this study is hand collected from a variety of sources including databases such as *CapitalIQ* and online publications such as *Forbes*, *CNBC* and *Reuters*. Data from 11 countries across Asia, including China, Hong Kong, India, Indonesia, Japan, the Philippines, Malaysia Singapore, South Korea, Taiwan and Thailand, were collected. In Asian firms, the title of CEO may not be commonly used and instead titles such as Managing Director or General Manager or President are used. In cases of doubt, the data point is either omitted or further news searches were conducted to validate that the family has control of the firm.

In total, 2,615 publicly listed firms across those 11 countries with known founders were investigated for evidence of succession. A successor could be related by blood or marriage (family successor), or unrelated (unrelated successor). If the founder is not the current CEO, then information relating to the successor, including year of appointment, age, education background and relationship with the founder, is collected. Family successors related to the founders are first identified by common last names. However, it is possible for an unrelated successor to bear the same last name. Further, even a successor who has a different last name may be related to the founder via marriage, e.g. a son-in-law. As a result, for each observation, an extensive search is conducted via news feeds and the Internet to ensure that the successor is accurately classified.

Founders who were never CEOs are excluded as these are most likely to be individuals who took on the Chairman role when the firm went public. In cases of multiple founders, as long as one of the co-founders is still serving as CEO, the firms

are classified as not having experienced a succession event. In addition, firms are excluded where there is not a clear CEO position. Foreign companies founded and/or controlled by non-Asians are excluded. Companies where founders regained CEO positions after ceding control over the firm are also excluded from the dataset. Finally, firms where there are multiple successions/changeovers after the initial succession are excluded.

The final dataset contains a total of 216 observations of Asian successions from 1999 to 2010 of which 74 relate to family successors and 142 involve the appointment of unrelated successors. In the subsample of family successors, 82% belong to the next generation – sons, daughters, son-in-law and nephews. This is common practice amongst successful Chinese families (Chen, 1995). In addition, male successors account for around 95% of the subsample (sons account for 74% of the subsample), which is common practice in Chinese families where male heirs take precedence over females (Wong, 1993; Greenhalgh, 1994).

2.3.2 Methodology

We model the probability of a family successor being appointed and the impact of family succession on firm performance. However, the research design has a potential endogeneity issue that needs to be addressed. The firm's characteristics, such as its pre-succession performance may influence the decision to appoint either a family or outside successor. Hence, the post-succession performance may reflect differences at succession (Demsetz & Villalonga, 2001; Pérez-González, 2006). Further, Adams, Almeida et al. (2009) find that a founder wanting the family successor to do well, would cede control of the firm only when it is performing at a high level.

To address the issue of endogeneity inherent in our models, we use two-equation treatment models (Greene, 2000). The method involves a treatment equation and a regression equation. For the treatment equation, we suppose that there is an unobserved underlying variable, $\text{family\_successor}_i^*$, that determines if a family successor is selected. In cases where $\text{family\_successor}_i^* > 0$, a family successor is chosen and, if not, then an outside successor is selected.

The treatment equation can be formally represented by:

$$family_{successor_i}^* = z_i\gamma + u_i$$

$$family_{successor_i} = 1 \; if \; family_{successor_i}^* > 0;$$

$$family\_successor_i = 0 \; otherwise$$

and

$$Prob\left(family_{successor_i} = 1 \middle| z_i\right) = \Phi(z, \gamma);$$

$$Prob(family\_successor_i = 0 | z_i) = 1 - \Phi(z, \gamma)$$

Where $\Phi(z, \gamma)$ represents the cumulative normal distribution function evaluated at the point z, γ', which is standard in probit models.

The regression equation is represented simply by:

$y_i = \beta x_i + family\_successor_i \delta + \varepsilon_i$ where u_i and ε_i are bivariate normal with mean zero, and covariate matrix $\begin{bmatrix} \sigma_\varepsilon & \rho \\ \rho & 1 \end{bmatrix}$, β is a vector of coefficients of the control variables, x_i, and δ measures the effect of the choice of successor on the dependent variable, y_i.

Given the fact that *family_successor* is an endogenous dummy variable, the observed variables are used to estimate the coefficients in the regression, and at the same time control for selection bias brought about by non-ignorable treatment effects.

With substitution, two outcome regressions can be obtained:

1. When $family\_successor_i^* > 0, family\_successor_i = 1: y_i = \beta x_i + (z_i\gamma + u_i)\delta + \varepsilon$ (treatment)
2. When $family\_successor_i^* \leq 0, family\_successor_i = 0: y_i = \beta x_i + \varepsilon_i$ (non-treatment)

We also control for country-, year- and industry-fixed effects, to take into account potential unobservable effects in our regressions.

2.3.3 Variable measurement

Firm performance is measured as the 3-year average operating return on assets (ROA), post-succession. This variable is defined as net operating profit after tax over average assets. In the literature, different definitions of the numerator are used for ROA. Anderson and Reeb (2003a) use net income, whereas Huson, Malatesta et al. (2004) and Pérez-González (2006) use net operating profit after tax as the numerator. We use the latter definition as it is unaffected by capital structure decisions, as operating income is

unaffected by interest costs which is a function of leverage level, unlike net income. In addition, we use Tobin's Q as an alternative measure of firm performance. Tobin's Q is estimated as the market value of equity divided by book value of equity.

Due to the wide dispersion of the data for Asia (especially in emerging markets), outliers in the data for both measures of performance, have been addressed by winsorization of 1% at each end. The set of key and control variables used in this study relates to the attributes of the firm, successor CEO, industry as well as macro-economic factors prior to the succession year. We include the firms' investment in organization capital, firm age, performance prior to succession, successor education level, whether the founder serves as the board chair and chair-CEO duality. A detailed description of the variables used for the study can be found in the Appendix of this chapter.

2.4. Empirical results

2.4.1 Descriptive statistics

Table 2.1 shows the summary statistics and the differences in means for key variables used in the study. In founder firms where unrelated successors are appointed, founders tend to stay on as Chairman of the Board (66% of firms). This may be driven by the need for the founder to monitor the unrelated successors. Many family CEO successors are also appointed as Chairman (59% of firms have dual roles). Furthermore, on average, firms that engage unrelated successors invest around twice as much in building organizational capital (measured by the ratio of Selling, General and Administration expenses (SG&A) to total assets of the firm), when compared to firms that appointed family successors.

In terms of education, more family successors receive undergraduate education abroad, whereas more unrelated successors gained postgraduate qualifications. Both

family and unrelated successors, on average, are appointed as CEO around 47 years old, similar to successors for US firms in Pérez-González (2006). Family ownership of firms that appoint family successors is on average lower than those that appoint unrelated successors (39% vs. 48%). This may seem counter-intuitive as it could be expected that families with higher levels of shareholding appoint family successors to safeguard family interests. However, this could be explained by the fact that if a family member is at the helm, the family needs a lower level of shareholding to keep the firm in check. Conversely, the family needs a higher level of shareholding to monitor unrelated successors (Grossman & Hart, 1980a).

Firms with family CEO successors are significantly older than those that appoint unrelated CEO successors. On average, they have been in existence for almost twice as long (40 vs. 19 years). In addition, firms with family CEO successors tend to be on average, larger in size than firms with unrelated CEO successors, as measured by the level of sales (US$1,920 million compared to US$1,090 million). Further, firms that appoint family successors have a significantly lower average asset growth rate (13.6%) than those that appoint unrelated CEO successors (55.4%).

Firms that appoint family successors also tend to perform better prior to succession. The 3-year average ROA prior to succession is around 6.0%, whereas the performance for firms that appoint unrelated successors is around 0.1%. Finally, founder firms that appoint family successors tend to operate in less competitive industries, as indicated by the Herfindahl index.

Table 2.1 – Summary statistics – family successors vs. all unrelated successors

The table outlines the summary statistics of key variables used in our empirical tests. Our sample period is from 1999 to 2010. There are in total 216 observations of Asian successions during the sample period. 74 relate to family successors and 142 involve the appointment of unrelated successors. All variables are winsorized at the 99th and 1st percentiles. Definitions of variables are detailed in the Appendix of this chapter. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Key variables	**All successors**	**Family successors**	**All unrelated successors**	**Difference in means / medians**
Number of CEO successions	216	74	142	
Founder as Chairman (*founder_chairman*)				
# of dummy variable coded as 1	94	32	62	
Duality (*duality*)				
# of dummy variable coded as 1	39	23	16	
SG&A over Assets (*sga_assets_prior*)				
Mean	21.5%	13.4%	25.7%	12.3%***
Median	14.3%	10.1%	17.0%	7.0%***
Minimum	0.0%	0.0%	0.0%	
Maximum	165.0%	110.9%	165.0%	
Standard deviation	26.0%	15.7%	29.2%	
Foreign Undergraduate Education (*undergrad_foreign*)				
# of dummy variable coded as 1	78	43	35	
Postgraduate Education (*postgrad*)				
# of dummy variable coded as 1	69	29	40	
Age at appointment (*successor_age*)				
Mean	47	47	47	0.0
Median	47	47	47	0.0
Minimum	32	32	35	
Maximum	60	60	59	
Standard deviation	8	9	7	
Family ownership (*family_own*)				
Mean	44.4%	38.6%	47.4%	8.9%***
Median	52.6%	44.2%	55.4%	11.20%*
Minimum	0.0%	0.0%	0.0%	
Maximum	90.0%	90.0%	88.2%	
Standard deviation	25.8%	28.7%	23.7%	
Firm age (*firm_age*)				
Mean	26	40	19	-20.5***
Median	23	37	16	-21.50***
Minimum	3	3	3	
Maximum	145	145	108	
Standard deviation	20	22	15	
ROA prior (*roa_prior*)				
Mean	2.1%	6.0%	0.1%	-5.9%***
Median	4.5%	5.7%	3.6%	-2.1%***
Minimum	-54.6%	-22.9%	-54.6%	
Maximum	32.7%	19.7%	32.7%	
Standard deviation	13.0%	5.8%	15.0%	

(continued)

Table 2.1 – *Continued*

Key variables	All successors	Family successors	All unrelated successors	Difference in means / medians
Tobin's Q ratio (*tobinsq_prior*)				
Mean	3.1	1.2	4.1	1.2***
Median	1.4	1.0	1.7	0.4***
Minimum	-2.6	0.2	-2.6	
Maximum	79.7	4.0	79.7	
Standard deviation	9.3	0.7	11.3	
Quick ratio (*qratio_prior*)				
Mean	2.0	1.9	2.0	0.1
Median	1.3	1.1	1.3	0.2
Minimum	0.2	0.4	0.2	
Maximum	18.4	12.8	18.4	
Standard deviation	2.5	2.2	2.7	
Leverage ratio (*tdta_prior*)				
Mean	0.0	0.0	0.0	-0.09***
Median	0.2	0.3	0.1	-0.2***
Minimum	0.0	0.0	0.0	
Maximum	0.8	0.7	0.8	
Standard deviation	0.2	0.2	0.2	
Asset growth prior (*ta_growth_prior*)				
Mean	41.1%	13.6%	55.4%	42.0%**
Median	10.5%	8.8%	12.6%	4.0%
Minimum	-40.9%	-27.8%	-40.9%	
Maximum	2643.6%	89.6%	2643.6%	
Standard deviation	191.9%	17.4%	235.0%	
Sales (US$ millions)				
Mean	1374.7	1920.1	1090.5	-829.6
Median	71.0	182.6	53.9	-128.7***
Minimum	0.7	2.0	0.7	
Maximum	45929.5	45817.6	45929.5	
Standard deviation	5941.5	7439.1	4962.2	
Firm specific risk (*retstdev_prior)*				
Mean	4.24	3.36	4.70	1.33***
Median	3.50	2.89	3.89	1.00)***
Minimum	1.08	1.08	1.38	
Maximum	16.16	10.98	16.16	
Standard deviation	2.46	1.78	2.64	
Herfindahl index (*herfindahl_prior*)				
Mean	2252.3	1788.5	2494.0	705.5***
Median	1732.8	1183.1	2095.3	920.0***
Minimum	174.9	174.9	181.5	
Maximum	8066.9	7458.3	8066.9	
Standard deviation	1811.6	1508.2	1906.9	

(continued)

Table 2.1 – *Continued*

Key variables	**All successors**	**Family successors**	**All unrelated successors**	**Difference in means / medians**
GDP growth prior (*gdp_growth_prior*)				
Mean	5.3%	5.0%	5.5%	0.5%*
Median	5.6%	4.8%	5.6%	1.0%
Minimum	-1.5%	-1.5%	0.6%	
Maximum	11.8%	10.7%	11.8%	
Standard deviation	2.6%	2.7%	2.5%	
Worldwide governance index (*wgi_prior*)				
Mean	1.00	0.89	1.05	0.2**
Median	1.36	1.19	1.36	0.2**
Minimum	-0.55	-0.51	-0.55	
Maximum	1.51	1.51	1.50	
Standard deviation	0.62	0.64	0.60	

2.4.2 Correlations of variables

Table 2.2 shows the correlation coefficients for the variables used in our study. As can be seen from said table, there are two pairs of highly correlated variables, *duality* is highly correlated with *founder_chairman*, whilst postgrad is highly correlated with *ta_growth_prior*. Accordingly, these highly correlated variables are use sequentially in the four treatment models presented in Tables 2.4 and 2.5.

Table 2.2 – Correlations

The table contains the correlations matrix of the variables used in our study. The table contains Pearson, Polychoric and Tetrachoric correlations taking into account the different types of variables used in the models.

	(A)	*(B)*	*(C)*	*(D)*	*(E)*	*(F)*	*(G)*	*(H)*	*(I)*	*(J)*	*(K)*	*(L)*	*(M)*	*(N)*	*(O)*	*(P)*	*(R)*	*(S)*	*(T)*	*(U)*
family_own (A)	1.00																			
founder_chairman (B)	0.18	1.00																		
duality (C)	-0.17	-0.73	1.00																	
sga_asset_prior (D)	0.03	-0.11	0.06	1.00																
fs_hat_sga_asset_prior (E)	-0.22	-0.11	0.22	0.16	1.00															
firm_age (F)	-0.33	-0.06	0.16	-0.14	0.43	1.00														
successor_age (G)	-0.15	-0.15	0.19	0.02	0.06	0.29	1.00													
undergrad_foreign (H)	0.15	0.06	0.22	-0.16	0.01	0.14	-0.18	1.00												
postgrad (I)	-0.12	0.03	0.12	-0.41	-0.04	0.19	0.06	0.49	1.00											
ctry_base_list (J)	0.28	0.04	0.04	-0.18	-0.18	-0.01	0.20	-0.14	-0.08	1.00										
roa_prior (K)	-0.05	0.21	-0.20	-0.33	0.22	0.19	-0.08	-0.04	0.09	-0.09	1.00									
tobinsq_prior (L)	-0.05	-0.02	-0.11	0.23	-0.19	-0.17	0.01	-0.24	-0.08	-0.03	-0.38	1.00								
qratio_prior (M)	0.14	-0.06	0.05	0.09	-0.11	-0.05	-0.13	-0.03	-0.01	0.10	0.02	0.12	1.00							
tdta_prior (N)	-0.08	0.04	0.16	-0.14	0.07	0.22	0.08	0.18	0.14	0.08	0.02	-0.18	-0.23	1.00						
ta_growth_prior (O)	0.07	-0.28	-0.04	0.17	-0.08	-0.13	-0.11	0.08	-0.56	-0.38	-0.24	0.22	0.06	0.00	1.00					
ln_sales_prior (P)	-0.38	0.12	0.03	-0.22	0.13	0.48	0.20	0.12	0.34	0.06	0.32	0.04	-0.28	0.20	-0.14	1.00				
retstdev_prior (R)	0.00	-0.12	0.11	0.28	-0.15	-0.25	-0.08	-0.02	-0.18	0.03	-0.43	-0.03	-0.10	0.15	0.19	-0.35	1.00			
herfindahl_prior (S)	0.02	-0.14	-0.17	0.00	-0.15	-0.11	-0.03	-0.17	-0.06	-0.11	-0.02	0.08	0.08	-0.11	-0.01	0.08	-0.07	1.00		
gdp_growth_prior (T)	0.13	0.06	-0.09	0.14	-0.06	-0.12	0.05	-0.06	-0.08	0.35	-0.08	0.07	0.00	0.07	0.07	-0.22	0.17	-0.06	1.00	
wgi_prior (U)	0.27	0.05	-0.15	0.07	-0.20	-0.19	-0.15	0.18	-0.08	-0.35	-0.13	0.00	0.03	-0.12	0.08	-0.08	-0.03	0.10	-0.29	1.00

2.4.3 The probability of a family successor being appointed

Table 2.3 shows the results for the 1st stage (treatment) probit models. The two variables in the models that relate to family control over the firm and, therefore, influence over the appointment of family successor, family ownership (*family_own*)[5] and founder-chairman (*founder_chairman*), are not statistically significant. Accordingly, there is no support for hypotheses *H1-1* and *H1-2.* Prior literature provides several reasons for the absence of support for the hypotheses. In essence, even though it is hypothesized that family ownership and founder control over the board may result to the appointment of family successor, they may be other counteracting factors that may supersede this preference. First, while poor prior performance, per se, may not lead to the appointment of unrelated successors (Bocatto, Gispert et al., 2010), Smith and Amoako-Adu (1999) find that poor prior operating performance may result in family members choosing not to seek management positions in the family firm. This in turn leads the absence or shortage of family successor, hence the appointment of unrelated successors. The summary statistics in Table 2.1 show that on average firms that appoint unrelated successors tend to have poorer prior operating performance (average of 0.1%) compared with the subsample of firms that appoint family successors (average of 6.0%). Results of our multivariate analysis also show that prior operating performance has a significant influence on the choice of successor.

An alternative explanation for the lack of support for H1-1 and H1-2 may be directly related to the absence of family successor. This is supported by the study by Morck and Yeung (2004). The authors opine that potential family successors may not have the entrepreneurial aptitude and interest in the family business, and may therefore utilize their inherited wealth to engage in activities other than through innovation and

entrepreneurship. Consistent with the socio-emotional wealth thesis, if there is no suitable family candidate, then an unrelated external candidate will be selected (Gómez-Mejía, Haynes et al., 2007).

The variable, *sga_assets_prior*, which proxies a firm's investment in organization capital, is negatively associated with the likelihood of the appointment of family successors. This may suggest that firms in our sample that invest in organization capital have a greater pool of successors to choose from. They are, therefore, less reliant on family alone in selecting the CEO successor. The result provides support for hypothesis *H1-3*, that firms in which founders invest in organization capital can benefit from a larger pool of talent to select from.

We control for number of firm characteristics. Firm age could influence the founder's choice of successor as the older the firm, the more likely the founder will select a family successor (Bennedsen, Nielsen et al., 2007). The results in Table 2.3 suggest that the age of the firm before succession (*firm_age*) has a positive and significant relationship with the likelihood of appointment of family successors.

Similarly, firm performance prior to succession could impact succession per Adams, Almeida et al. (2009). The results suggest that the performance of the firm prior to succession (*roa_prior*) is positively related to the probability of appointment of family successors. However, the coefficient for the Tobin's Q model is negative. If Tobin's Q is interpreted as an indication of the firm's growth opportunity set, the results suggest that firms that face lower growth opportunities are more likely to appoint a family successor. These findings are in contrast to Cucculelli and Micucci (2008) who do not find a relationship.

Leverage (*tdta_prior*) is positively related to the likelihood of appointment of family successors. This could be the result of a lack of possible unrelated candidates

who may find firms with high leverage levels unattractive to manage. Firstly, such firms may be difficult to manage, as high level of debt constrains the ability to maneuver the firm, consistent with the notion of debt being used to discipline management (Jensen, 1986). Further, high leverage level may translate to a higher risk of failure, which could adversely affect CEO reputation in the labor market for CEOs (Fama, 1980a).

Finally, the underlying business risk of the firm (*retstdev_prior*) is negatively related to the probability of appointing a family successor. This seems consistent with the idea that founders may be constrained in their choice of successors when their firms have high business risk. High risk founder firms may require unrelated successors who have the industry expertise to manage such businesses. Alternatively, it is possible that founders may not wish to expose family successors to failure, and would hence limit their participation in highly risky businesses.

Table 2.3 – The determinants of appointing a family successor

The table reports results of the 1st stage (treatment) probit regression. The dependent variable is a dummy variable, where 1=family successor; 0=unrelated successor. Definitions of independent variables are detailed in the Appendix of this chapter. The z-statistics are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	
family_own	-0.005
	(-0.95)
founder_chairman	-0.085
	(-0.37)
sga_asset_prior	-1.853 **
	(-2.43)
firm_age	0.04 ***
	(5.1)
successor_age	-0.031 **
	(-2.05)
ctry_base_list	0.651
	(1.5)
roa_prior	0.042 **
	(2.34)
qratio_prior	-0.015
	(-0.29)
tdta_prior	1.993 ***
	(2.84)
ta_growth_prior	-0.806
	(-1.6)
ln_sales_prior	-0.099
	(-1.33)
retstdev_prior	-0.147 **
	(-2.16)
herfindahl_prior	-0.117 *
	(-1.77)
gdp_growth_prior	-2.382
	(-0.48)
wgi_prior	-0.016
	(-0.08)
_cons	1.445
	(1.4)
Pseudo R^2	0.3624
χ^2	100.62***
Country fixed effects	Yes

2.4.4 Family succession and firm performance

Table 2.4 shows the results for the 2nd stage model where performance is measured by ROA. The coefficients of the family successor dummy variable (*family_successor*) are positive and highly significant across all model specifications. This suggests that family successors outperform unrelated successors after controlling for firm, successor, industry and macro factors, as well as country, year and industry fixed effects[6]. The result provides support for hypothesis *H2-1*, that family successors achieve better post-succession performance than unrelated successors[7].

This finding is contrary to most prior literature on family firms in the US, Europe and Asia, but in line with Anderson and Reeb (2003a) and Barontini and Caprio (2006) for successions in family firms in the US and Europe, respectively. However, these studies include subsequent successions, rather than focusing solely on founder-succession. Our results also differ from one other founder-succession studies. Cucculelli and Micucci (2008) find that Italian firms with descendant successors deliver poorer firm performance, post-succession while Molly et al (2010) does not find evidence that a family firm's profitability is affected by succession for Belgian firms.

Our performance results could be driven by the subsample of non-descendant family successors. To address this concern, we run our models with only the subsample of descendant successors. We find that the results are still positive and highly robust, showing that the positive performance of firms with family successors is not driven by non-descendant successors. The positive performance results could also potentially be explained by the influence of Confucian ideologies in Asian families. First, in such families, succeeding the family business is a matter of duty to the founder and the

[6] We do not run the model for separate countries due to sample size constraints.

[7] As a robustness test, we also estimate instrumental variable regression models using the number of founders and the existence of a male heir as instruments. The results are consistent with the endogenous treatment models and for brevity, we do not include these.

family. Hence, even at a young age, children are conditioned and trained to be equipped with the skills and acumen to take over the family business at some point in the future. This means all other individual preferences of the child are subordinated to this duty (Yan & Sorenson, 2006). In addition, in a traditional Asian family, elder sons have executive roles, the younger ones heed to their authority (Jacobs, Guopei et al., 1995). However, distribution of wealth of the founder is equal regardless of sequence of birth to promote harmony and cooperation amongst family members (Chau, 1991). Finally, the performance of the successor, especially a son who carries the family name, is a reflection of the success of the family in their closely knit social business network. Family honor or 'face' (Redding & Michael, 1983) is of paramount importance in traditional Chinese families.

The age of the successor (*successor_age*) is not statistically significant and thus does not provide support for hypothesis *H2-2*. The firm's investment in organization capital (*sga_assets_prior)* is positive and statistically significant across all model specifications. This suggests that founders in firms that invest in organization capital lay a strong foundation for superior performance of their successors. This translates to better performance across all successors supporting the view that succession planning is important for a firm's continued survival and success. We include an interaction term in the model to capture the joint impact of organization capital and family succession. However, we find weak evidence of the positive effects of organization capital with respect to family successors, when duality is considered as a variable in the model (Columns (2) and (4) in Table 2.4). In the Asian context, investment in organization capital also has a unique meaning. Unrelated professional executives who are hired into the family firm by the founder enjoy informal and personal relationships with the entire family (Lee, 1996). Not only are they well remunerated (Weidenbaum, 1996), they

become highly trusted individuals who become part of the inner circle of the family (Yan & Sorenson, 2006). Such special relationships continue even after there is a leadership change at the family firm and they will continue to support and guide the successor to achieve superior performance.

The education background of the successors may impact the performance of the firm, post-succession (Pérez-González, 2006). We control for educational background by including whether successors have foreign and/or postgraduate education. Foreign education exposes successors to western style business and management philosophies and practices that may translate to superior performance. Similarly, the attainment of postgraduate education may result in more effective management. We find that foreign education (*undergrad_foreign*) is not significant, but postgraduate education (*postgrad*) has a positive effect on post-succession operating performance.

We also control for board characteristics. Duality (*duality*) is negatively related to post-succession performance. This result is consistent with the agency explanation of duality which suggests that firms with successors holding dual roles are exposed to the risk that these CEO successors pursue their own self-interest at the expense of shareholders (Jensen & Meckling, 1976).

The *founder_chairman* variable (Columns (1) and (3) in Table 2.4) is insignificant and is inconsistent with the positive relationship for US firms in Villalonga and Amit (2006). The difference could be explained by cultural difference between US and Asian family businesses. In Asian families, even after control of the business has been entrusted to the child, they are still expected to consult with their founder father as a sign of respect (Chen, 1995), irrespective of whether the founder stays on in the capacity as Chairman.

Several additional control variables are significant and hence noteworthy. First, the leverage level of the firm prior to succession (*tdta_prior*) is negative and weakly related to post-succession performance. A potential explanation may be that successors face severe constraints when they lead a business that has high debt levels. They may invest in lower risk investments and projects which in turn translate to lower operating performance.

C*try_base_list* is significantly positively associated with post-succession performance. These firms are domiciled in emerging markets but list on a major financial hub in Asia such as Hong Kong or Singapore. The listing provides access to capital to grow, coupled with the abundance of potential investment opportunities in emerging markets.

The corporate governance variable (*wgi_prior*) is significantly negatively associated with post-succession performance, across all model specifications. This is surprising as a common expectation is that better corporate governance leads to better performance (Klapper & Love, 2004). However, Young, Peng et al. (2008) find that underlying many of the corporate governance issues in emerging markets are the principal-principal type conflicts, between majority and minority shareholders, as opposed to the classic principal-agent conflict. The principal-principal conflict usually leads to several potential outcomes such as installing less qualified family members, friends and cronies into key positions (Faccio, Lang et al., 2001), siphoning profits via unfair transfer pricing policies to another entity (Chang & Hong, 2000; Khanna & Rivkin, 2001) and pursuing strategies that advance the interest of the family at the expense of other shareholders such as excessive diversification (Backman, 2001). This is because excessive diversification result in coordination and managing resource allocation which further reduces performance (Isobe, Makino et al., 2006; Mursitama,

2006). However, it is difficult to argue that only firms in more developed markets engage in excessive diversification but there could be a case made for better performance with respect to diversification in an emerging market where there are more investment opportunities.

Table 2.4 –The impact of family succession on firm performance (ROA)

The table reports results of the 2nd stage (treatment) OLS regression. The dependent variable is 3-year average ROA post-succession. The correlations matrix shows that two pairs of independent variables are highly correlated – *founder_chairman* and *duality*, and *postgrad* and *ta_growth_prior*. Columns 1 to 4 show results from models with different combination of these variables. Columns 1 and 2 show results from models with *founder_chairman* and *duality*, respectively with *ta_growth_prior*. Columns 3 and 4 show results from models with *founder_chairman* and *duality*, respectively with postgrad. Definitions of independent variables are detailed in the Appendix of this chapter. The z-statistics are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	**(1)**	**(2)**	**(3)**	**(4)**
predicted family_successor (vs. unrelated successors – overall)	11.997 **	12.974 ***	12.314 ***	13.177 ***
	(2.56)	(2.76)	(2.59)	(2.76)
family_own	0.008	0.012	0.013	0.017
	(0.21)	(0.34)	(0.37)	(0.48)
founder_chairman	1.187		1.403	
	(0.80)		(0.93)	
duality		-3.685 *		-3.294 *
		(-1.92)		(-1.7)
sga_asset_prior	7.491 **	7.63 **	7.522 **	7.602 **
	(2.43)	(2.48)	(2.40)	(2.43)
*predicted fs * sga_asset_prior*	16.068	18.468 *	16.525	18.839 *
	(1.51)	(1.73)	(1.53)	(1.74)
firm_age	-0.101	-0.115	-0.112	-0.126 *
	(-1.45)	(-1.64)	(-1.59)	(-1.77)
successor_age	0.037	0.069	0.048	0.076
	(0.35)	(0.65)	(0.45)	(0.70)
undergrad_foreign	0.011	0.249	-0.759	-0.522
	(0.01)	(0.16)	(-0.48)	(-0.33)
postgrad			2.554 *	2.395
			(1.72)	(1.62)
ctry_base_list	14.509 **	15.460 **	14.974 **	15.906 **
	(2.34)	(2.49)	(2.39)	(2.53)

(continued)

Table 2.4 – *Continued*

Independent variables	**(1)**	**(2)**	**(3)**	**(4)**
roa_prior	0.090	0.079	0.108	0.099
	(1.35)	(1.19)	(1.61)	(1.48)
qratio_prior	0.212	0.250	0.164	0.197
	(0.67)	(0.79)	(0.51)	(0.61)
tdta_prior	-9.443 **	-9.371 *	-8.948 *	-8.830 *
	(-1.96)	(-1.95)	(-1.84)	(-1.81)
ta_growth_prior	-0.994 **	-1.046 ***		
	(-2.45)	(-2.59)		
ln_sales_prior	0.952 *	1.063 **	0.951 *	1.090 **
	(1.81)	(2.05)	(1.77)	(2.06)
retstdev_prior	0.584	0.669 *	0.572	0.643 *
	(1.53)	(1.74)	(1.48)	(1.65)
herfindahl_prior	-0.030	-0.114	0.022	-0.064
	(-0.07)	(-0.26)	(0.05)	(-0.14)
gdp_growth_prior	11.513	22.365	-3.610	7.787
	(0.16)	(0.31)	(-0.05)	(0.11)
wgi_prior	-10.865 ***	-11.288 ***	-10.798 ***	-11.256 ***
	(-2.66)	(-2.77)	(-2.61)	(-2.72)
_cons	-34.584 ***	-38.696 ***	-36.382 ***	-40.041 ***
	(-2.99)	(-3.3)	(-3.12)	(-3.37)
hazard_lambda	-6.348 **	-6.491 **	-6.548 **	-6.694 **
	(-2.3)	(-2.36)	(-2.35)	(-2.4)
Control for Fixed effects				
Industry (SIC)	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes

The results for an alternative performance measure external to the firm, Tobin's Q, are shown in Table 2. 5.

Consistent with the ROA model, the coefficients of the family successor dummy variable (*family_successor*) are positive, significant and robust across all model specifications. These results provide further support for hypothesis *H2-1*, that family successors achieve better post-succession performance than unrelated successors.

In addition, the age of the successor (*successor_age*) is positive and statistically significant. The result provides support for hypothesis *H2-2* and is consistent with Smith and Amoako-Adu (1999). The effects of a firm's investment in organization capital, (*sga_assets_prior)* are positive and highly significant, which are consistent with the ROA models. However, the interaction term with family successor is not significant, suggesting that investors do not attribute a higher valuation for higher level of spending on organizational capital for firms with family successors, per se.

Finally, several control variables are consistent with the ROA models (*ctry_base_list and wgi_prior*). However, in contrast to the results for the ROA models, the coefficient for leverage level of the firm prior to succession (*tdta_prior*) is not significant. In addition, economic performance prior to succession (*gdp_prior*) is positive and significant, suggesting that prior economic performance has a positive and significant impact on the firm's post-succession performance, measured by Tobin's Q.

Table 2.5 – The impact of family succession on firm performance (Tobin's Q)

The table reports results of the 2nd stage (treatment) OLS regression. The dependent variable is 3-year average Tobin's Q post-succession. The correlations matrix shows that two pairs of independent variables are highly correlated – *founder_chairman* and *duality*, and *postgrad* and *ta_growth_prior*. Columns 1 to 4 show results from models with different combination of these variables. Columns 1 and 2 show results from models with *founder_chairman* and *duality*, respectively with *ta_growth*_prior. Columns 3 and 4 show results from models with founder_chairman and duality, respectively with postgrad. Definitions of independent variables are detailed in the Appendix of this chapter. The z-statistics are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	**(1)**	**(2)**	**(3)**	**(4)**
predicted family_successor (vs. unrelated successors – overall)	6.711 ***	6.839 ***	8.442 ***	8.543 ***
	(2.530)	(2.57)	(2.82)	(2.85)
family_own	-0.003	-0.003	-0.002	-0.002
	(-0.16)	(-0.15)	(-0.11)	(-0.10)
founder_chairman	0.010		0.087	
	(0.01)		(0.10)	
duality		-0.681		-0.556
		(-0.58)		(-0.46)
sga_asset_prior	6.411 ***	6.364 ***	6.582 ***	6.545 ***
	(3.78)	(3.75)	(3.63)	(3.61)
*predicted fs * sga_asset_prior*	-0.455	1.752	-0.569	1.137
	(-0.06)	(0.20)	(-0.07)	(0.13)
firm_age	-0.106 ***	-0.108 ***	-0.128 ***	-0.130 ***
	(-2.73)	(-2.76)	(-3.00)	(-3.03)
successor_age	0.101 *	0.106 *	0.124 *	0.128 **
	(1.680)	(1.740)	(1.91)	(1.95)
undergrad_foreign	0.189	0.244	0.127	0.174
	(0.220)	(0.29)	(0.15)	(0.2)
postgrad			0.346	0.329
			(0.43)	(0.41)
ctry_base_list	11.067 ***	11.195 ***	11.291 ***	11.404 ***
	(3.19)	(3.22)	(3.1)	(3.13)

(continued)

Table 2.5 – *Continued*

Independent variables	**(1)**	**(2)**	**(3)**	**(4)**
roa_prior	-0.041	-0.043	-0.038	-0.039
	(-1.12)	(-1.17)	(-0.98)	(-1.01)
qratio_prior	0.127	0.138	0.113	0.121
	(0.71)	(0.76)	(0.59)	(0.63)
tdta_prior	0.444	0.427	0.130	0.127
	(0.16)	(0.15)	(0.04)	(0.04)
ta_growth_prior	-0.284	-0.292		
	(-1.25)	(-1.29)		
ln_sales_prior	0.206	0.213	0.225	0.238
	(0.7)	(0.73)	(0.72)	(0.77)
retstdev_prior	0.205	0.224	0.230	0.245
	(0.94)	(1.02)	(1.00)	(1.05)
herfindahl_prior	0.182	0.173	0.242	0.232
	(0.73)	(0.70)	(0.91)	(0.87)
gdp_growth_prior	72.995 *	75.057 *	67.097 *	69.141 *
	(1.83)	(1.89)	(1.67)	(1.72)
wgi_prior	-5.616 **	-5.61 **	-6.21 ***	-6.218 ***
	(-2.43)	(-2.43)	(-2.54)	(-2.55)
_cons	-23.461 ***	-24.142 ***	-25.112 ***	-25.658 ***
	(-3.58)	(-3.63)	(-3.66)	(-3.69)
hazard_lambda	-4.181 ***	-4.197 ***	-5.221 ***	-5.232 ***
	(-2.69)	(-2.71)	(-3.02)	(-3.03)
Control for Fixed effects				
Industry (SIC)	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes

2.5 Conclusion

A founder CEO has a choice of selecting a related family member or an unrelated successor. For a listed firm that has external shareholders, proper governance would prescribe that the choice must be based on merit, via the ability of the successor to create value for shareholders. Prior studies on succession in general find that family firms tend to appoint family successors and would even restrict senior executives to members of the family (DeAngelo & DeAngelo, 1985; Smith & Amoako-Adu, 1999; Anderson & Reeb, 2003a; Bertrand & Schoar, 2006). The appointment of family successors is generally regarded as suboptimal because of wasteful nepotism. This provides an explanation for the negative impact of family succession (Pérez-González (2006) and similar studies).

In recent years, family firms in Asia have been encountering succession for the first time. Founder-succession is a critical event for the firm in that founder-firms are highly dependent on their founders for vision, drive, commercial connections as well as technical skill sets. The generational change from CEO founder to successor across a large number of Asian firms provides a unique opportunity to investigate the factors that drive the likelihood of the appointment of a family successor and the impact of founder-succession on firm performance. In comparison, most studies on family succession include multi-generational succession and do not specifically isolate the impact of founder-succession.

Asian firms have a number of distinct characteristics compared to their counterparts in developed markets including close shareholder control and a strong influence of Confucianism on business and family practices. These suggest that to ensure continuity, the family has an interest in building a strong organization to support the family successor.

We control for endogeneity and analyze the factors that drive succession choice and the impact on performance for Asian firms. First, consistent with Cucculelli and Micucci (2008), we do not find evidence that family ownership of the founder firm drives the choice of a family successor. Next, we find that founder firms that invest heavily in organization capital increase its access to a wider pool of talent, beyond family members. Founder firms that are older also tend to appoint family successors. Finally, we find that founders are more likely to choose a family successor if the firm achieves superior performance prior to succession. The finding seems to suggest that the successor's relationship to the founders may be less important than the expertise to turn around an ailing firm.

In contrast to most prior international studies of family firms, we show that family successors outperform unrelated successors. This is measured by improvements in operating performance (ROA) as well as stock price performance (Tobin's Q) of the firm post-succession. The firms in our sample mostly comprise Overseas Chinese and Korean family firms that are strongly guided by Confucian values, which may be a possible rationale for Asian family successors performing well compared to their western counterparts.

2.6 Appendix: variable descriptions

Key variables	Variable names used	Descriptions
Successor characteristics		
Family successor dummy	*family_successor*	Dummy variable for family successor (1=CEO successor is connected to the founder by blood or marriage; 0 otherwise).
Age at appointment	*successor_age*	Age at which CEO successor is appointed.
Foreign education dummy	*undergrad_foreign*	Dummy variable for CEO successor having received undergraduate education in a foreign country (1= CEO successor is foreign educated; 0 otherwise).
Postgraduate education dummy	*postgrad*	Dummy for CEO successor having attained postgraduate qualification (1= CEO successor attained postgraduate qualification; 0 otherwise).
Dual role of the successor	*duality*	Dummy variable for successor who is appointed both Chairman and CEO positions (1=CEO successor with dual roles; 0 otherwise).
Firm characteristics		
Family ownership	*family_own*	3-year average ownership of the firm by founder and their families prior to succession.
Founder remaining as chairman of the board post-succession dummy	*founder_chairman*	Dummy for founder serving as Chairman of the Board of Directors after succession (1=Founder serving as Chairman; 0 otherwise).
SG&A over assets	*sga_assets_prior*	Percentage of Selling, General & Administration Expenses over the total assets of the firm. (As used in Lev and Radhakrishnan (2005); Eisfeldt and Papanikolaou (2013a)).
Firm age at appointment	*firm_age*	The age of the firm prior to succession.
Listing in foreign markets	*ctry_base_list*	Dummy for firms listed outside the home market (1= firm listed in a stock exchange outside their country of origin; 0 otherwise).
Pre-succession performance (ROA)	*roa_prior*	3-year average ROA prior to succession event (from t=-3 to -1). ROA is defined as Net Operating Profit After Tax (NOPAT) / Average Assets.
Pre-succession performance (Tobin's Q)	*tobinsq_prior*	3-year average Tobin's Q prior to succession event (from t=-3 to -1). Tobin's Q is computed as Market Value of Equity / Book Value of Equity

Key variables	Variable names used	Descriptions
Firm characteristics (continued)		
Liquidity level of the firm	*qratio_prior*	3-year average quick ratio prior to succession.
Leverage level of the firm	*tdta_prior*	3-year average leverage level for the firm prior to succession, defined as ratio of total debt over total assets.
Asset growth	*ta_growth_prior*	3-year average asset growth rates prior to succession.
Size of the firm	*lnsales_prior*	3-year average natural log of net sales prior to succession.
Firm risk	*retstdev_prior*	3-year average standard deviation of stock return prior to succession.
Macro/country/industry level		
Level of industry competition	*herfindahl_prior*	3-year average Herfindahl index for the industry prior to succession.
Economic performance	*gdpgrowthrate*	3-year average GDP growth rate for the country prior to succession.
Corporate governance indicator	*wgi_prior*	Worldwide Governance Index (WGI) for each country at t=-1. The WGI is a country level index by the World Bank Institute which covers six dimensions of corporate governance, including Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Rule of Law; and Control of Corruption.

CHAPTER 3

GUANXI (关系) AND BOARD CONNECTIVITY IN HONG KONG AND SINGAPORE

3.1 Introduction

Social and economic networks are at the heart of economic activity. Interpersonal and inter-organizational support, influence, and information flow through the links between individuals in these networks. The boardroom network is an important network in corporate finance, formed by directors holding seats on the same board. A firm's boardroom network and its efficacy, is dependent on individual board member's access to wider social and economic networks that have long been recognized as a valuable source of organizational strength and development (Rees, 1966; Granovetter, 1973). However, having a board that is well connected can have opposing effects. Better connections can help a firm to extend its reach to contacts and resources (Pfeffer & Salancik, 1978; Johnson, Daily et al., 1996), as well as access to valuable information (Adler & Kwon, 2002), far beyond what it could do on its own. In contrast, having better connected board members may yield negative results for the firm in number of situations: if they can only afford limited attention and time for the firm (Loderer & Peyer, 2002; Fich & White, 2003; Fich & Shivdasani, 2006); if the quality of information flowing to the firm is inaccurate (Larcker, So et al., 2013); or if the firm faces regulatory, litigation, and reputation costs for collusive activities (Pfeffer & Salancik, 2003; Larcker, So et al., 2013).

The concept of boardroom network connections is closely linked to the concept of business relationships (关系 or *guanxi*) amongst the Chinese business community in Asia. *Guanxi* originated as a cultural phenomenon referring to personal relationships at the individual level (Yang, 1994; Chai & Rhee, 2010). Researchers have argued that *guanxi* can be transferred from the individual level to the corporate level via board memberships. *Guanxi* is perceived as a source of social capital and a strategic tool for organizations that helps facilitate business operations, and in so doing gain a

competitive advantage for the firm (Luo, 1997; Hoskisson, Eden et al., 2000; Park & Luo, 2001). In the context of the boardroom network, *guanxi* helps the firm leverage both formal and informal networks of board members in order to gain from their personal relationships. Due to the high cost of building a *guanxi* network on its own, a firm gains the benefits of such networks via the invitation of well-connected board members.

Given the importance of *guanxi* to the Chinese business community, we explore the effect of *guanxi* connections via boardroom networks in Hong Kong and Singapore, both of which are dominated by ethnic Chinese. We first address the effects of the board's *guanxi* connections on the performance of the firm, followed by an analysis of the various channels through which superior connectivity can translate to tangible advantages for the firm.

Our results show that connectedness of the board to the network has positive effect on a firm's ROA performance and are consistent with the findings in Larcker, So et al. (2013) for U.S. firms. Firms with highly connected board experience higher firm performance of between 1.183% and 2.822%, compared to firms with weaker connected boards. This result is robust after controlling for year-, industry- and country-fixed effects, as well as potential endogeneity via the use of treatment effect models. As additional robustness checks, we use a more extensive list of governance characteristics for the Singapore subsample, as well as a propensity score estimator to treat the potential non-random assignment of board connectedness and firm performance (Rosenbaum & Rubin, 1984), and the instrumental variable (IV) approach. The results for the robustness tests remain consistent with our main findings.

However, where there is a founder who serves as a chairman of the board with a highly connected board, we find net negative firm performance of around 0.35% of

ROA. This may suggest a situation of conflict between the founder-chairman and the highly connected board members. This could be explained by the tension between founder-chairman not being able to relinquish complete control of the business they founded (de Vries, 1985; Sonnenfeld, 1987, 1991), and the need of well-connected directors to protect their reputation in the labor market for directors via active engagement on the board (Masulis & Mobbs, 2014; Jiang, Wan et al., 2015; Levit & Malenko, 2015). Another potential area of conflict is risk taking. In this respect, well-connected directors may be risk averse for fear that risk taking may result in failure of the firm, which may tarnish their reputation in the directors' market.

In addition, we consider the potential channels through which a well-connected board can impact the firm. In terms of acquisition activities, we find that firms with well-connected boards are not only likely to more active acquirers, but they are also more likely to be successful in completing the acquisitions that they announce. Besides the positive effect of broad context of board connectedness on acquisition activities, we also find that direct connections between the boards of the acquirer and target further enhances the likelihood of engaging in acquisitions and successful completion. Our evidence for Hong Kong and Singapore with respect to the direct connections of directors is consistent with Renneboog and Zhao (2014) for the UK. This seems to suggest that firms in our sample also leverage connections proffered by well-connected board member to expand via acquisitions.

Firms may use strategic alliance as an alternative strategy to acquisitions (Gomes, Weber et al., 2011), or as a means to gain information about foreign markets if they are relatively new in their overseas expansion experience (Reuber & Fischer, 1997). This is highly pertinent to firms in Hong Kong and Singapore where the size of the market is a constraint for growth, making expansion to overseas markets to achieve

growth very critical. In this respect, we find that firms with better board connections tend to engage in strategic alliances, which may suggest that firms in our sample use strategic alliance as a means to expand the scope of their business reach. However, we find that the presence of family control and higher levels of institutional ownership have a negative effect on the likelihood of a firm adopting strategic alliances as a growth strategy. This may be due to concerns over the potential ill effects of strategic alliances (Garai, 1999), including the loss of knowhow, talent and intellectual properties by these types of firm owners.

Finally, we investigate potential linkages between board connectivity and its impact on the firm's pool of suppliers and customers. Similarly, we find strong evidence that direct and indirect board connections have a positive and significant effect the pool of suppliers. However, we find weaker evidence for customers. The contrast in our findings can be explained by the fiduciary duty and duty of care that board members owe to shareholders of each of the firms they act for (Miller, 1992; Knepper, Bailey et al., 2015). In the context of these duties, linking firms to suppliers are much less contentious than connecting firms to customers.

Our study makes several important contributions to the literature on boardroom connectivity in Asia. We add to existing literature on the use of board connections to the conduct of business relationships which has focused on Western markets, by examining *guanxi* in the Asian business environment, which is largely Chinese in ethnicity. Mainland China has emerged as the second largest economy in the world[8] and Overseas Chinese control significant wealth in their respective localities across other parts of Asia even though they are minorities in number (Kao, 1993; Seagrave, 1995; Chua, 2004b).

[8] Source: the World Bank, 2016.

Second, we contribute to existing knowledge about functioning of the boards in Asia, in the presence of two influential and well-connected groups of players, both having disparate interests with respect to their board membership. On the one hand, founder-chairmen may wish to supplement their own *guanxi* network with those of the invited board members. On the other hand, the presence of a board comprising of well-connected and influential board members may result in potential conflict. These board members may be more focused on their own reputation in the labor market for directors and can either take a conservative view on issues that are risk minimizing, or disagree with the Founder-Chairmen on points relating to corporate governance.

Third, we extend the existing literature by examining the channels through which the benefits of a highly connected board can translate into an advantage to the firm including acquisition activities, strategic alliances as well as extension of customer and supplier relationships.

The remainder of this paper is structured in the following manner. Section 3.2 contains a detailed review of the prior literature, leading to the development of testable hypotheses for our study. Section 3.3 outlines the methodology that we deploy for our study, as well as the data, sample and experimental design. Section 3.4 proceeds with the presentation of our empirical results, followed by robustness tests in Section 3.5. The paper will conclude in Section 3.6.

3.2 Prior literature and hypotheses development

The superiority of an extensive boardroom network can benefit a firm in several ways. First, board of directors can help to scale the environment in which the firm operates and assist the firm with the acquisition of critical resources it needs to compete (Pfeffer & Salancik, 1978; Johnson, Daily et al., 1996). One such resource is access to channels

of communication with the external environment (Zahra & Pearce, 1989; Pfeffer & Salancik, 2003). Next, the network forged by the board allows the firm to benefit from social relationships, and hence minimize information asymmetry with respect to the designing of contracts, which brings positive results for the contracting parties (Schoorman, Bazerman et al., 1981). Social capital theories suggest that connectedness of the board of directors yields benefits to the firm, since they create social networks which offer superior access to information (Adler & Kwon, 2002). A better connected board gains from superior access to information, hence able to make better strategic decisions (Mizruchi, 1996; Mol, 2001; El-Khatib, Fogel et al., 2015). Furthermore, board network connections could be a conduit for information flow through which value-enhancing innovation can propagate (Beckman, Haunschild et al., 2004). As such, firms with better connected board members can leverage business relationships to enhance their business performance (Mol, 2001; Nicholson, Alexander et al., 2004). Finally, a firm's board network connections contain communications channels and resource exchange between firms, which can facilitate collusive behaviors resulting in positive outcomes for those sets of closely knit firms (Pennings, 1980).

However, better board connections may result in poorer performance of the firm. A highly connected board member may be someone who sits on multiple boards, which may dilute their attention and effort, leading to poorer monitoring which is consistent with recent literature that finds a negative relationship between the busyness of directors and monitoring efficacy (Loderer & Peyer, 2002; Fich & White, 2003; Fich & Shivdasani, 2006). In addition, while studies hail the benefits of information flow, there is also a possibility where conflicting and wrong information is passed on from a well-connected board, leading to the provision of bad strategic advice to management (Larcker, So et al., 2013). Finally, while collusion seems to lead to positive outcomes,

there is also a possibility of a backlash of regulatory sanctions and litigation, which could translate into adverse publicity and a bad reputation in the market (Pfeffer & Salancik, 2003; Larcker, So et al., 2013).

3.2.1 *Guanxi* and board connectedness

Guanxi is a concept that is closely linked to the concept of connectedness. It dominates business activities throughout China and East Asia (Lovett, Simmons et al., 1999). *Guanxi* is the life blood of the Chinese business community, with wide reaching influence into politics and society (Kao, 1993). The *guanxi* forms a firm's unique competitive advantage and core competence that can result in superior performance (Luo & Chen, 1997). The ideal and concept of *guanxi* is deeply rooted in Chinese history and culture, and therefore influences the business culture of overseas Chinese anywhere in the world (Kao, 1993; Weidenbaum, 1996), including Hong Kong and Singapore both of which are predominantly Chinese. The importance of relationship or connectedness to the success of Asian founders and firms, have also been well documented in the management literature (Yeung & Tung, 1996; Luo & Chen, 1997) and is known to contribute positively to firm performance (Campbell, 1987; Shenkar, 1990). Furthermore, Yeung and Tung (1996) find that Hong Kong firms rely on business networks to expand successfully abroad, and find a positive relationship between the level of *guanxi* and firm performance.

Given the benefits of *guanxi* to success of businesses in Asia and the cost of building this network, it is reasonable to expect that founders and firms will attempt to expand and supplement their own *guanxi* connections with those of others. They do so by inviting those who have extensive connections onto their company's board. Literature in this area terms such an activity as building "social capital" (Coleman,

1994). Similarly, studies in this area find that these additional connections have a positive impact on firm performance (Nicholson, Alexander et al., 2004; Kim, 2005; Pombo & Gutiérrez, 2011; Larcker, So et al., 2013). *Guanxi* extends beyond the formal network, and it relates to networks of informal relationships and the ability to leverage these special relationships to garner favors and open doors to business opportunities. Trust which is the foundation of such a network, helps to circumvent expensive conflict oriented legal systems (Lovett, Simmons et al., 1999). Mayer, Davis et al. (1995) provide the building blocks for trust: integrity, benevolence and ability. These key attributes of the *guanxi* network become the glue that binds the members of the network. Due to the importance of trust and credibility inherent in a *guanxi* network, the system spawns when an intermediary introduces a newcomer into the rest in the network, implicitly vouching for the newcomer's reliability (Yang, 1994).

The building of the network requires the investment of time to build, since credibility needs to be earned before being accepted into the system (Davies, Leung et al., 1995). Hence, there are two opposing types of costs that need be considered with respect to the creation of a *guanxi* network. On one hand, there are costs related to building a well-functioning *guanxi* network (Lovett, Simmons et al., 1999). The cost is traded off with the saving of frictional costs when the *guanxi* network is leveraged. An interesting aspect of such a network is that once it is established, there is cumulative effect in growing a *guanxi* network, since more opportunities for connections arise with the more connections a member possesses. A firm's boardroom network is part of the *guanxi* network, since each board member connected to a web of relationships in the market. We adopt the concept of social networks to reflect the *guanxi* network in our study.

In contrast to well established business and management practices in the West, *guanxi* emphasizes personal relationships, and is built on reputations and trust that serve to ease transaction frictions because transactions occur within a flexible, yet permanent, network. We study the role of corporate boards in the context of this *guanxi* network, which focuses on the ability of the firm's members of board of directors to use its social capital to link the firm to the external environment. In our study, we focus on Hong Kong and Singapore listed firms. These two cities are very similar in many respects, including size, service sector orientation and, most importantly, predominantly composed of ethnic Chinese in their population. Given the more personal nature of the *guanxi* network in Chinese dominated markets, this study explores the efficacy of *guanxi* networks on firm performance and proposes that such connections afforded by the boardroom network centrality, bring about superior information flow and beneficial linkages with the external environment.

There are, however, several potential negative effects of engaging board members with extensive *guanxi*. First, these board members may be too busy to give the requisite attention to the firm they have been appointed (Loderer & Peyer, 2002; Fich & White, 2003; Fich & Shivdasani, 2006). In addition, it is also possible that given their multitude of information they handle, directors with high *guanxi* connections may provide inaccurate information that may result in poor decisions being made by the firm (Larcker, So et al., 2013).

Studies on the roles of the board, including Pfeffer and Salancik (1978) and Johnson, Daily et al. (1996), find that board connectedness or *guanxi* helps to connect the firm to external resources. In fact, the source of the valuable connections is the success with which these directors use these connections in their service to the firms

that appointed them. Any sustained failure to serve as directors will diminish their value in the market for directors. Hence, we hypothesize that:

H1: Firms with better connected the board of directors achieves better firm performance.

3.2.2 Channels through which *guanxi* connections can impact the firm

Strong *guanxi* of a firm's board can impact the firm by improving the likelihood of firms being engaged in acquisitions. This is particularly important for firms that aim to grow by acquisition. In such cases, boards that possess strong *guanxi* connections can help to source and facilitate acquisitions. Using data of US firms from 1991 to 2005, Singh and Schonlau (2009) find that boards that are better connected have higher chances of undertaking acquisitions and also of being acquired. There are several possible explanations for this. First is the information asymmetry hypothesis where firms with well-connected boards may gain access to superior information via these connections, allowing the acquirer firm to better evaluate the target. In addition, well-connected board members may be able to facilitate discussions and smooth out contentious issues in the negotiation process.

Furthermore, several existing studies find that the presence of common directors can have an effect on acquisitions (Cai & Sevilir, 2012; Renneboog & Zhao, 2014). Renneboog and Zhao (2014) also find that superior board connectivity, whether direct or indirect, eases the negotiation process.

H2-1a: Firms with better connected board of directors have higher likelihood of engaging in M&A transaction.

H2-1b: Firms that have common directors with other firms have higher likelihood of engaging in M&A transaction.

In addition to M&A, strategic alliances allow firms to gain some of the benefits of M&A, such as improving operating efficiency and access to markets, while avoiding the huge potential ramifications of failures in M&A transactions (Garai, 1999). Strategic alliances also provide a means by which firms experiment and gain experience, before embarking on more substantial transactions (Kogut, 1988; Reuer & Koza, 2000).

H2-2a: Firms with better connected board of directors have higher likelihood of being involved in strategic alliances.

H2-2b: Firms that have common directors with other firms have higher likelihood of being involved in strategic alliances.

Finally, another means through which better board connections can impact the firm is linkages with suppliers and customers. Besides the wider benefits of superior access to information and channels of communications, better board connections can help to reduce of information asymmetry for contracting parties (Schoorman, Bazerman et al., 1981). Hence, it would be reasonable to expect that better connected boards can have an effect on the firm's access to customers and suppliers.

H2-3a: Firms with better connected board of directors have a larger pool of suppliers.

H2-3b: Firms with better connected board of directors have a larger pool of customers.

3.3 Methodology and data

3.3.1 Effects of boardroom network connectedness on firm performance

In social and economic networks, nodes comprising of individuals form links to other individuals. These nodes and linkages form the network (Jackson, 2008). The positions of the individual nodes are not random (Jackson & Rogers, 2007). Positions lend themselves to power when they possess the following characteristics: they are connected to more nodes; are located close to other nodes; are on the shortest path connecting any other pairs of nodes; and are connected to other highly connected nodes (Padgett & Ansell, 1993). Our study on the Asian board centrality adopts concepts that have been well developed by network theory: that expounds the inherently multidimensional nature of board centrality (Proctor & Loomis, 1951; Sabidussi, 1966; Bonacich, 1972; Freeman, 1977). Based on these network theories, we compute the following measures of network centrality:

- *Degree* centrality score measures the number of direct channels of communications or resource exchanges accessible by the firm via the board that can enhance opportunities. This measure represents the number of first degree connections to outside boards. In other words, it provides a sense of how many other people can an individual reaches directly. Formally, it is measured as follows:

$$Degree_i \equiv \sum_{j \neq i} \delta(i,j)$$

, where *δ(i, j)* is an indicator that boards *i* and *j* share a director for a given company *i* in a network.

- *Eigenvector* centrality is a concept closely linked to *degree* connectedness but recognizes that possession of more direct connections is more effective when these direct connections have better influence or reach more outside boards in the network. The *eigenvector* centrality measures a board member's connectivity via the well-connectedness of its direct links. As such, an individual with high *eigenvector* centrality is connected to other well-connected individuals. In the context of this measure, a board is well-connected when it is perceived to be more prestigious and powerful. It is measured with reference to the well-connectedness of those direct links:

$$Eigenvector_i \equiv \frac{1}{\lambda} \sum_j g_{ij} \cdot Eigenvector_{j,}$$

, where λ is the proportionality factor and $g_{ij} = 1$ if firm *i* and *j* are linked.

Eigenvector centrality measure is the sum of all adjacent vertices' eigenvector centrality scores. The computation of this measure is an iterative process beginning with the assignment of 1 for all the vertices in the network map. At each iteration, the score for each vertex is computed as the aggregate score of all adjacent vertices' scores for the prior iteration, which changes the score for each vertex after each iteration. In the above formula, matrix g an $n \times n$ matrix with elements (*i, j*) and (*j, i*) equal to 1 if vertex *j* is adjacent to the target vertex *i*. By including the centrality of not only the target vertex (per the degree centrality) as well as those of the adjacent

vertices, a vertex will have higher eigenvector centrality score if it is connected to more vertices with higher centrality scores. It is for this reason that the eigenvector centrality score is often interpreted as capturing the notion of prestige and influence. The factor λ in the formula ensures that the centrality measure converges after numerous iterations.

- *Betweenness* captures the advantage of being in more paths between pairs of boards, enabling these firms to be suitable brokers of information or exchange of information (Freeman, 1978). This measure reflects the importance of board is in connecting other boards to each other, since the individual with high *betweenness* centrality score is one who is in the most direct route between two individuals in the network. Formally, it is measured as follows:

$$Betweenness_i \equiv \sum_{j \neq i : i \notin (k,j)} \frac{P_i(k,j)/P(k,j)}{(n-1)(n-2)/2}$$

, where $P_i(k,j)$ denotes the total number of shortest paths between board k and board j, and $P(k,j)$ is the total number of shortest paths between k and j.

- *Closeness* indicates the relative proximity of connections between two outside boards, where there are fewer steps between boards (Freeman, 1978). It represents the speed and efficiency with which another board can be accessed, i.e. how fast can this individual reach everyone else in the network. Technically, it is represented as follows:

$$Closeness_i \equiv \frac{n-1}{\sum_{j \neq i} l(i,j)}$$

, where $l(i, j)$ is the number of steps in the shortest path between board i and j.

For each of the individual director, four separate scores that reflect that director's connectedness in respect of each of the four dimensions are computed. These scores are then used to compute the average score for the board they serve on. While the focal point is the local networks in Hong Kong and Singapore, the directors' connections to other networks elsewhere in the world are also taken into account.

In our study, we model the impact of boardroom network centrality on firm performance. In the design of our study we also address a potential endogeneity issue which can be illustrated via the following question: do well-connected board directors deliver good corporate performance or was it the superior performance of the firm that attracts well-connected board of directors? We address the issue of endogeneity inherent in our research design via a two-equation treatment models (Greene, 2000). This involves a treatment equation and a regression equation. In our study, we also control for country-, year- and industry-fixed effects, to take into account potential unobservable effects in our regressions.

3.3.2 Effects of boardroom network connectedness on the probability of M&A and strategic alliances

Given the potential benefits afforded by a well-connected board, we proceed to investigate various channels through which superior connectivity can translate to tangible advantages for the firm. As such, we explore the effects of boardroom network connectedness and presence of common directors on the probability of announcing an acquisition or being engaged in a strategic alliance.

In respect of deal announcements, we analyze a multivariate logit model with the following specification:

$$Prob\left(Deal\ announcement = 1 \middle| X_{i,t}\right)$$
$$= \alpha_t + \beta_1 connectedness\_measures_{t-1} + common\_dirs_{t-1}$$
$$+ ave\_dir\_age_t + founder\_chairman_{t-1} + duality_{t-1}$$
$$+ perc\_female_{t-1} + perc\_non\_exec_{t-1} + control\ variables_{t-1} + \varepsilon_t$$

where Deal announcement is a dummy variable that equals one if a firm has announced it is going to make an acquisition, which we define as the intention to acquire more than 50% of the target firm; zero otherwise.

Connectedness_measuret-1 in the formula is the board's centrality score measured by eigenvector, betweenness, closeness and degree, as defined earlier. In addition, we control for a wide variety of board and firm characteristics, as well as other control variables such as country corporate governance situation, economic conditions, year, country and industry fixed effects.

Similar models are used in several recent studies., El-Khatib, Fogel et al. (2015) study the effects of CEO's centrality on the likelihood of acquisitions using a discrete choice model. Li and Srinivasan (2011) test CEO turnover-performance sensitivity.

Next, we study the impact of board connectedness on the probability of engaging in a strategic alliance by adopting a multivariate logit model, similar to that of deals announcement but with a dummy variable that equals one if a firm is involved in a strategic alliance; zero otherwise.

3.3.3 Effects of boardroom network connectedness on the pool of supplier and customer relationships

Another means through which better board connections can value-add to the firm is linkages with suppliers and customers. To test for this, we collect data from *CapitalIQ* which provides records on the number of suppliers and customers for the last two years, which coincides with the final year for our main dataset, i.e. 2014. We then match this data to each of firm in our sample.

Given the wide dispersion of the dependent count variable, we adopt a negative binomial regression method to model to test for the effects of board connectedness on the pool of suppliers and customers. The model, per Greene (1994), has the following specification:

$$Pr(Y_i = y|\mu, \alpha) = \frac{\Gamma(y + \alpha^{-1})}{y!\,\Gamma(\alpha^{-1})}\left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu}\right)^{\alpha-1}\left(\frac{\mu}{\alpha^{-1} + \mu}\right)^{y}$$

where, Y_i is count dependent variable in question, α is the dispersion parameter, Γ represents the gamma distribution and μ is the mean for the sample.

As stated above, α reflects the dispersion of the data. The extent of dispersion is determined via a goodness of fit test, where the null hypothesis is that the model is well specified. If α is zero, the model is a Poisson distribution model. The negative binomial regression model is used because we need a model that can handle the situation where the dependent variable is a count variable and where the data is widely dispersed. We conduct a goodness of fit test (unreported herein) and find that the data is widely dispersed.

3.3.4 Board network centrality data

To construct our measures of board network centrality, we collected data from *CapitalIQ* and *Datastream*. All information relating to the board of listed firms in Hong Kong and Singapore, and their characteristics are collected from *CapitalIQ* for the period 2007 to 2014, as the data during this period are more complete. Stock price data are collected separately, from *Datastream*.

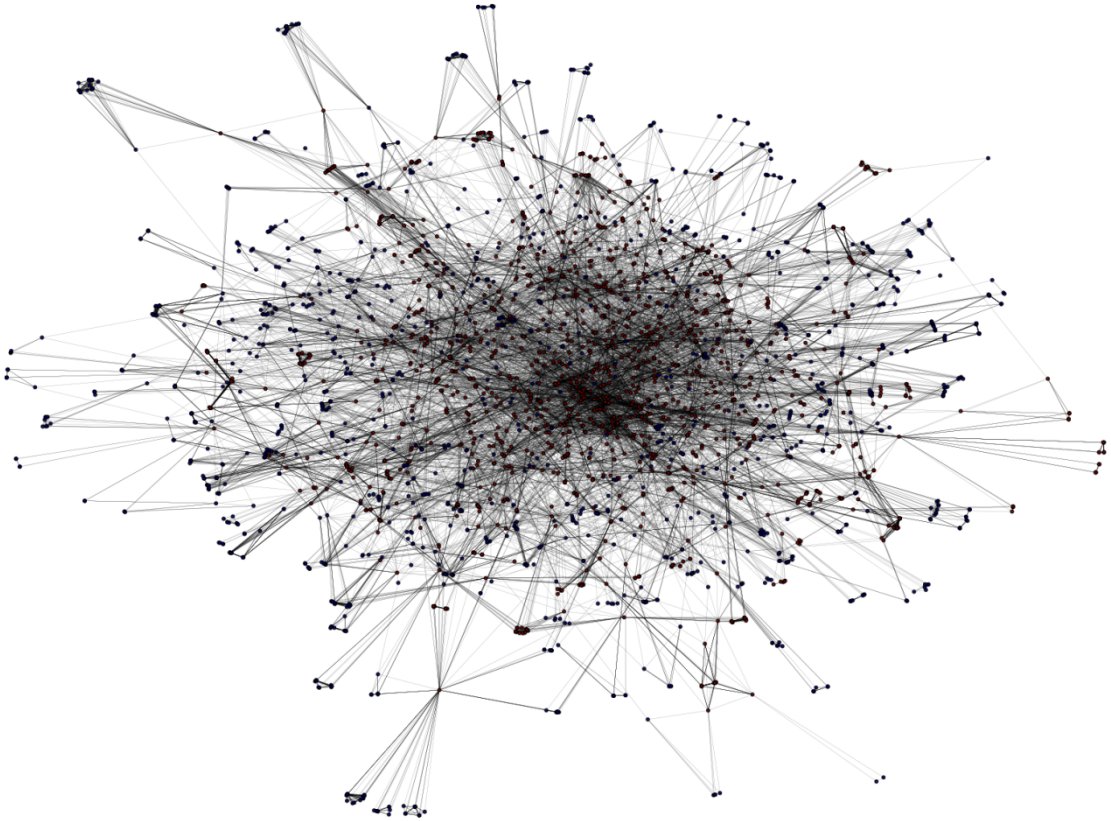
We selected Hong Kong and Singapore for our study because of the higher standards of corporate governance relative to other parts of Asia, especially when compared to emerging markets in Asia. In addition, these two cities are comparable in many other ways. First, both economies are in the same stage of development. Next, they are both small city economies that are largely service industry oriented. Finally, they are both former British colonies that share similar legal backgrounds and systems.

From *CapitalIQ*, data relating to 199,406 board positions with 32,210 unique board members were extracted, representing 2,642 listed firms in Hong Kong and Singapore during the sample period. From these a total of 22,947 firm-years of data, with around 70,643 director-firm pairs were collected. After removing observations with missing data, the final dataset comprises 9,934 firm-years of data, representing 1,653 unique firms. Figure 3.1 shows the diagram for the boardroom network in Hong Kong and Singapore. The figure shows a closely knit network.

We use the case of Mr. Simon Murray who has one of the most extensive listing of directorship appointments in our sample, to illustrate how the network map is constructed. In all, he has been involved with 36 private and public firms in China, Hong Kong, Japan, Singapore and the UK. After excluding private firms as well as firms where there are omitted dates of appointments, he is on the board of 15 firms at

different points in our sample period. The centrality score for Mr. Murray in our network is computed on a yearly basis, according to the appointments he holds in that particular year, as this will define the extent of his connectivity in that particular year. When he relinquishes one of his appointments without replacing it with another fresh appointment, his centrality score will be adjusted downwards accordingly and the firms that he is involved in will have a lower average centrality score for the entire board. The reverse holds true. It is argued that the level of *guanxi* a firm can benefit from diminishes when a director leaves the firm, since that the departing director will be privy to less timely information than before, and he or she is less likely to bring his or her personal relationships to bear for the departing firm.

Figure 3.1 – Diagram for the boardroom network in Hong Kong and Singapore



Our models aim to explore the effects of highly connected boards on performance as represented by ROA. Our key independent variable for our model is a dummy variable that equals one if a particular board's centrality score (*eigenvector*, *betweenness*, *closeness* and *degree*) is above the median score for the entire sample for the year in question (*high-connectedness*), and zero otherwise (*low-connectedness*). In addition, we also use an extensive list of control variables. A detailed description of the variables used in our study can be found in the Appendix of this chapter. For our study, the independent variables are from the fiscal year prior to the one that the dependent variable represents. The dependent variable for the first stage of the treatment model is a dummy variable, where it equals one when board connectedness is above median of the sample; zero otherwise.

Table 3.1 shows the summary statistics of independent variables that we use in our study, as well as tests of the differences in means and medians between the highly-connected and less connected boards in our sample. We find that highly connected boards (above median centrality) in our sample are associated with higher average age of the directors on the board. On average, they are less diverse in terms of the percentage of female on the boards, but are more independent than less connected boards. Firms with such boards are also likely to have the following characteristics: have higher level of institutional shareholdings (*institutionalholding*); spend less on building organizational capital (*sga_asset*); are older (*firm_age*); perform better (*roa*); are less liquid (*quick_ratio*); have lower asset growth rates (*asset_growth*); are larger (*sales*); are less more stable (*idio_stdev*); and in less competitive industries (*h_index*).

To avoid potential multicollinearity between the independent variables used in our models, correlations are calculated for each pair of variables. Table 3.2 shows the correlation matrix. The board size variable (*board_size*) is highly correlated with all the

boardroom network centrality variables (*eigenvector*, *betweenness*, *closeness* and *degree*). As a result, this variable is included in the probit and logit models where the centrality variables are the outcome variables, but excluded from the second stage of the treatment models where the centrality variables are used as independent variables.

Table 3.1 – Summary statistics[9] and differences in means and medians

The table outlines the summary statistics of key variables used in subsequent empirical tests. Our sample period is from 2007 to 2014. We extracted a total of 199,406 board positions with 32,210 unique board members, representing 2,642 listed firms in Hong Kong and Singapore during the sample period. After removing observations with missing data, our final dataset comprises 9,934 firm-years of data, representing 1,653 unique firms. All variables are winsorized at the 99th and 1st percentiles. Definitions of variables are detailed in the Appendix of this chapter. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Key variables	**Overall**	**Eigen – High**	**Eigen – Low**	**Difference in means / medians**	**Betweenness – High**	**Betweenness – Low**	**Difference in means / medians**	**Closeness - High**	**Closeness - Low**	**Difference in means / medians**	**Degree – High**	**Degree - Low**	**Difference in means / medians**
Eigenvector													
Number of observations	9934												
Mean	2.65	5.2	0.1	5.0***									
Median	0.2	1.2	0.0	1.2***									
Minimum	0.0	0.0	0.0										
Maximum	44.6	44.6	14.1										
Standard deviation	7.2	9.6	0.6										
Betweenness													
Number of observations	9934												
Mean	0.8				1.3	0.2	1.1***						
Median	0.5				1.0	0.1	0.9***						
Minimum	0.0				0.0	0.0							
Maximum	5.8				5.8	5.8							
Standard deviation	1.0				1.1	0.4							
Closeness													
Number of observations	9934												
Mean	129.1							157.8	99.0	58.8***			
Median	146.1							160.0	129.7	30.3***			
Minimum	0.0							0.1	0.1				
Maximum	190.1							190.1	184.8				
Standard deviation	54.5							25.9	60.1				

(continued)

[9] The summary statistics show the mean and median for each independent variable when the board connectedness is high or low. For the first stage of treatment model, high (low) connectedness is defined as firms with above (below) median for the respective measure of connectedness including eigenvector, betweenness, closeness and degree.

Table 3.1 – *Continued*

Key variables	Overall	Eigen – High	Eigen – Low	Difference in means / medians	Betweenness – High	Betweenness – Low	Difference in means / medians	Closeness - High	Closeness - Low	Difference in means / medians	Degree – High	Degree - Low	Difference in means / medians
Degree													
Number of observations	9934												
Mean	0.9										1.2	0.6	0.6***
Median	0.8										1.1	0.6	0.5***
Minimum	0.1										0.1	0.1	
Maximum	2.8										2.8	2.1	
Standard deviation	0.5										0.5	0.3	
board_size													
Mean	7.5	8.6	7.2	1.5***	8.2	7.6	0.6***	8.5	7.3	1.2***	8.9	6.9	2.0***
Median	7.0	8.0	7.0	1.0***	8.0	7.0	1.0***	8.0	7.0	1.0***	8.0	7.0	1.0***
Minimum	1.0	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Maximum	26.0	26.0	25.0		26.0	26.0		26.0	26.0		26.0	25.0	
Standard deviation	3.3	3.6	2.9		3.4	3.3		3.5	3.1		3.7	2.7	
ave_dir_age													
Mean	52.0	53.5	50.4	3.1***	53.3	50.5	2.8***	53.9	49.9	4.0***	53.1	50.7	2.4***
Median	52.0	54.0	50.0	4.0***	54.0	50.0	6.0***	55.0	50.0	5.0***	54.0	51.0	3.0***
Minimum	24.0	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Maximum	86.0	86.0	80.0		86.0	85.0		86.0	80.0		86.0	80.0	
Standard deviation	8.7	8.6	8.5		8.5	8.6		8.5	8.4		8.6	8.6	
duality													
# of dummy variable coded as 1	3074	1604	1470		1783	1291		1697	1377		1671	1403	
percent_female													
Mean	5.0	5.0	6.0	-1.0***	4.0	6.0	-2.0***	5.0	6.0	-1.0***	4.0	6.0	-2.0***
Median	0.0	0.0	0.0	0.0***	0.0	0.0	0.0***	0.0	0.0	0.0***	0.0	0.0	0.0***
Minimum	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Maximum	100.0	100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0	
Standard deviation	12.0	14.0	9.0		14.0	9.0		14.0	9.0		14.0	9.0	

(continued)

Table 3.1 – *Continued*

Key variables	Overall	Eigen – High	Eigen – Low	Difference in means / medians	Betweenness – High	Betweenness – Low	Difference in means / medians	Closeness - High	Closeness - Low	Difference in means / medians	Degree – High	Degree - Low	Difference in means / medians
percent_non_exec													
Mean	63.0	65.0	61.0	4.0***	68.0	58.0	10.0***	66.0	60.0	6.0***	66.0	60.0	6.0***
Median	67.0	69.0	64.0	5.0***	71.0	60.0	11.0***	70.0	63.0	7.0***	69.0	63.0	6.0***
Minimum	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Maximum	100.0	100.0	100.0		100.0	100.0		100.0	100.0		100.0	100.0	
Standard deviation	21.0	20.0	22.0		19.0	22.0		20.0	22.0		20.0	22.0	
founder_chairman													
# of dummy variable coded as 1	1900	919	981		1026	874		983	917		963	937	
famfirm_50													
# of dummy variable coded as 1	2026	824	1202		972	1054		890	1136		845	1181	
institutionalholding													
Mean	26.8	28.7	24.8	3.9***	27.1	26.4	0.8***	27.4	26.0	1.4***	27.6	25.9	1.7***
Median	14.0	19.0	10.0	9.0***	14.0	13.0	1.0	15.0	12.5	2.5*	16.0	12.0	4.0***
Minimum	1.0	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Maximum	91.0	90.0	91.0		90.0	91.0		90.0	91.0		90.0	91.0	
Standard deviation	28.4	28.8	27.9		28.5	28.3		28.7	28.1		28.5	28.2	
sga_asset													
Mean	13.0	12.0	15.0	-3.0***	12.0	14.0	-2.0***	12.0	15.0	-3.0***	11.0	15.0	-4.0***
Median	8.0	6.0	9.0	-3.0***	6.0	9.0	-3.0***	6.0	9.0	-3.0***	6.0	10.0	-4.0***
Minimum	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Maximum	97.0	97.0	97.0		97.0	97.0		97.0	97.0		97.0	97.0	
Standard deviation	17.0	16.0	17.0		16.0	17.0		16.0	17.0		16.0	18.0	
firm_age													
Mean	29.2	32.0	26.3	5.7***	30.7	27.6	3.0***	32.3	25.9	6.4***	31.6	26.7	4.8***
Median	23.0	24.0	22.0	2.0***	24.0	22.0	2.0***	25.0	21.0	4.0***	24.0	22.0	2.0***
Minimum	0.0	1.0	0.0		0.0	2.0		1.0	0.0		0.0	2.0	
Maximum	196.0	196.0	170.0		196.0	187.0		196.0	170.0		196.0	187.0	
Standard deviation	22.5	25.8	18.1		23.4	21.4		25.5	18.2		24.9	19.4	

(continued)

Table 3.1 – *Continued*

Key variables	Overall	Eigen – High	Eigen – Low	Difference in means / medians	Betweenness – High	Betweenness – Low	Difference in means / medians	Closeness - High	Closeness - Low	Difference in means / medians	Degree – High	Degree - Low	Difference in means / medians
roa_prior													
Mean	3.6	3.7	3.4	0.3*	3.6	3.5	0.1	3.7	3.4	0.3*	3.8	3.3	0.5***
Median	3.8	3.7	4.0	-0.3	3.6	4.0	-0.4**	3.6	4.1	-0.5**	3.8	3.9	-0.1
Minimum	-58.1	-58.1	-58.1		-58.1	-58.1		-58.1	-58.1		-58.1	-58.1	
Maximum	34.0	34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0	
Standard deviation	10.9	9.8	11.9		10.2	11.6		9.6	12.1		9.7	12.0	
quick_ratio													
Mean	2.7	2.6	2.8	-2.0**	2.5	2.9	-0.4***	2.6	2.8	-0.2**	2.4	3.0	-0.6***
Median	1.3	1.3	1.4	-0.1***	1.3	1.3	-0.0**	1.3	1.4	-0.1***	1.3	1.4	-0.1***
Minimum	0.1	0.1	0.1		0.1	0.1		0.1	0.1		0.1	0.1	
Maximum	53.0	53.0	53.0		53.0	53.0		53.0	53.0		53.0	53.0	
Standard deviation	5.8	5.7	5.8		5.2	6.3		5.5	6.0		4.9	6.5	
debt_to_asset													
Mean	20.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
Median	16.0	18.0	15.0	3.0***	17.0	16.0	1.0	17.0	15.0	2.0*	17.0	15.0	2.0***
Minimum	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Maximum	104.0	104.0	104.0		104.0	104.0		104.0	104.0		104.0	104.0	
Standard deviation	19.0	18.0	20.0		18.0	20.0		18.0	20.0		18.0	20.0	
asset_growth													
Mean	24.0	23.0	25.0	-3.0*	23.0	25.0	-2.0	23.0	25.0	-2.0**	25.0	23.0	2.0
Median	9.0	9.0	10.0	-1.0	9.0	10.0	-1.0	9.0	10.0	-1.0***	10.0	9.0	1.0*
Minimum	-62.0	-62.0	-62.0		-62.0	-62.0		-62.0	-62.0		-62.0	-62.0	
Maximum	545.0	545.0	545.0		545.0	545.0		545.0	545.0		545.0	545.0	
Standard deviation	69.0	68.0	71.0		69.0	69.0		68.0	71.0		71.0	68.0	
sales													
Mean	1,274.1	1284.9	1262.8	22.0	1292.5	1254.0	38.5	1200.0	1354.6	-154.6*	1320.4	1225.3	95.1
Median	127.6	139.9	115.4	24.5***	135.7	118.8	16.9**	136.7	117.9	18.8**	135.2	121.1	14.1**
Minimum	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Maximum	38,909.2	38909.2	38909.2		38909.2	38909.2		38909.2	38909.2		38909.2	38909.2	
Standard deviation	4,372.2	4228.9	4518.0		4473.0	4259.4		4071.8	4675.9		4498.9	4234.6	

(continued)

Table 3.1 – *Continued*

Key variables	Overall	Eigen – High	Eigen – Low	Difference in means / medians	Betweenness – High	Betweenness – Low	Difference in means / medians	Closeness - High	Closeness - Low	Difference in means / medians	Degree – High	Degree - Low	Difference in means / medians
idio_stdev													
Mean	36.0	32.0	40.0	-8.0***	34.0	38.0	-4.0***	33.0	39.0	-6.0***	33.0	39.0	-6.0***
Median	30.0	26.0	33.0	-7.0***	28.0	31.0	-3.0***	27.0	33.0	-6.0***	27.0	33.0	-6.0***
Minimum	8.0	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Maximum	142.0	142.0	142.0		142.0	142.0		142.0	142.0		142.0	142.0	
Standard deviation	23.0	21.0	24.0		22.0	24.0		21.0	24.0		21.0	24.0	
h_index													
Mean	351.0	342.1	360.3	-18.2***	343.7	359.0	-15.3***	344.9	357.7	-12.8***	350.3	351.8	-1.5
Median	274.1	271.3	275.3	-4.0***	272.4	274.4	-2.0***	274.4	274.0	0.4***	274.4	272.0	2.4
Minimum	84.8	84.8	84.8		84.8	84.8		84.8	84.8		84.8	84.8	
Maximum	974.7	974.7	974.7		974.7	974.7		974.7	974.7		974.7	974.7	
Standard deviation	225.6	225.4	225.4		222.9	228.3		224.6	226.5		229.1	221.9	
gdp_growth													
Mean	4.0	4.0	5.0	-1.0***	4.0	4.0	0.0*	4.0	4.0	0.0	4.0	5.0	-1.0**
Median	4.0	4.0	4.0	0.0**	4.0	4.0	0.0	4.0	4.0	0.0	4.0	4.0	0.0
Minimum	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Maximum	15.0	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Standard deviation	4.0	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
wgi													
Mean	1.5	1.5	1.5	0.0***	1.5	1.5	0.0***	1.5	1.5	0.0	1.5	1.5	0.0***
Median	1.5	1.4	1.5	-0.1***	1.5	1.4	0.1***	1.5	1.5	0.0	1.4	1.5	-1.0***
Minimum	1.4	1.4	1.4		1.4	1.4		1.4	1.4		1.4	1.4	
Maximum	1.6	1.6	1.6		1.6	1.6		1.6	1.6		1.6	1.6	
Standard deviation													

Table 3.2 – Correlations

The table contains the correlations matrix of the variables used in our study. The table contains Pearson, Polychoric and Tetrachoric correlations taking into account the different types of variables used in the models.

	(A)	*(B)*	*(C)*	*(D)*	*(E)*	*(F)*	*(G)*	*(H)*	*(I)*	*(J)*	*(K)*	*(L)*	*(M)*	*(N)*	*(O)*	*(P)*	*(Q)*	*(R)*	*(S)*	*(T)*	*(U)*	*(V)*	*(W)*
eigen (A)	1.00																						
between (B)	0.53	1.00																					
close (C)	0.33	0.51	1.00																				
deg (D)	0.70	0.77	0.61	1.00																			
ave_dir_age (E)	0.11	0.13	0.20	0.13	1.00																		
founder_chairman (F)	-0.06	0.04	0.04	0.01	0.04	1.00																	
duality (G)	0.03	0.12	0.13	0.09	0.01	0.33	1.00																
percent_female (H)	-0.13	-0.20	-0.26	-0.29	-0.08	-0.10	-0.17	1.00															
percent_non_exec (I)	0.02	0.26	0.22	0.09	0.12	0.01	-0.09	-0.03	1.00														
board_size (J)	0.56	0.58	0.51	0.77	0.17	0.02	0.20	-0.34	0.07	1.00													
famfirm_50 (K)	-0.16	-0.05	-0.06	-0.21	0.08	0.49	0.09	0.10	0.10	-0.18	1.00												
institutionalholding (L)	0.03	0.04	-0.02	0.04	-0.13	0.06	0.00	-0.01	-0.02	0.00	-0.08	1.00											
firm_age (M)	0.11	0.04	0.10	0.12	0.29	-0.04	-0.01	-0.06	0.01	0.19	-0.05	-0.09	1.00										
roa_prior (N)	0.03	0.01	0.00	0.04	0.00	0.08	0.01	-0.01	0.04	0.01	0.01	0.11	0.05	1.00									
sales (O)	-0.02	-0.02	-0.03	-0.02	-0.02	0.04	0.01	0.02	-0.03	-0.02	0.05	-0.01	0.01	-0.02	1.00								
sga_asset (P)	-0.13	-0.07	-0.09	-0.14	-0.04	0.10	0.03	0.05	0.06	-0.14	0.22	0.02	-0.04	-0.18	0.02	1.00							
quick_ratio (Q)	-0.05	-0.03	-0.03	-0.06	-0.06	-0.07	-0.03	0.00	0.00	-0.05	-0.04	-0.01	-0.04	-0.04	0.02	-0.06	1.00						
debt_asset (R)	0.01	-0.02	-0.01	-0.02	-0.04	0.00	0.00	-0.01	-0.04	0.00	0.02	-0.02	-0.05	-0.16	-0.03	-0.06	-0.22	1.00					
h_index (S)	-0.07	-0.06	-0.07	-0.06	0.01	-0.05	-0.06	0.03	-0.02	-0.04	0.01	-0.05	-0.03	0.03	0.07	0.03	-0.05	0.03	1.00				
total_asset_growth (T)	-0.01	0.02	-0.02	0.03	-0.12	-0.06	-0.03	-0.01	-0.04	0.04	-0.06	0.03	-0.10	0.09	-0.01	-0.11	0.10	0.02	0.01	1.00			
idio_stdev (U)	-0.16	-0.06	-0.12	-0.16	-0.14	-0.08	-0.04	0.08	0.03	-0.20	0.09	-0.05	-0.17	-0.37	0.02	0.19	0.07	0.04	0.01	0.06	1.00		
gdp_growth (V)	-0.06	-0.01	0.03	-0.03	0.06	0.02	0.00	0.01	0.07	-0.04	0.06	-0.04	0.03	0.05	-0.01	0.00	0.00	-0.01	0.03	0.02	-0.08	1.00	
wgi (W)	-0.17	-0.03	0.04	-0.12	0.18	0.06	-0.03	0.04	0.21	-0.08	0.12	-0.24	0.06	-0.03	-0.04	0.02	-0.01	0.02	0.06	-0.06	0.13	0.17	1.00

3.4 Empirical results

3.4.1 Effects of boardroom network connectedness on firm performance (ROA)

Columns 1 to 4 on Table 3.3 report the results our main second stage treatment models[10]. The dependent variable for the model is firm performance (ROA).

There is strong evidence to support our hypothesis, *H1*, that boardroom network connectedness has a positive effect on firm performance. The result is consistent across all model specifications, after controlling for key board, firm and industry characteristics as well as country-, industry- and year-fixed effects and endogeneity. On average, firms with highly connected boards, deliver superior operating performance of between 1.183% and 2.822% relative to firms with boards that are less connected. Our finding is consistent with Larcker, So et al. (2013).

There are also strong signs of the positive effects of institutional shareholdings. This could be attributable to the superior monitoring afforded by the presence of institutional shareholders, as in a large number of studies including Mikkelson and Ruback (1985), Black (1992), Strickland, Wiles et al. (1996), Wahal (1996), Carleton, Nelson et al. (1998), Wahal and McConnell (2000), and Gillan and Starks (2000).

Our results also show that the presence of a founder, who serves as a chairman of the board, is positively associated with operating performance of the firm. This seems to suggest that founders that are still actively engaged on the board have positive effects on the firm's operating performance. Our results is consistent with studies such as Adams and Ferreira (2007) and Villalonga and Amit (2006). The persistence of

[10]For brevity, the results for the 1st stage probit model are not presented in this paper, since it is only used to calculate the predicted values used in the 2nd stage of the treatment model.

Founders' influence is well documented. Entrepreneurs who created and groomed their business to success tend to have stronger emotional attachments to the firm and find it difficult to let go of control (de Vries, 1985; Sonnenfeld, 1987, 1991). In a study of successions in the Russian context, Shekshnia (2008) finds that many founders continue to wield executive powers even after they relinquish any executive role and take on non-executive positions. This is similar to the findings by Wasserman (2003) that founders tend to stay on with the business to offer strategic advice after succession, often as Chairman of the Board.

The presence of a founder-chairman, who has strong influence over the firm, together with a well-connected board, can lead to two possible outcomes. The founder-chairman could leverage the contacts of the well-connected board to enhance the performance of the firm. Conversely, the founder-chairman and the board could be engaged in conflict.

Board members who have extensive network connections are powerful in their own right which means that they are unlikely to be beholden to any particular firm that they serve on. Such directors may not acquiesce to the every wish of an influential founder-chairman especially if it causes them disrepute in the labor market for directors. Directors care about their reputation in the labor market (Levit & Malenko, 2015) and the literature details two types of reputation. The first type relates to directors who are reputable because they serve the interest of the shareholders well resulting in better performance, leading to increased demand for their services on corporate boards (Coles & Hoi, 2003; Fich & Shivdasani, 2007). The second type of director is friendly towards management, which creates demand for their services since they are unlikely to pose a challenge. Directors who are too shareholder-centric, can reduce their chances of being

invited onto corporate boards (Helland, 2006; Marshall, 2010). Adams, Hermalin et al. (2010) provide a comprehensive discussion on this trade-off.

The need to safeguard directors' reputation and founders' desire to operate the firm without interference may cause conflict between the two. Hence, we attempt to investigate the effect of having a founder serving as Chairman together with the presence of a highly connected board. The models in columns 1(a), 2(a), 3(a) and 4(a) include an interaction term between the *founder_chairman* and the highly connected board variable. The results show a significant negative net effect of up to 0.35%. It is possible that, due to their strong emotional attachment to their business, founders may act in unproductive ways, often using psychological means to justify their decisions and actions (de Vries, 1985; Lansberg, 1988). There is also evidence of entrenchment of founder-executives (Morck, Shleifer et al., 1989), which suggests that founders who continue to play an active role via board chairmanship may interfere with the operations of the firm to achieve personal objectives.

Table 3.3 – Results from the treatment model (ROA main)

The table reports results of the 2nd stage (treatment) OLS regression. The dependent variable is ROA. Columns (1) to (4) show the results for the OLS regression for each of the connectedness measures, whereas Columns (1a) to (4a) show the results for the OLS regression for each of the connectedness measures and the interaction between *founder-chairman* and the respective *predicted connectedness* scores. The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Definitions of independent variables are detailed in the Appendix of this chapter. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: ROA							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
Predicted connectedness measures (above vs. below median connectedness)	2.553 ***	2.06 *	2.393 ***	1.183 **	2.822 ***	2.424 **	2.716 ***	1.441 ***
	(0.006)	(0.065)	(0.009)	(0.017)	(0.002)	(0.032)	(0.003)	(0.005)
ave_dir_age	0.000	0.019	0.000	0.022 *	0.002	0.020 *	0.004	0.023 *
	(0.987)	(0.145)	(0.984)	(0.068)	(0.892)	(0.116)	(0.823)	(0.055)
founder_chairman	0.453 *	0.380 *	0.379 *	0.392 *	1.591 ***	1.965 **	1.895 ***	1.561 **
	(0.062)	(0.122)	(0.121)	(0.105)	(0.009)	(0.015)	(0.005)	(0.016)
predicted connectedness score x founder_chairman					-2.253 **	-2.745 **	-2.778 **	-2.113 **
					(0.041)	(0.039)	(0.017)	(0.052)
duality	-0.017	-0.147	-0.078	-0.026	-0.009	-0.114	-0.063	-0.018
	(0.936)	(0.519)	(0.713)	(0.899)	(0.964)	(0.621)	(0.767)	(0.930)
percent_female	2.972 **	3.264 **	3.167 **	2.639 *	3.079 **	3.545 **	3.349 **	2.795 **
	(0.037)	(0.047)	(0.031)	(0.058)	(0.031)	(0.032)	(0.023)	(0.045)
percent_non_exec	-0.148	-0.581	-0.329	0.521	-0.111	-0.527	-0.268	0.572
	(0.829)	(0.558)	(0.658)	(0.374)	(0.873)	(0.597)	(0.719)	(0.330)
famfirm_50	0.397 *	0.292	0.375 *	0.304	0.354	0.261	0.329	0.273
	(0.098)	(0.212)	(0.116)	(0.187)	(0.143)	(0.267)	(0.169)	(0.236)
institutionalholding	0.008 **	0.009 ***	0.009 ***	0.010 ***	0.008 **	0.009 ***	0.009 ***	0.010 ***
	(0.015)	(0.007)	(0.011)	(0.003)	(0.015)	(0.010)	(0.013)	(0.004)
firm_age	0.000	0.003	0.000	0.002	0.000	0.002	0.000	0.002
	(0.987)	(0.549)	(0.953)	(0.665)	(0.999)	(0.609)	(0.925)	(0.682)
roa_prior	0.648 ***	0.644 ***	0.646 ***	0.642 ***	0.647 ***	0.643 ***	0.645 ***	0.642 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

(continued)

	Dependent variable: ROA							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
sales	-0.005	-0.011	-0.002	-0.011	-0.006	-0.009	-0.003	-0.010
	(0.813)	(0.612)	(0.93)	(0.590)	(0.779)	(0.651)	(0.885)	(0.612)
sga_asset	1.217 **	1.051 *	1.181 **	0.943 *	1.134 *	0.979 *	1.075 *	0.874 *
	(0.044)	(0.082)	(0.050)	(0.102)	(0.062)	(0.106)	(0.076)	(0.130)
quick_ratio	-0.018	-0.010	-0.019	-0.011	-0.017	-0.009	-0.018	-0.009
	(0.304)	(0.547)	(0.266)	(0.539)	(0.322)	(0.593)	(0.283)	(0.591)
debt_to_asset	-1.315 ***	-1.151 **	-1.234 **	-1.276 ***	-1.331 ***	-1.150 **	-1.253 **	-1.277 ***
	(0.011)	(0.027)	(0.017)	(0.013)	(0.010)	(0.028)	(0.016)	(0.013)
h_index	0.027	0.119	0.008	-0.013	-0.021	0.055	-0.050	-0.062
	(0.949)	(0.777)	(0.985)	(0.974)	(0.960)	(0.898)	(0.904)	(0.880)
total_asset_growth	0.183	0.148	0.168	0.154	0.182	0.149	0.167	0.152
	(0.19)	(0.292)	(0.228)	(0.267)	(0.195)	(0.290)	(0.233)	(0.272)
idio_stdev	-4.570 ***	-5.013 ***	-4.720 ***	-4.940 ***	-4.541 ***	-4.998 ***	-4.697 ***	-4.926 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
gdp_growth	-11.225	-9.507	-9.820	-9.538	-10.996	-9.549	-9.725	-9.487
	(0.157)	(0.226)	(0.213)	(0.222)	(0.167)	(0.226)	(0.219)	(0.225)
wgi	-9.902 *	-8.742 *	-7.538	-8.708 *	-9.886 *	-8.749 *	-7.736 *	-8.778 *
	(0.058)	(0.091)	(0.147)	(0.090)	(0.059)	(0.092)	(0.137)	(0.088)
_cons	14.318 *	12.742 *	11.321 *	12.027 *	14.064 *	12.511 *	11.302	11.956 *
	(0.065)	(0.096)	(0.14)	(0.113)	(0.070)	(0.103)	(0.142)	(0.116)
lambda	-1.599 ***	-1.147 *	-1.370 **	-0.535 *	-1.755 ***	-1.356 **	-1.557 ***	-0.679 **
	(0.005)	(0.094)	(0.015)	(0.093)	(0.002)	(0.051)	(0.006)	(0.038)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3.4.2 Effects of boardroom network connectedness on the probability of M&A and strategic alliances

Our results show that boardroom network centrality is statistically significant and positively related to the likelihood of announcing an M&A transaction[11], providing support to our hypothesis, *H2-1a*. This holds true for every definition of boardroom network centrality, which is similar to the findings by Singh and Schonlau (2009), which attribute this phenomenon to both the information asymmetry hypothesis and discussion facilitation by well-connected board members.

While each of the centrality measures captures the extent of connection, we feel that our analysis would be enhanced by investigating situations where a firm's board has directors in common with other boards in the sample (Cai & Sevilir, 2012; Renneboog & Zhao, 2014). We explore this by constructing a variable representing the number of directors that are common to other boards in the sample. Since board size may vary widely across firms, we scale the variable as a percentage to board size (*percent_common_dirs*)[12]. This variable is included in the results in Table 3.4 where it is consistently positive and statistically significant suggesting that a higher percentage of common directors on the board increase the probability of successfully completing the transaction amongst firms. This result supports our hypothesis, *H2-1b*.

The *founder_chairman* variable is negative and statistically significant, indicating that a founder serving as Chairman of the board has a negative effect on the probability of a firm being an acquirer. This can be explained by the avoidance of

[11] As a robustness test, we also used M&A deals that were successfully completed as an alternative outcome variable for the Logit model. Our results still hold with respect to the impact of boardroom centrality.

[12] The *percent_common_dir* variable has been checked for its correlations with the other centrality measures as well as other variables used in the model. None of these variables are highly correlated.

highly risky activities, such as mergers and acquisitions, if the founder wishes to retire soon and leave the firm in good condition (Adams, Almeida et al., 2009).

Table 3.4 – Results of the logit (acquisitions on connectedness)

The table reports results of the logit regression. The dependent variable is a dummy variable, where 1=firm with announcement of acquisitions; 0 otherwise. The four columns show results for each of the four connectedness measures – eigenvector, betweenness, closeness and degree. Definitions of independent variables are detailed in the Appendix of this chapter. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: dummy variable for announced acquisitions			
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables				
connectedness measures	0.026 ***	0.244 ***	0.003 **	0.562 ***
	(0.000)	(0.000)	(0.029)	(0.000)
percent_common_dirs	0.0200 ***	0.022 ***	0.019 ***	0.022 ***
	(0.000)	(0.000)	(0.000)	(0.000)
ave_dir_age	0.006	0.005	0.007	0.004
	(0.407)	(0.459)	(0.331)	(0.568)
founding_chairman	-0.2870 **	-0.301 **	-0.306 **	-0.308 **
	(0.054)	(0.043)	(0.039)	(0.039)
duality	0.137	0.085	0.125	0.109
	(0.257)	(0.485)	(0.301)	(0.37)
percent_female	0.059	0.521	0.321	0.969
	(0.951)	(0.584)	(0.744)	(0.315)
percent_non_exec	0.340	0.021	0.243	0.247
	(0.333)	(0.955)	(0.496)	(0.486)
famfirm_50	0.146	0.155	0.143	0.188 *
	(0.248)	(0.222)	(0.259)	(0.14)
institutionalholding	-0.007 ***	-0.007 ***	-0.007 ***	-0.007 ***
	(0.002)	(0.001)	(0.001)	(0.002)
firm_age	-0.001	0.000	-0.001	-0.001
	(0.699)	(0.881)	(0.787)	(0.653)
roa_prior	-0.015 ***	-0.014 ***	-0.015 ***	-0.014 ***
	(0.003)	(0.005)	(0.003)	(0.006)
sales	-0.023	-0.023	-0.023	-0.023
	(0.176)	(0.174)	(0.178)	(0.180)

(continued)

Table 3.4 – *Continued*

Dependent variable: dummy variable for announced acquisitions				
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables				
sga_asset	0.224	0.216	0.177	0.280
	(0.488)	(0.506)	(0.585)	(0.386)
quick_ratio	0.017 **	0.017 **	0.016 **	0.018 **
	(0.028)	(0.028)	(0.035)	(0.017)
debt_to_asset	0.264	0.304	0.283	0.309
	(0.338)	(0.270)	(0.303)	(0.262)
h_index	-0.057	-0.071	-0.068	-0.064
	(0.817)	(0.775)	(0.785)	(0.796)
total_asset_growth	0.236 ***	0.224 ***	0.227 ***	0.220 ***
	(0.000)	(0.000)	(0.000)	(0.000)
idio_stdev	0.260	0.257	0.248	0.364 *
	(0.280)	(0.286)	(0.307)	(0.133)
gdp_growth	6.156	5.759	6.227	5.928
	(0.167)	(0.198)	(0.163)	(0.184)
wgi	7.930 ***	8.380 ***	8.167 ***	7.978 ***
	(0.005)	(0.003)	(0.004)	(0.005)
_cons	-14.563	-15.124	-15.088	-15.153
	(0.001)	(0.000)	(0.000)	(0.000)
χ^2	202.17***	212.21***	196.07***	213.01***
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

Table 3.5 shows our results with respect to the likelihood of engaging in strategic alliances with a well-connected board.

Similar to our findings on M&A, our results for strategic alliances not only show that the likelihood of a firm engaging in strategic alliances increases with board connectedness, but also that having a higher percentage of common directors has similarly positive effects. These results provide support for our hypotheses, *H2-2a* and *H2-2b*, and support the findings in the study by Gulati and Westphal (1999).

However, the probability of embarking on a strategic alliance is reduced when there is a family firm and where there is high ownership by institutional investors. This may be due to the potential shortcomings of strategic alliances, specifically the exposure to loss of talent, know-how and intellectual property via stealing by alliance partners which may have far reaching consequences that cannot be adequately resolved. Our finding in this respect is consistent with Garai (1999). In this regard, family firms may be in agreement with institutional investors in their avoidance of strategic alliances[13].

[13] Consistent with the literature, a discussion of the insignificant results for control variables is not included. Nonetheless, a possible explanation may be that strategic alliances, while important for the firm's future, do not involve the use of a large part of the firm's cash resources, and have a much lower financing impact if the arrangement does not work out as originally anticipated. Hence, a founder chairman may not be a significant decision maker in such arrangements.

Table 3.5 – Results of the logit (strategic alliances on connectedness)

The table reports results of the logit regression. The dependent variable is a dummy variable, where 1=firm with strategic alliance; 0 otherwise. The four columns show results for each of the four connectedness measures – eigenvector, betweenness, closeness and degree. Definitions of independent variables are detailed in the Appendix of this chapter. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: dummy variable for strategic alliances			
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables				
connectedness measures	0.021 ***	0.110 **	0.002 *	0.498 ***
	(0.000)	(0.023)	(0.067)	(0.000)
percent_common_dirs	0.019 ***	0.019 ***	0.018 ***	0.019 ***
	(0.000)	(0.000)	(0.000)	(0.000)
ave_dir_age	0.001	0.002	0.002	-0.001
	(0.882)	(0.785)	(0.749)	(0.854)
founding_chairman	-0.104	-0.121	-0.121	-0.124
	(0.448)	(0.379)	(0.378)	(0.369)
duality	0.058	0.048	0.053	0.039
	(0.602)	(0.665)	(0.632)	(0.725)
percent_female	-0.978	-0.927	-0.869	-0.101
	(0.318)	(0.351)	(0.390)	(0.918)
percent_non_exec	-0.104	-0.190	-0.137	-0.196
	(0.746)	(0.565)	(0.676)	(0.544)
famfirm_50	-0.675 ***	-0.674 ***	-0.672 ***	-0.628 ***
	(0.000)	(0.000)	(0.000)	(0.000)
institutionalholding	-0.005 ***	-0.005 ***	-0.005 ***	-0.005 ***
	(0.010)	(0.006)	(0.007)	(0.008)
firm_age	-0.003	-0.003	-0.003	-0.003
	(0.191)	(0.277)	(0.241)	(0.185)
roa_prior	0.015 **	0.015 **	0.015 **	0.016 **
	(0.027)	(0.027)	(0.027)	(0.017)
sales	0.000	-0.001	-0.001	-0.001
	(0.992)	(0.919)	(0.937)	(0.94)

(continued)

Table 3.5 – *Continued*

Dependent variable: dummy variable for strategic alliances				
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables				
sga_asset	-0.639 *	-0.716 *	-0.726 *	-0.567
	(0.098)	(0.065)	(0.062)	(0.141)
quick_ratio	-0.043 ***	-0.045 ***	-0.045 ***	-0.040 **
	(0.014)	(0.011)	(0.010)	(0.019)
debt_to_asset	0.085	0.102	0.094	0.124
	(0.773)	(0.728)	(0.748)	(0.674)
h_index	0.209	0.185	0.187	0.198
	(0.336)	(0.392)	(0.389)	(0.363)
total_asset_growth	0.111 *	0.099	0.103	0.094
	(0.122)	(0.168)	(0.153)	(0.191)
idio_stdev	-1.131 ***	-1.210 ***	-1.182 ***	-0.986 ***
	(0.000)	(0.000)	(0.000)	(0.002)
gdp_growth	-5.34	-5.313	-5.164	-5.332
	(0.247)	(0.249)	(0.262)	(0.248)
wgi	2.416	2.930	2.863	2.563
	(0.382)	(0.288)	(0.299)	(0.354)
_cons	-4.654	-5.31	-5.419	-5.317
	(0.259)	(0.197)	(0.188)	(0.198)
χ^2	244.72***	238.18***	236.78***	256.00***
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

3.4.3 Effects of boardroom network connectedness on the pool of supplier and customer relationships

Table 3.6 presents the results of the negative binomial regression models with respect to the pool of suppliers and customer relationship.

Our result supports our hypothesis, *H2-3a*, showing that board connectedness is positively associated and statistically significant with respect to the pool of suppliers. This result supports the findings in Pfeffer and Salancik (1978) and Johnson, Daily et al. (1996) that well connected board members connect the firm to external resources. The results are robust to all definitions of board connectedness. For the firms' relationships with their customers, we still find a positive relationship, but the coefficient is not statistically different from zero. This result fails to support our hypothesis, *H2-3b*. This seems consistent with the understanding that board members would act in the interest of the shareholders of the firm to which the board appointments relate. In this regard, a board member would hesitate to link customers of other firms to the other contacts in his network. Such a conflict would be less pronounced in the case of suppliers.

Table 3.6 – Results of negative binomial regression (suppliers or customers on connectedness)

The table reports results of the negative binomial regression. The dependent variable is a count variable which is the number of suppliers or customers. Definitions of independent variables are detailed in the Appendix of this chapter. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: the number of suppliers / customers							
Independent variable: Connectedness measures	**Eigenvector**		**Betweenness**		**Closeness**		**Degree**	
Other independent variables	**Suppliers**	**Customers**	**Suppliers**	**Customers**	**Suppliers**	**Customers**	**Suppliers**	**Customers**
connectedness measures	0.033 ***	0.015	0.142 *	0.011	0.004 ***	0.001	0.753 ***	0.491 ***
	(0.002)	(0.165)	(0.069)	(0.891)	(0.002)	(0.408)	(0.000)	(0.004)
percent_common_dirs	0.001	-0.003	0.002	-0.002	-0.001	-0.004	0.001	-0.004
	(0.829)	(0.587)	(0.662)	(0.698)	(0.822)	(0.532)	(0.986)	(0.459)
ave_dir_age	0.006	0.010	0.008	0.002	0.007	0.003	0.002	-0.002
	(0.452)	(0.967)	(0.299)	(0.762)	(0.328)	(0.739)	(0.784)	(0.787)
founding_chairman	0.229 *	0.003	0.214	-0.012	0.234 *	-0.005	0.245 *	0.012
	(0.139)	(0.988)	(0.169)	(0.945)	(0.131)	(0.979)	(0.109)	(0.945)
duality	0.086	-0.032	0.087	-0.008	0.078	-0.017	0.042	-0.080
	(0.509)	(0.83)	(0.512)	(0.959)	(0.552)	(0.91)	(0.746)	(0.59)
percent_female	-1.858 *	-3.184 **	-1.951 *	-3.306 **	-1.684 *	-3.156 **	-0.950	-2.42 *
	(0.093)	(0.02)	(0.081)	(0.017)	(0.132)	(0.022)	(0.399)	(0.074)
percent_non_exec	-0.556	-0.546	-0.662 *	-0.473	-0.704 *	-0.549	-0.833 **	-0.648 *
	(0.142)	(0.216)	(0.106)	(0.295)	(0.07)	(0.221)	(0.029)	(0.137)
famfirm_50	-0.064	-0.28 *	-0.05	-0.284 *	-0.063	-0.285 *	0.006	-0.267
	(0.697)	(0.128)	(0.765)	(0.124)	(0.698)	(0.122)	(0.968)	(0.144)
institutionalholding	0.001	-0.004 *	0.001	-0.004 *	0	-0.004 *	0.001	-0.005 **
	(0.806)	(0.059)	(0.738)	(0.079)	(0.877)	(0.066)	(0.8)	(0.036)
firm_age	0.004	0.005	0.005 *	0.005 *	0.004 *	0.005 *	0.004 *	0.004
	(0.155)	(0.141)	(0.075)	(0.104)	(0.116)	(0.12)	(0.13)	(0.167)
roa_prior	0.029 ***	0.012	0.028 ***	0.011	0.027 ***	0.011	0.028 ***	0.012 *
	(0.000)	(0.141)	(0.000)	(0.16)	(0.000)	(0.149)	(0.000)	(0.132)
sales	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.952)	(0.332)	(0.849)	(0.335)	(0.957)	(0.34)	(0.938)	(0.38)

(continued)

Table 3.6 – *Continued*

Dependent variable: the number of suppliers / customers								
Independent variable: Connectedness measures	**Eigenvector**		**Betweenness**		**Closeness**		**Degree**	
Other independent variables	**Suppliers**	**Customers**	**Suppliers**	**Customers**	**Suppliers**	**Customers**	**Suppliers**	**Customers**
sga_asset	1.417 ***	-0.451	1.303 ***	-0.558	1.390 ***	-0.523	1.451 ***	-0.400
	(0.000)	(0.337)	(0.001)	(0.228)	(0.001)	(0.261)	(0.000)	(0.391)
quick_ratio	-0.040 ***	-0.041 ***	-0.041 ***	-0.042 ***	-0.041 ***	-0.040 ***	-0.035 ***	-0.038 ***
	(0.003)	(0.002)	(0.003)	(0.001)	(0.003)	(0.003)	(0.009)	(0.004)
debt_to_asset	1.079 ***	0.367	1.022 ***	0.361	1.034 ***	0.389	1.100 ***	0.414
	(0.002)	(0.343)	(0.004)	(0.352)	(0.003)	(0.318)	(0.002)	(0.282)
h_index	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
	(0.290)	(0.951)	(0.441)	(0.918)	(0.461)	(0.912)	(0.418)	(0.772)
total_asset_growth	0.269 **	-0.050	0.284 **	-0.053	0.268 **	-0.062	0.239 *	-0.070
	(0.033)	(0.648)	(0.028)	(0.63)	(0.037)	(0.575)	(0.055)	(0.524)
idio_stdev	-0.852 ***	-1.348 ***	-0.872 ***	-1.376 ***	-0.828 ***	-1.300 ***	-0.715 **	-1.191 ***
	(0.007)	(0.000)	(0.006)	(0.000)	(0.009)	(0.000)	(0.025)	(0.001)
gdp_growth	-4.689	121.761	12.38	116.171	26.274	124.757	108.725	201.38
	(0.989)	(0.743)	(0.97)	(0.755)	(0.938)	(0.737)	(0.746)	(0.589)
wgi	38.611	80.356	45.032	78.309	50.212	81.418	77.141	106.128
	(0.745)	(0.546)	(0.708)	(0.557)	(0.678)	(0.542)	(0.524)	(0.427)
_cons	-53.86	-115.126	-63.451	-112.221	-71.515	-116.977	-111.741	-153.992
	(0.761)	(0.562)	(0.723)	(0.572)	(0.692)	(0.556)	(0.535)	(0.439)
χ^2	154.19***	153.37***	146.30***	151.28***	152.22***	151.93***	168.77***	159.62***
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3.5 Robustness tests

3.5.1 The Singapore Corporate Governance Index (SCGI)

To confirm that the superior performance in our treatment models is not attributable to governance factors, we include an extensive set of governance measures as a control. For this we adopt the use the Singapore Corporate Governance Index (SCGI) to control for the firm-level corporate governance characteristics of the sample firms. The SCGI is developed and managed by the Sim Kee Boon Institute (SKBI) for Financial Economics at the Singapore Management University (SMU) and is constructed annually based on the revised OECD Principles of Corporate Governance (2004), modified appropriately to reflect the local context, following the revised Singapore Code of Corporate Governance (2012). The index comprises a total of 146 questions covering various aspects of corporate governance based on the five OECD corporate governance principles, including rights of shareholders, equitable treatment of shareholders, role of stakeholders, disclosure and transparency, and board responsibilities.

The SCGI covers all firms listed on the Singapore Stock Exchange (SGX). Around 720 firms are covered each year. The data is hand collected from the firms' annual reports, official website and SGX's website. Unfortunately, a similar firm level index is not available for Hong Kong.

There are two variables relating to corporate governance that are used in the earlier regressions that are also covered in the SCGI, namely *duality* and *percent_non_exec*. In order to avoid potential issues of multicollinearity or endogeneity, these two variables are excluded in lieu of the inclusion of the SCGI variable and the results of the regression for the Singapore subsample are shown in Table 3.7.

For this subsample, we find a positive and significant relationship between boardroom network connectedness and firm performance. The firm level governance

index variable is positive and highly significant across all definitions of boardroom network centrality, which is consistent with the findings in prior studies. Klapper and Love (2004), investigating the impact of firm level governance characteristics on firm performance in 14 emerging markets, find a positive and significant relationship between firm level corporate governance and firm performance. Using a sample of 2,106 firms and list of 39 corporate governance measures, Larcker, Richardson et al. (2007) find that firm level governance characteristics also explain future operating performance.

Unlike the full sample, the result from the Singapore subsample does not show a consistent significant positive effect for the involvement of the founder-chairman. However, the interaction term between *founder_chairman* and the presence of a highly connected board, is largely negative as well as statistically significant in these results. Once again it seems to suggest that the active involvement of founders in conjunction with a strongly connected board is a less-than-ideal scenario.

The family firm dummy variable (*famfirm_50*) is positive and highly significant across all models suggesting that the presence of a controlling family enhances firm performance by between 1% and 2.5%. This result is also consistent with the findings on European firms by Barontini and Caprio (2006) who provide evidence that family control does not result in lower valuation and reduced firm performance. A possible explanation of this may be offered by studies on the positive impact of blockholder ownership on performance, such as Grossman and Hart (1980b) and Shleifer and Vishny (1986).

Table 3.7 – Results from the treatment model (Singapore subsample)

The table reports results of the 2nd stage (treatment) OLS regression for the Singapore subsample. The dependent variable is ROA. Columns (1) to (4) show the results for the OLS regression for each of the connectedness measures, whereas Columns (1a) to (4a) show the results for the OLS regression for each of the connectedness measures and the interaction between *founder-chairman* and the respective *predicted connectedness* scores. The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Definitions of independent variables are detailed in the Appendix. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
Predicted connectedness measures (above vs. below median connectedness)	15.422 ***	3.619	11.214 ***	3.492 ***	16.384 ***	4.157	11.853 ***	3.904 ***
	(0.002)	(0.278)	(0.002)	(0.014)	(0.002)	(0.221)	(0.001)	(0.007)
sgpcg_index_vw	0.008	0.068 **	0.022	0.068 ***	0.003	0.066 **	0.019	0.066 ***
	(0.838)	(0.015)	(0.478)	(0.001)	(0.935)	(0.019)	(0.545)	(0.002)
ave_dir_age	-0.117 **	0.022	-0.059 *	0.018	-0.118 **	0.022	-0.058	0.019
	(0.046)	(0.377)	(0.133)	(0.417)	(0.049)	(0.39)	(0.147)	(0.374)
founder_chairman	-1.164 *	0.088	-0.946 *	-0.048	0.526	0.970	0.483	1.097
	(0.102)	(0.835)	(0.116)	(0.905)	(0.634)	(0.295)	(0.623)	(0.146)
Predicted connectedness score x founder_chairman					-3.119 **	-1.554	-2.549 *	-2.044 *
					(0.038)	(0.283)	(0.061)	(0.073)
percent_female	13.465 **	5.715	12.505 ***	5.454 *	13.852 **	6.149	12.773 ***	5.581 *
	(0.016)	(0.319)	(0.011)	(0.095)	(0.015)	(0.288)	(0.01)	(0.089)
famfirm_50	2.431 ***	0.987 ***	1.986 ***	1.102 ***	2.403 ***	0.990 ***	1.954 ***	1.078 ***
	(0.001)	(0.010)	(0.000)	(0.003)	(0.001)	(0.010)	(0.001)	(0.003)
institutionalholding	0.01	0.005	0.011	0.006	0.010	0.005	0.011	0.006
	(0.27)	(0.44)	(0.185)	(0.367)	(0.274)	(0.442)	(0.19)	(0.374)
firm_age	-0.014	0.014 *	-0.006	0.01	-0.016	0.014 *	-0.007	0.01
	(0.271)	(0.085)	(0.573)	(0.147)	(0.215)	(0.088)	(0.48)	(0.179)
roa_prior	0.64 ***	0.63 ***	0.645 ***	0.632 ***	0.64 ***	0.63 ***	0.645 ***	0.632 ***
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
sales	0.108 *	0.035	0.136 **	0.04	0.098	0.035	0.122 *	0.036
	(0.116)	(0.45)	(0.035)	(0.383)	(0.17)	(0.46)	(0.065)	(0.437)

(continued)

Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
sga_asset	0.924	-0.198	0.815	0.124	0.917	-0.162	0.818	0.128
	(0.521)	(0.85)	(0.517)	(0.902)	(0.535)	(0.878)	(0.522)	(0.899)
quick_ratio	0.046	0.049	0.049	0.054 *	0.047	0.051	0.05	0.057 *
	(0.319)	(0.165)	(0.227)	(0.106)	(0.317)	(0.149)	(0.221)	(0.09)
debt_to_asset	-2.392 *	-0.402	-1.329	-0.604	-2.351 *	-0.353	-1.242	-0.5
	(0.092)	(0.659)	(0.233)	(0.493)	(0.107)	(0.701)	(0.273)	(0.572)
h_index	-1.649 *	-1.576 *	-2.202 **	-1.612 **	-1.668 *	-1.601 *	-2.204 **	-1.617 **
	(0.125)	(0.066)	(0.025)	(0.039)	(0.132)	(0.064)	(0.027)	(0.039)
total_asset_growth	0.541	0.305	0.561	0.349	0.554	0.313	0.572 *	0.36
	(0.212)	(0.323)	(0.142)	(0.252)	(0.215)	(0.314)	(0.14)	(0.239)
idio_stdev	-0.179	-2.599 ***	-0.758	-2.082 ***	-0.07	-2.561 ***	-0.696	-2.032 ***
	(0.887)	(0)	(0.458)	(0.003)	(0.956)	(0)	(0.502)	(0.004)
gdp_growth	-15.095 ***	-15.894 ***	-17.009 ***	-15.612 ***	-15.014 ***	-15.907 ***	-16.941 ***	-15.56 ***
	(0.003)	(0)	(0)	(0)	(0.004)	(0)	(0)	(0)
wgi	-10.196 *	-13.953 ***	-11.19 **	-13.341 ***	-10.3 *	-13.986 ***	-11.302 **	-13.412 ***
	(0.116)	(0.002)	(0.047)	(0.003)	(0.123)	(0.002)	(0.048)	(0.003)
_cons	13.128	15.817 **	13.584	15.361 **	13.164	15.694 **	13.599	15.268 **
	(0.218)	(0.038)	(0.144)	(0.043)	(0.23)	(0.041)	(0.15)	(0.045)
lambda	-9.296 ***	-0.744 *	-6.846 ***	-2.077 **	-9.82 ***	-2.421	-7.153 ***	-2.228 ***
	(0.003)	(0.099)	(0.001)	(0.018)	(0.002)	(0.246)	(0.001)	(0.011)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3.5.2 Propensity score matching

In addition to the use of the treatment effect estimator, we also use a propensity score estimator to address the potential non-random assignment problem with respect to boardroom network centrality and firm performance (Rosenbaum & Rubin, 1984). The concept relating to the propensity score matching approach is the simulation of a controlled experiment. With the assignment to treatment being captured by the observed covariates, the creation of a matched sample using the propensity score makes this assignment to treatment effectively random. Applying this approach to the full dataset, we find that the centrality measures are still positive and statistically significant[14].

3.5.3 Instrumental variable approach

In addition to the endogenous treatment model, we use the 2 Stage Least Square (2SLS) Instrumental Variable (IV) approach to control for potential endogeneity effect. The selected IV must satisfy two conditions: relevance and validity, in that it must be correlated with the endogenous variable and uncorrelated to the error term of the regression, respectively. We use board size (*board_size*) as an instrument to control for endogeneity. This variable satisfies the condition of relevance as it is highly correlated to the endogenous variables of connectedness. However, its validity may be subject to question. This is because there are a number of studies in US, the UK and Europe that find board size is related to firm performance (operating ROA) (Yermack, 1996; Van Ees, Postma et al., 2003; Cheng, 2008). However, this view is not universally accepted, in that other studies find no relationship (Conyon & Peck, 1998; Beiner, Drobetz et al., 2004; Bozec, 2005; Bennedsen, Kongsted et al., 2008). Many prior also relate to time periods that predates 2000. There have been sweeping changes in corporate governance

[14] For brevity, the results of the propensity score matching is not reported in this paper. This will be made available on request.

regulations and practices both in Asia and globally in response to the Global Financial Crisis and corporate debacles (e.g. Enron, WorldCom and Pramalat) from year 2000. In addition, we do not find studies for the same the focus on operating performance for Hong Kong and Singapore, which is the focus of our study. Furthermore, best practices (Deniau, Knight et al., 2016) and guidelines (HKEx (1993), MAS (2012)) in corporate governance in Asia, publicly advocate that firms have diverse boards to include more independent directors and female directors on board. From an institutional perspective, it may be argued that board size is a result of institutional factor to comply with institutional pressures as well as market the firm to investors as one that has superior governance and not linked to firm performance. This is similar to the argument advanced by (DiMaggio & Powell, 1983) with respect to efficacy of independent directors.

Given that the choice of *board_size* as a valid IV may be in question, we proceeded to apply the Durbin-Wu-Hausman or the augmented regression test for endogeneity of the IV. Based on untabulated results from the Durbin-Wu-Hausman test we are not able to reject the hypothesis that the selected IV is exogenous.

In addition to the test for endogeneity, we also deploy the industry median connectedness score as an alternative IV. This IV satisfy both requirements for IVs stated above, in that firms likely choose highly connected directors for their boardroom if their industry peers also have highly connected directors, but the median board connectedness across an industry does not affect the performance of a firm. Similarly, we utilize the Durbin-Wu-Hausman to test for the endogeneity of the industry median IV. Once again, we are not able to reject the hypothesis that the alternative IV is exogenous. The unreported results confirm our main findings.

Overall, the our findings using future firm performance as the dependent variable and the additional tests help to mitigate the endogeneity concerns of director selection and firm performance.

3.5.4 Alternative definitions well-connected and least-connected boards

As an additional robustness check, we use different definitions of best-connected and least-connected boards to investigate the effects of these levels of connectedness on firm performance. For the purpose of these additional tests, best-connected and least-connected boards refer to the top one-third and bottom-one third in the respective connectedness measures.

Table 3.8 shows the results for the treatment models for the best-connected boards. The results are consistent with our main results. Table 3.9 shows the same for the least-connected boards. The results suggest that boards with low connectivity have a negative and significant impact on firm performance.

Table 3.8 – Results from the treatment model (main) with top one-third best-connected directors

The table reports results of the 2nd stage (treatment) OLS regression. The dependent variable is ROA. Columns (1) to (4) show the results for the OLS regression for each of the connectedness measures, whereas Columns (1a) to (4a) show the results for the OLS regression for each of the connectedness measures and the interaction between *founder-chairman* and the respective *predicted connectedness* scores. The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Definitions of independent variables are detailed in the Appendix of this chapter. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: ROA							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
Predicted connectedness measures (above vs. below median connectedness)	1.494 *	1.393	1.871 **	1.472 **	1.636 **	1.766	2.089 **	1.630 **
	(0.068)	(0.304)	(0.03)	(0.025)	(0.048)	(0.205)	(0.017)	(0.015)
ave_dir_age	0.014	0.021	0.011	0.020 *	0.015	0.020	0.012	0.021 *
	(0.314)	(0.146)	(0.425)	(0.104)	(0.289)	(0.153)	(0.389)	(0.095)
founder_chairman	0.497 **	0.418 *	0.489 **	0.479 **	0.888 **	0.938 *	1.026 **	0.867 **
	(0.039)	(0.088)	(0.042)	(0.046)	(0.030)	(0.075)	(0.023)	(0.038)
predicted connectedness score x founder_chairman					-1.271	-1.411	-1.609	-1.273
					(0.24)	(0.265)	(0.158)	(0.257)
duality	-0.028	-0.082	-0.068	-0.011	-0.022	-0.081	-0.061	-0.009
	(0.895)	(0.726)	(0.75)	(0.956)	(0.918)	(0.728)	(0.776)	(0.966)
percent_female	1.41	1.655	2.136	1.735	1.410	1.841	2.141	1.739
	(0.398)	(0.441)	(0.23)	(0.299)	(0.398)	(0.393)	(0.229)	(0.298)
percent_non_exec	0.697	0.124	0.375	0.655	0.728	0.042	0.415	0.684
	(0.247)	(0.908)	(0.564)	(0.272)	(0.227)	(0.969)	(0.525)	(0.252)
famfirm_50	0.294	0.200	0.307	0.276	0.273	0.191	0.285	0.266
	(0.211)	(0.377)	(0.19)	(0.229)	(0.246)	(0.400)	(0.225)	(0.248)
institutionalholding	0.009 ***	0.009 ***	0.009 ***	0.010 ***	0.009 ***	0.008 **	0.009 ***	0.010 ***
	(0.010)	(0.013)	(0.01)	(0.003)	(0.01)	(0.017)	(0.01)	(0.004)
firm_age	0.001	0.003	0.001	0.002	0.001	0.003	0.001	0.002
	(0.774)	(0.504)	(0.791)	(0.702)	(0.760)	(0.526)	(0.800)	(0.709)
roa	0.644 ***	0.643 ***	0.645 ***	0.643 ***	0.644 ***	0.643 ***	0.645 ***	0.643 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

(continued)

	Dependent variable: ROA							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
sales	-0.008	-0.011	-0.008	-0.011	-0.009	-0.011	-0.008	-0.011
	(0.686)	(0.602)	(0.692)	(0.589)	(0.679)	(0.610)	(0.688)	(0.605)
sga_asset	1.076 *	0.990 *	1.18 **	1.009 *	1.031 *	0.981 *	1.130 *	0.980 *
	(0.076)	(0.119)	(0.054)	(0.085)	(0.09)	(0.123)	(0.066)	(0.095)
quick_ratio	-0.010	-0.014	-0.012	-0.010	-0.010	-0.013	-0.012	-0.009
	(0.557)	(0.415)	(0.473)	(0.573)	(0.582)	(0.437)	(0.503)	(0.598)
debt_to_asset	-1.242 **	-1.146 **	-1.194 **	-1.157 **	-1.247 **	-1.137 **	-1.195 **	-1.163 **
	(0.016)	(0.028)	(0.020)	(0.024)	(0.015)	(0.029)	(0.020)	(0.024)
h_index	0.053	0.046	0.094	0.067	0.032	0.026	0.064	0.038
	(0.898)	(0.912)	(0.822)	(0.871)	(0.939)	(0.95)	(0.878)	(0.928)
total_asset_growth	0.176	0.158	0.180	0.155	0.175	0.155	0.180	0.156
	(0.204)	(0.263)	(0.193)	(0.264)	(0.207)	(0.272)	(0.195)	(0.262)
idio_stdev	-4.890 ***	-5.136 ***	-4.780 ***	-4.867 ***	-4.873 ***	-5.109 ***	-4.754 ***	-4.859 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
gdp_growth	-9.970	-9.015	-9.235	-9.532	-9.895	-9.059	-9.148	-9.544
	(0.204)	(0.250)	(0.240)	(0.224)	(0.208)	(0.249)	(0.245)	(0.224)
wgi	-8.833 *	-7.493	-8.356 *	-8.138 *	-8.901 *	-7.542	-8.383 *	-8.290 *
	(0.087)	(0.151)	(0.106)	(0.115)	(0.085)	(0.149)	(0.105)	(0.108)
_cons	12.388 *	10.740	12.013 *	10.944	12.402 *	10.789	11.920 *	11.127
	(0.105)	(0.162)	(0.116)	(0.152)	(0.105)	(0.161)	(0.12)	(0.145)
lambda	-0.762 *	-0.628	-0.990 *	-0.710 *	-0.844 *	-0.846	-1.119 **	-0.799 **
	(0.124)	(0.444)	(0.060)	(0.079)	(0.092)	(0.315)	(0.036)	(0.053)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.9 – Results from the treatment model (main) with top one-third least-connected directors

The table reports results of the 2nd stage (treatment) OLS regression. The dependent variable is ROA. Columns (1) to (4) show the results for the OLS regression for each of the connectedness measures, whereas Columns (1a) to (4a) show the results for the OLS regression for each of the connectedness measures and the interaction between *founder-chairman* and the respective *predicted connectedness* scores. The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Definitions of independent variables are detailed in the Appendix of this chapter. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: ROA							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
Predicted connectedness measures (above vs. below median connectedness)	-2.764 ***	-2.251 **	-2.659 ***	-0.995 *	-2.921 ***	-2.429 **	-2.836 ***	-1.148 *
	(0.008)	(0.038)	(0.012)	(0.098)	(0.005)	(0.027)	(0.008)	(0.063)
ave_dir_age	0.002	0.019 *	0.004	0.025 **	0.004	0.02 *	0.007	0.026 **
	(0.88)	(0.121)	(0.777)	(0.031)	(0.79)	(0.105)	(0.654)	(0.028)
founder_chairman	0.356	0.391 *	0.347	0.427 *	-0.148	-0.061	-0.286	0.043
	(0.148)	(0.109)	(0.16)	(0.076)	(0.749)	(0.892)	(0.538)	(0.92)
predicted connectedness score x founder_chairman					1.725	1.606	2.124 *	1.252
					(0.198)	(0.229)	(0.108)	(0.275)
duality	-0.049	-0.081	-0.049	0	-0.042	-0.073	-0.041	0
	(0.817)	(0.706)	(0.816)	(0.999)	(0.842)	(0.735)	(0.846)	(0.999)
percent_female	3.298 *	3.646 *	3.668 *	1.816	3.265 *	3.611 *	3.591 *	1.832
	(0.089)	(0.111)	(0.079)	(0.321)	(0.093)	(0.115)	(0.086)	(0.317)
percent_non_exec	-0.072	-0.352	-0.224	0.799	-0.037	-0.302	-0.156	0.823
	(0.92)	(0.692)	(0.771)	(0.175)	(0.959)	(0.734)	(0.84)	(0.163)
famfirm_50	0.308	0.26	0.307	0.251	0.29	0.252	0.288	0.242
	(0.186)	(0.258)	(0.188)	(0.275)	(0.215)	(0.275)	(0.218)	(0.293)
institutionalholding	0.009 ***	0.009 ***	0.009 ***	0.009 ***	0.009 ***	0.009 ***	0.009 ***	0.009 ***
	(0.008)	(0.006)	(0.007)	(0.007)	(0.009)	(0.008)	(0.009)	(0.008)
firm_age	0.001	0.003	0.001	0.003	0.001	0.003	0.001	0.002
	(0.824)	(0.514)	(0.778)	(0.569)	(0.831)	(0.554)	(0.804)	(0.581)
roa	0.644 ***	0.644 ***	0.645 ***	0.643 ***	0.644 ***	0.644 ***	0.644 ***	0.643 ***
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)

(continued)

	Dependent variable: ROA							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
sales	0.003	-0.005	0.006	-0.007	0.002	-0.005	0.004	-0.008
	(0.883)	(0.819)	(0.781)	(0.718)	(0.936)	(0.827)	(0.852)	(0.713)
sga_asset	1.019 *	1.026 *	1.09 *	0.928 *	0.98 *	0.994 *	1.025 *	0.882 *
	(0.083)	(0.085)	(0.067)	(0.113)	(0.097)	(0.095)	(0.086)	(0.133)
quick_ratio	-0.017	-0.014	-0.021	-0.012	-0.017	-0.014	-0.021	-0.011
	(0.311)	(0.411)	(0.226)	(0.486)	(0.321)	(0.425)	(0.235)	(0.508)
debt_to_asset	-1.256 **	-1.053 **	-1.249 **	-1.241 **	-1.266 **	-1.055 **	-1.257 **	-1.241 **
	(0.015)	(0.044)	(0.016)	(0.015)	(0.015)	(0.044)	(0.015)	(0.016)
h_index	0.053	0.119	0.101	-0.036	0.018	0.094	0.058	-0.054
	(0.899)	(0.776)	(0.809)	(0.93)	(0.965)	(0.824)	(0.891)	(0.895)
total_asset_growth	0.177	0.165	0.172	0.173	0.18	0.165	0.177	0.174
	(0.206)	(0.237)	(0.217)	(0.21)	(0.198)	(0.237)	(0.206)	(0.21)
idio_stdev	-4.768 ***	-5.029 ***	-4.82 ***	-5.056 ***	-4.766 ***	-5.026 ***	-4.824 ***	-5.05 ***
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
gdp_growth	-11.364	-9.338	-9.589	-9.272	-11.149	-9.326	-9.432	-9.296
	(0.153)	(0.237)	(0.225)	(0.236)	(0.162)	(0.238)	(0.233)	(0.235)
wgi	-7.981 *	-7.951 *	-8.025 *	-7.913 *	-8.124 *	-8.059 *	-8.11 *	-8.103 *
	(0.126)	(0.126)	(0.123)	(0.125)	(0.12)	(0.121)	(0.119)	(0.116)
_cons	13.799 *	12.906 *	13.979 *	11.464 *	13.985 *	13.101 *	14.047 *	11.807 *
	(0.075)	(0.094)	(0.071)	(0.133)	(0.072)	(0.09)	(0.07)	(0.122)
lambda	1.535 **	1.292 **	1.397 **	0.511	1.62 ***	1.386 **	1.489 **	0.594 *
	(0.015)	(0.047)	(0.03)	(0.173)	(0.011)	(0.035)	(0.021)	(0.121)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3.5.5 Effects of boardroom network connectedness on firm valuation

In addition to operating performance (ROA), we also used Tobin's Q as an alternative measure of firm performance. Tobin's Q is estimated as the market value of equity divided by book value of equity. Given that the numerator is market based value, the ratio is often regarded as the financial market measure of firm's performance. In this regard there is an element of forward expectation by the financial market incorporated in this ratio. A review of literature reveals different interpretations of Tobin's Q. Firms with high Tobin's Q (ratio of >1.0) are regarded as having better investment opportunities (Lang, Stulz et al., 1989) or having higher growth potential (Brainard & Tobin, 1968; Tobin, 1969).

Table 3.10 shows the results for the treatment models for the best-connected boards. The results are generally consistent with the main results where operating ROA is used as the dependent variable (Table 3.3). The results suggest that the market attributes firms with high connectivity with higher value than those with lower board connectivity, which provides further support for our hypothesis, H1.

The Tobin's Q results show a positive and significant interaction term for the presence of a highly connected board and founder-chairman (columns 1a to 4a). This could be interpreted that market concerns over possible entrenchment (Fan, Wong et al. (2012) may be mitigated by the presence of a well-connected board with members who care greatly about their reputation in the market (Levit & Malenko, 2015). Further, duality is significantly negative, which suggests that the market may be concerned about the reduction of risk-taking propensity as a result of duality (Kim & Buchanan, 2011), which in turn decreases the investment opportunities and hence growth.

Table 3.10 – Results from the treatment model (Tobin's Q main)

The table reports results of the 2nd stage (treatment) OLS regression. The dependent variable is Tobin's Q. Columns (1) to (4) show the results for the OLS regression for each of the connectedness measures, whereas Columns (1a) to (4a) show the results for the OLS regression for each of the connectedness measures and the interaction between *founder-chairman* and the respective *predicted connectedness* scores. The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Definitions of independent variables are detailed in the Appendix of this chapter. The p-values are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: Tobin's Q							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
Predicted connectedness measures (above vs. below median connectedness)	0.320 *	0.614 ***	0.249	0.271 ***	0.303 *	0.459 **	0.212	0.178 *
	(0.065)	(0.005)	(0.151)	(0.004)	(0.088)	(0.034)	(0.23)	(0.069)
ave_dir_age	-0.007 **	-0.006 ***	-0.006 **	-0.005 **	-0.008 ***	-0.008 ***	-0.008 ***	-0.006 ***
	(0.023)	(0.011)	(0.044)	(0.035)	(0.006)	(0.002)	(0.011)	(0.011)
founder_chairman	-0.046	-0.072 *	-0.053	-0.064	-0.304 ***	-0.847 ***	-0.403 ***	-0.531 ***
	(0.321)	(0.130)	(0.248)	(0.165)	(0.011)	(0.000)	(0.002)	(0.000)
predicted connectedness score x founder_chairman					0.498 **	1.333 ***	0.629 ***	0.820 ***
					(0.017)	(0.000)	(0.003)	(0.000)
duality	-0.073 *	-0.120 ***	-0.080 **	-0.081 **	-0.074 *	-0.138 ***	-0.084 **	-0.083 **
	(0.067)	(0.007)	(0.049)	(0.043)	(0.068)	(0.002)	(0.042)	(0.04)
percent_female	-0.089	0.246	-0.107	-0.013	-0.003	0.297	-0.026	0.051
	(0.741)	(0.430)	(0.697)	(0.961)	(0.991)	(0.335)	(0.924)	(0.847)
percent_non_exec	-0.105	-0.418 **	-0.099	-0.057	-0.191	-0.542 ***	-0.194	-0.148
	(0.428)	(0.031)	(0.489)	(0.613)	(0.159)	(0.006)	(0.186)	(0.194)
famfirm_50	-0.012	-0.003	-0.020	-0.010	0.016	0.028	0.009	0.018
	(0.796)	(0.949)	(0.665)	(0.831)	(0.733)	(0.557)	(0.856)	(0.691)
institutionalholding	0.001	0.001	0.001	0.001	0.001	0.001 *	0.001	0.001 *
	(0.320)	(0.280)	(0.269)	(0.185)	(0.289)	(0.128)	(0.200)	(0.120)
firm_age	-0.004 ***	-0.003 ***	-0.004 ***	-0.004 ***	-0.004 ***	-0.003 ***	-0.004 ***	-0.003 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
roa_prior	-0.012 ***	-0.012 ***	-0.013 ***	-0.013 ***	-0.012 ***	-0.012 ***	-0.012 ***	-0.013 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

(continued)

	Dependent variable: Tobin's Q							
Independent variable: Connectedness measures	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**	**Eigenvector**	**Betweenness**	**Closeness**	**Degree**
Other independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1a)**	**(2a)**	**(3a)**	**(4a)**
sales	0.002	0.000	0.002	0.000	0.001	-0.001	0.001	0.000
	(0.689)	(0.983)	(0.673)	(0.930)	(0.728)	(0.844)	(0.710)	(0.958)
sga_asset	1.687 ***	1.737 ***	1.674 ***	1.68 ***	1.653 ***	1.724 ***	1.647 ***	1.651 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
quick_ratio	0.025 ***	0.026 ***	0.024 ***	0.026 ***	0.023 ***	0.024 ***	0.023 ***	0.024 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
debt_to_asset	0.233 **	0.290 ***	0.244 **	0.243 **	0.173 *	0.243 **	0.188 *	0.186 *
	(0.022)	(0.006)	(0.016)	(0.016)	(0.096)	(0.023)	(0.069)	(0.07)
h_index	0.179 **	0.213 ***	0.173 **	0.172 **	0.175 **	0.233 ***	0.172 **	0.176 **
	(0.023)	(0.008)	(0.027)	(0.027)	(0.028)	(0.004)	(0.030)	(0.026)
total_asset_growth	0.106 ***	0.092 ***	0.104 ***	0.098 ***	0.113 ***	0.097 ***	0.111 ***	0.104 ***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
idio_stdev	0.616 ***	0.600 ***	0.585 ***	0.601 ***	0.626 ***	0.601 ***	0.591 ***	0.603 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
gdp_growth	-1.906	-1.644	-1.705	-1.717	-1.892	-1.423	-1.633	-1.608
	(0.221)	(0.296)	(0.271)	(0.266)	(0.232)	(0.368)	(0.299)	(0.304)
wgi	-2.227 **	-2.239 **	-1.975 **	-2.115 **	-2.075 **	-1.903 *	-1.693 *	-1.815 *
	(0.025)	(0.026)	(0.046)	(0.032)	(0.042)	(0.061)	(0.094)	(0.071)
_cons	3.710 ***	3.799 ***	3.377 **	3.443 **	3.639 **	3.487 **	3.134 **	3.151 **
	(0.012)	(0.011)	(0.022)	(0.019)	(0.017)	(0.021)	(0.037)	(0.035)
lambda	-0.232 **	-0.357 ***	-0.194 *	-0.164 ***	-0.228 **	-0.275 **	-0.177 *	-0.114 *
	(0.029)	(0.007)	(0.068)	(0.007)	(0.036)	(0.038)	(0.103)	(0.068)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3.6 Conclusion

Guanxi or business connections underlie the success of many businesses in Asia. Hence, business owners of successful Asian businesses have the incentive to supplement their own business connections with those of the members of the board whom they invite into their boardroom. We adopt social network centrality scores to test whether a well-connected board translates into superior firm performance, premised on superior information flow as well as better connection to the external environment.

We find that better connected boards deliver superior ROA performance of between 1.183% and 2.822% relative to firms that have boards that have poorer connections, after controlling for an extensive list of board, firm, industry and economic characteristics, as well as country-, year- and industry-fixed effects. Our result is similar when we apply the firm-level governance control for the Singapore subsample and propensity score matching for the full sample as well as the IV approach. However, we find some evidence of potential dysfunctional interactions when a boardroom has both founder-chairman and a well-connected board of directors. This may be explained by the different interests between founder-chairman and the well-connected board members that give rise to a potential conflict between the two.

To further understand the different channels through which better connectivity can manifest, we explore the relationship between board network centrality and the likelihood of the firm being involved in significant acquisitions, strategic alliances, as well as the probability of establishing a larger set of suppliers and customer base. We find strong evidence that direct and indirect board connections has a positive and significant effect on the likelihood that the firm is an active acquirer and its chances of successfully completing deals it announced, indicating that the information advantage as

well as the existence of a conduit between the acquirer and target firms help to facilitate the transaction. We also find similar outcome with respect to strategic alliances conducted by firm in our sample. In our investigation of the impact of board network centrality on the firm's pool of customer and supplier relationships, we find strong evidence that firms with well-connected board is positively associated with a larger pool of suppliers. However, we do not find the same for customer base. This seems to suggest that board members are mindful of their fiduciary duty and duty of care to the shareholders of the firm they are representing, and would avoid conflict which arises when linking a customer to the other firm (Miller, 1992; Knepper, Bailey et al., 2015).

A key limitation of our study and an area for further research is to explore the value creation for shareholders via market reaction with respect to M&A activities as well as strategic alliances.

3.7 Appendix: variable descriptions

Key variables	Variable names used	Descriptions
Board characteristics		
Eigenvector	*eigen_high*	Dummy variable for Board Network Connectedness – Eigenvector and vice-versa (1=above median; 0 otherwise).
Betweenness	*between_high*	Dummy variable for Board Network Connectedness – Betweenness and vice-versa (1=above median; 0 otherwise).
Closeness	*close_high*	Dummy variable for Board Network Connectedness – Closeness and vice-versa (1=above median; 0 otherwise).
Degree	*deg_high*	Dummy variable for Board Network Connectedness – Degree and vice-versa (1=above median; 0 otherwise).
Size of board[15]	*board_size*	The number of board members at t= -1.
Average age	*ave_dir_age*	Average age of the board members.
Dual role of Chairman and CEO	*duality*	Dummy variable for CEO who also holds appointment as Chairman, and vice-versa (1=CEO with Chairman role; 0 otherwise).
Board diversity	*percent_female*	Percentage of board members who are female at t= -1.
Board independence	*percent_non_exec*	Percentage of board members who are non-executive at t= -1.
Founder as chairman of the board	*founder_chairman*	Dummy for founder serving as Chairman of the Board of Directors (1=Founder serving as Chairman; 0 otherwise) at t= -1.
Firm characteristics		
Family firm	*famfirm_50*	Dummy for family firm defined as family ownership of >50% (1=family firm; 0 otherwise) at t= -1.
Institutional holding	*institutionalholding*	Percentage of institutional holding at t= -1.
SG&A over assets	*sga_asset*	Percentage of Selling, General & Administration Expenses over the total assets of the firm at t= -1.
Firm age	*firm_age*	The age of the firm.
Prior period firm performance (ROA)	*roa_prior*	ROA at t= -1. ROA is defined as Net Operating Profit After Tax (NOPAT) / Average Assets.

[15] The *board_size* variable is highly correlated to the main variable used to measure Board Network Connectivity (namely Eigenvector, Betweenness, Closeness and Degree), hence it is only used in the first stage Probit model.

Key variables	Variable names used	Descriptions
Firm characteristics (continued)		
Liquidity level of the firm	*quick_ratio*	Quick ratio at t= -1.
Leverage level of the firm	*debt_to_asset*	Leverage level for the firm at t= -1, defined as ratio of total debt over total assets.
Asset growth	*asset_growth*	Asset growth rates prior at t= -1.
Size of the firm	*sales*	Net sales (in USD) at t= -1.
Firm risk	*idio_stdev*	Standard deviation of stock return at t= -1.
Macro/country/industry level		
Level of industry competition	*h_index*	Herfindahl index for the industry at t= -1.
Economic performance	*gdp_growth*	GDP growth rate for the country at t= -1.
Corporate governance indicator	*wgi*	Worldwide Governance Index (WGI) for each country at t= -1. The WGI is a country level index by the World Bank Institute which covers six dimensions of corporate governance, including Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Rule of Law; and Control of Corruption.
Other variables		
Strategic alliances	*strategic_alliance*	Dummy for family firm that have engaged in strategic alliances (1=strategic alliance; 0 otherwise) at t= -1.
Percentage of common directors	*percent_common_dir*	Common directors as a percentage to total board size

CHAPTER 4

WITHIN THE INNER CIRCLE OF THE DIRECTORS' NETWORK: THE EFFECTS OF CLIQUES CONNECTEDNESS ON BORROWING DECISIONS IN HONG KONG AND SINGAPORE

4.1 Introduction

A firm's financing choices and its access to external capital markets can impact its long term viability and future success. The quality of corporate governance in a firm can affect the type and source of financing for a firm, as governance acts to alleviate agency problems between managers and other stakeholders in the firm, including capital providers (Shleifer & Vishny, 1997). The concern for lenders in the context of corporate governance is the diversion of cash resources from their intended purpose to pursue managerial self-interest (Jensen & Meckling, 1976). One governance mechanism is the role of the Board of Directors in their provision of effective monitoring of management. The board is considered as a generally effective, albeit imperfect control tool used to protect shareholder interests (Fama, 1980b).

A highly connected board may enhance the effectiveness of board governance. First, directors who are highly connected are concerned about their reputation in the directors' network, tend to challenge managerial decisions and are rewarded with opportunities for other boardroom appointments (Jiang, Wan et al., 2015). In addition, independent directors on multiple boards place higher value on appointments in more prestigious firms as these improve their reputation in the market (Masulis & Mobbs, 2014). Second, directors also act as conduits of communication with the firm's external environment which creates value for the firm (Zahra & Pearce, 1989; Pfeffer & Salancik, 2003). In this respect, highly connected board members can help to reduce information asymmetry, resulting in better firm performance (Schoorman, Bazerman et al., 1981), and superior M&A outcomes (Cai & Sevilir, 2012).

Prior studies that consider board connectivity use a measure of centrality connectivity which focuses on each node (director) in relation to the entire directors'

network (Hochberg, Ljungqvist et al., 2007; Larcker, So et al., 2013). We adopt the clique score, a unique board connectedness measure as a proxy for board members' connectedness to the inner circle of the directors' network. The concept of clique is widely used in social network studies (Bernard, Killworth et al., 1979; Stiller & Dunbar, 2007). We suggest that this alternative connectedness measure is superior to a more general connectivity measure as it utilizes a set of more rigorous criteria in the computation of the connectedness measure, which acts to augment the traditional board connectivity measures. For our clique score measure, all members in the clique must be connected directly to each other to be included in a clique.

We examine the effects of such connectedness on several key borrowing decisions for listed firms in Hong Kong and Singapore. These decisions include the cost of borrowing as well as the use of relational borrowing, unsecured debt and short-term debt. Asian markets provide a unique context due to the prevalence of founder firms and closely knit social as well as business networks. We focus on Hong Kong and Singapore as they share very similar characteristics. First, both markets have high corporate governance standards, driven largely by the high dependence of firms on international capital markets for financing. Second, they are in the same stage of economic development and are largely service oriented economies. Finally, they have a dominating influence of Chinese culture and the adoption of the British legacy legal system.

The results show that clique connectedness is negatively related to borrowing cost, which suggests that having a board with stronger connections to the inner circle of the directors' network reduces the cost of borrowing for firms. This is consistent with the reduction of information asymmetry hypothesis (Ajinkya, Bhojraj et al., 2005; Karamanou & Vafeas, 2005; Wu & Sorensen, 2013) and the superior monitoring of the

firm that arises due to well-connected directors' concern about their reputation in the directors network (Fama, 1980b; Masulis & Mobbs, 2014; Ruiz-Verdú & Singh, 2014).

We also consider the level of bank debt used and find that the level of relational (bank) borrowing is reduced when firms have directors with strong clique connectivity. This finding is consistent with the view that excessive bank borrowing may jeopardize firm survival as these borrowings tend to be short-term and are usually recalled by lenders in times of adverse economic conditions. Directors who value their reputation in their network would question the wisdom of managerial decision to seek high levels of bank debt (Fama, 1980b; Ruiz-Verdú & Singh, 2014).

With respect to borrowing on an unsecured basis, the results show that firms with higher clique connectivity are able to borrow a larger proportion of their debt on an unsecured basis. Firms without unsecured borrowings are less likely to have well connected boards. In contrast, firms that borrow exclusively on an unsecured basis are more likely to have highly connected boards.

The use of large amounts of short-term debt to fund operations and investments among Asian firms is pervasive. Our results show that firms with directors that are highly connected to the directors' network use less short-term debt. Further, firms that have highly connected directors are less likely to use short-term debt. This seems to suggest that highly connected directors are concerned about the risk to their reputation resulting from potential failure when a firm uses only short-term debt.

Our study makes several contributions to the literature on board connectivity. First, we use a novel measure to analyze the network effect of the inner circle of the directors' network. This advances the study of board connectedness which has progressed from binary measure of connectedness via director interlocks (Hallock, 1997)

to centrality measures such as degree, betweenness, closeness and eigenvector (Hochberg, Ljungqvist et al., 2007; Larcker, So et al., 2013). We show that strong connectedness to the inner circle in the directors' network has a positive effect on various aspects of a firm's borrowing decisions. Finally, we use a mixture model (specifically a ZOIB model) to account for the fact that some firms have no borrowings, some firms are 100% debt and many other firms have debt ratios that lie somewhere in between these two extreme values. The use of this model is a more accurate reflection of firm borrowing patterns than the methodologies used in previous research on borrowing decisions.

The remainder of this paper is structured in the following manner. Section 4.2 contains a detailed review of the prior literature, leading to the development of testable hypotheses for our study. Section 4.3 outlines the methodology that we deploy for our study, together with the data and descriptive statistics for the sample. Section 4.4 proceeds with the presentation of our empirical results, followed by robustness tests in Section 4.5. The paper will conclude in Section 4.6.

4.2 Prior literature and hypotheses development

4.2.1 Corporate governance and directors' connectedness

A firm's success is inextricably linked to its ability to raise capital to finance its expansion in its lifecycle. Firm governance acts to alleviate agency problems between managers and other stakeholders in the firm, including capital providers (Shleifer & Vishny, 1997). Lenders are concerned about the diversion of cash resources from their intended purpose to pursue managerial self-interest (Jensen & Meckling, 1976). One governance mechanism is the role of the Board of Directors in their provision of

effective monitoring of management. In this respect, having a board that is highly connected to the directors' network can enhance its monitoring function, as these directors care about their reputation in the labor market for directors. This view is consistent with the earlier view of Fama (1980b) and Ruiz-Verdú and Singh (2014) suggest that concern over reputation is the single most potent motivation for directors to act in the interest of shareholders. However, the board's effectiveness in such a role depends on whether the directors choose to establish a reputation to be pro-shareholder or pro-management.

Levit and Malenko (2015) argue that, on a macro level, the choice is premised on which path is more lucrative, which in turn is determined in equilibrium by the aggregate quality of corporate governance in the market for directors. If the market as a whole emphasizes strong governance practices that protects shareholders' interest, then building a strong reputation in this respect can lead to more directorship appointments. The converse is true. The authors conclude that such concerns tend to reinforce governance systems making strong systems stronger and weak systems weaker. At the firm level, reputational concerns of directors can enhance the quality of corporate governance. Jiang, Wan et al. (2015) examine the voting behavior of directors in public firms in China and find that directors who are high in reputation value tend to challenge managerial decisions. These actions are in turn rewarded with more opportunities for boardroom appointments. Furthermore, in line with this reputation effect, Bugeja, Rosa et al. (2009) document that directors of target firms that had been taken over due to poor prior performance and who are financially dependent on a particular board seat, will find difficulty in gaining future employment.

Reputational concern of directors is an additional reason why well-connected directors may have an effect on firms with a controlling shareholder which could be a

family (insider shareholder in our study) or institutional investor (institutional investor in our study). Holderness (2009) documents the widespread presence of insider shareholders around the world. These insider shareholders have varying effects on the ability of the firm to obtain financing since they have different impacts on corporate governance practices of the firm.

Ownership structure with family control is pervasive around the world (Porta, Lopez-de-Silanes et al., 1999; Faccio & Lang, 2002; Anderson & Reeb, 2003b). With respect to financing, family ownership can help to reconcile the conflict between equity and debt claimants because of the long term orientation of the family (Anderson & Reeb, 2003b). On the other hand, family control can increase the opaqueness of the firm to the external environment, exacerbating the problem of information asymmetry with respect to lenders (Chen, Chen et al., 2008; Anderson, Duru et al., 2009). In Asia, the presence of insider shareholders is common. Holderness (2009) documents an average level of shareholding ranging from 37% in South Korea to 73% in Thailand. Claessens, Djankov et al. (2002) also report that over two-thirds of firms in East Asia are controlled by a single shareholder. The presence of institutional shareholders also has an effect on corporate governance. This is largely due to superior monitoring. This is documented by in a large number of prior studies including Mikkelson and Ruback (1985), Black (1992), Strickland, Wiles et al. (1996), Wahal (1996), Carleton, Nelson et al. (1998), Wahal and McConnell (2000), and Gillan and Starks (2000).

Finally, a highly connected board also serves as a conduit of communication (Zahra & Pearce, 1989; Pfeffer & Salancik, 2003) and an extension of firm's access to resources (Pfeffer & Salancik, 1978; Johnson, Daily et al., 1996). Established relationships assist in reducing information asymmetry for external parties including prospective and current investors, lenders, suppliers and customers (Schoorman,

Bazerman et al., 1981). In addition, a better connected board gains from superior access to information and are able to make better strategic decisions (Mizruchi, 1996; Mol, 2001; El-Khatib, Fogel et al., 2015).

4.2.2 The effects of clique on borrowing costs

Board connectedness may have a positive effect on borrowing costs. This is attributable to the information flow, or more specifically the reduction in information asymmetry hypothesis. Several prior studies document the positive effects of the presence of independent directors on corporate reporting, leading to a reduction in information asymmetry (Ajinkya, Bhojraj et al., 2005; Karamanou & Vafeas, 2005; Wu & Sorensen, 2013). The reduction of information asymmetry allows lenders to better assess risk t which lowers the cost of borrowing (Anderson, Mansi et al., 2004). This is relevant to Asian firms that are family-owned, as the lack of transparency in these firms is commonly cited as an issue that outside investors face when investing in Asia (Chen, Chen et al., 2008). In addition, firms with connections to banks and politicians have greater access to long-term debt than firms without such ties (Charumilind, Kali et al., 2006).

Another rationale for lower borrowing cost, reported by Lorca, Sánchez-Ballesta et al. (2011) in their study of listed Spanish firms between 2004 and 2007, is that effective boards on reduce agency problems for debtholders. This is consistent with studies that find effective board monitoring reduces managerial opportunism leading to lenders' willingness to lower the risk premium (Bhojraj & Sengupta, 2003; Anderson, Mansi et al., 2004; Ashbaugh-Skaife, Collins et al., 2006; Piot & Missonier-Piera, 2007; Ertugrul & Hegde, 2008; Fields, Fraser et al., 2012).

H1: Firms with strong board clique connectedness have lower borrowing costs.

4.2.3 The effects of clique on relational (bank) borrowing

In Asia, most firm debt is private bank debt due largely to a high savings rate which resulted in higher bank intermediation in the economy (Corsetti, Pesenti et al., 1998; Radelet & Sachs, 1998; Wade & Veneroso, 1998). Asian firms may also elect to have more bank debt because of the efficiency of renegotiation and liquidation. Gilson, John et al. (1990) document that there is a higher probability of private restructuring for firms holding higher levels of bank debt. Private restructuring is beneficial since it occurs without adverse publicity. The extensive use of bank debt is similar to many European countries, and is in stark contrast to that in the US where most debt is raised publicly (Lorca, Sánchez-Ballesta et al., 2011). Additionally, in the context of family firms, the relationship nature of bank lending is such that banks and the founders as well as their families have long established relationships (Schumpeter, 1939; Roberts & Yuan, 2010).

Differences in public and private debt markets can affect the efficacy of monitoring by institutional investors. Private lenders' incentive to monitor is enhanced

by the fact that they cannot liquidate their position as readily as equity and bond holders. Roberts and Yuan (2010), document that the effect of institutional investors on borrowing cost is not uniform across all levels of ownership for private loans for US listed firms. They find that the initial benefits of incentive of private lenders to monitor will be overshadowed by the cost of risk shifting when the equity ownership becomes more concentrated.

Studies show that banks are more efficient and effective monitors (Brealey, Leland et al., 1977; Diamond, 1984; Fama, 1985; Boyd & Prescott, 1986). Banks have more concentrated holdings and better access to information and thus are better at disciplining management than public debtholders. In addition, they have an ongoing relationship with the borrower and therefore have better access to information than public debtholders. Alternatively, it is argued that since the bank is senior to the more junior public debt, bank monitoring is only valuable if the quantum is significant relative to public debt (Diamond, 1993).

To avoid close scrutiny, firms may choose to issue public debt (Denis & Mihov, 2003). Furthermore, firms that wish to send desired signals to the markets, such as commitment to an optimal investment policy, may elect to issue public debt (Zwiebel, 1996). Conversely, the use of bank debt may have a positive signal. Such signals are highly credible since the banks commit their resources into the relationship (Fama, 1985) and firms with high levels of information asymmetry will borrow privately. However, public and private borrowing can be complementing. Both Gorton and Haubrich (1987) and Fama (1985) find that bank close monitoring is a public good which could have the effect of lowering the cost of public debt.

Firms may also avoid taking high risks if they are using risky debt and would therefore forgo investments in projects that are value enhancing projects (Myers, 1977). To mitigate this risk, Myers (1977) suggests that firm maintain "continuous, intimate and flexible relationship'' with lenders (Myers, 1977, p. 159). This is usually achieved via a long-term banking relationship because these lenders are concentrated and have fewer free rider problems than public debtholders.

Together with the benefit of enhanced monitoring and better information flow, a board with better connections to the inner circle of the wider directors' network would enable the firm to borrow more from banks. A recent study of Italian firms between 2000 and 2012 by Amore, Caselli et al. (2016) finds that the presence of interlocked directors (well-connected) increases bank debt by between 4.5% and 6.3%.

H2: Firms with strong board clique connectedness have a higher proportion of debt relational borrowing.

In addition, we test the effect of having a board with strong clique connectedness when an insider owns a large proportion of the firm' shares.

H-2A: Firms with strong board clique connectedness together with the presence of high insider ownership results in higher levels of debt relational borrowing.

4.2.4 The effects of clique on the use of unsecured debt

Prior studies on the role of financial intermediaries such as commercial banks, insurance companies, and finance companies, suggest that they monitor and control their borrowers on behalf of other investors (Leland & Pyle, 1977; Campbel & Kracaw, 1980; Diamond, 1984; Fama, 1985). Part of this function involves obtaining collateral that also serves to lower their risk of loss resulting from default. If bankruptcy occurs, lenders could seize and dispose the assets to recover the amounts owed to them. Furthermore, it is not uncommon for banks to engage in the practice of overcollateralization, in that the amount of collateral is a multiple of the amount of loan in question. The rationale for doing so is that in the case of a fall in the value of collateral, the lender can still recover their loan value. Overcollateralization, what Kregel (2008) terms as "Minsky's cushion of safety", is common market practice. From this perspective, the capacity for firms to borrow from the private market would be constrained by their asset base. This constraint is exacerbated by the practice of over-collateralization. Therefore the availability of assets would pose a key constraint to the firm's ability to borrow if lenders demand collateral. Theory also predicts that firms that have most of their principal assets residing in the present value of future growth opportunities, do not optimally borrow against those assets (Myers, 1977).

Based on the foregoing, the ability to achieve higher level of leverage with a given amount of asset is a funding advantage to the firm as firm performance can be enhanced via higher leverage. Given the reduction in information asymmetry (Ajinkya, Bhojraj et al., 2005; Karamanou & Vafeas, 2005; Wu & Sorensen, 2013) and enhanced monitoring (Fama, 1980b; Masulis & Mobbs, 2014; Ruiz-Verdú & Singh, 2014) resulting from the presence of highly connected directors, lenders may be willing to lend to such firms on an unsecured basis.

H3: Firms with strong board clique connectedness have a higher proportion of unsecured debt.

4.2.5 The effects of clique on short-term debt

Short-term debt is defined as debt with a maturity of one year or less. This is usually used to finance working capital needs of the firm since these needs are short-term in nature. The maturity matching of both assets and liabilities lowers refinancing risks for the firm.

Excessive short-term borrowing is risky because these are the most likely to be recalled during a liquidity crunch in the market (Dadush, Dasgupta et al., 2000). The problem is more pronounced if the short-term borrowings have been used to finance the acquisition of long-term assets, since the mismatch of the tenure of assets and liabilities exposes the firm to severe refinancing risk, particularly as a result of adverse market condition. This is of particular relevance to Asia, as one of the root causes of the Asian Financial Crisis was excessive short-term borrowings (Benmelech & Dvir, 2013). There are a large number of studies that find that short-term borrowings increase the chance of financial crisis (Diamond & Rajan, 2001b, 2001a; He & Xiong, 2009; Benmelech & Dvir, 2013). Hence, there have been calls to regulate the use of short-term debt (Gorton & Metrick, 2010). Mishra and McConaughy (1999) find firms, especially family firms, tend to shun debt, particularly short-term debt, for fear of ceding control to others. Short-term debt is avoided by family firms because they usually come with more stringent covenants; expose the firm to refinancing risk; and possible higher interest cost. In their study of family firms in the US, Mishra and McConaughy (1999) find that

family firms use less than half of the short-term debt that other firms use. However, short-term debt may be used as it is cheaper than long-term debt (Mills & Schumann, 1985; Renfrew, Sheehan et al., 1985; Hutchinson, 1995).

Given the refinancing risk that may arise from the use of short-term financing, firms with high clique connectivity may avoid the use of this source of financing. This is because such directors may be concerned about the loss of reputation following the failure of the firm (Fama, 1980b; Masulis & Mobbs, 2014; Ruiz-Verdú & Singh, 2014).

H4: Firms with strong board clique connectedness have a lower proportion of short-term borrowings.

4.3 Methodology and data

4.3.1 Concept of clique

The concept of a clique is an extension of a series of prior studies on interlocking directors. Prior studies explore the merits of being in cliques and clusters (Allen, 1978; Mintz & Schwartz, 1983). In addition, there are also studies that investigate the emergence of corporate elites and inner circle connections from class cohesion (Zeitlin, 1974; Useem, 1984, 1987). Directors are connected to their network in varying extent and, as a result, not every director wields the same level of influence on the board. In their study of social capital and influence of directors in US firms, Stevenson and Radin (2009) find the ability to influence decision making on the board is determined by linkages to others, membership of clique, as well as prior relationships with other

directors. Stevenson and Radin (2009) opine that membership of clique or "clusters of ties" helps board members gain more influence.

In the computation of the clique score for each board (which is outlined in the next section), we employ a concept from graph theory which is widely used in studies of social networks (Bernard, Killworth et al., 1979; Stiller & Dunbar, 2007). The definition of a clique, originally introduced by both Luce and Perry (1949) and Festiger (1949) was intended to provide a faster and more systematic way to form group structures, that would facilitate the study of organization of groups. Scott (2012) provides a widely adopted definition of clique that it is a subset of points that are all linked to each other but not connected to another clique.

There are several clique structures that can be constructed. In our study we have adopted the maximal complete subgraph method in our computation of clique scores. A subgraph is another graph formed from a subset of the vertices and edges of an original graph. By definition, a maximal clique is one that cannot be extended by including one more adjacent vertex. A description of the concept of clique is detailed in the appendix of this paper.

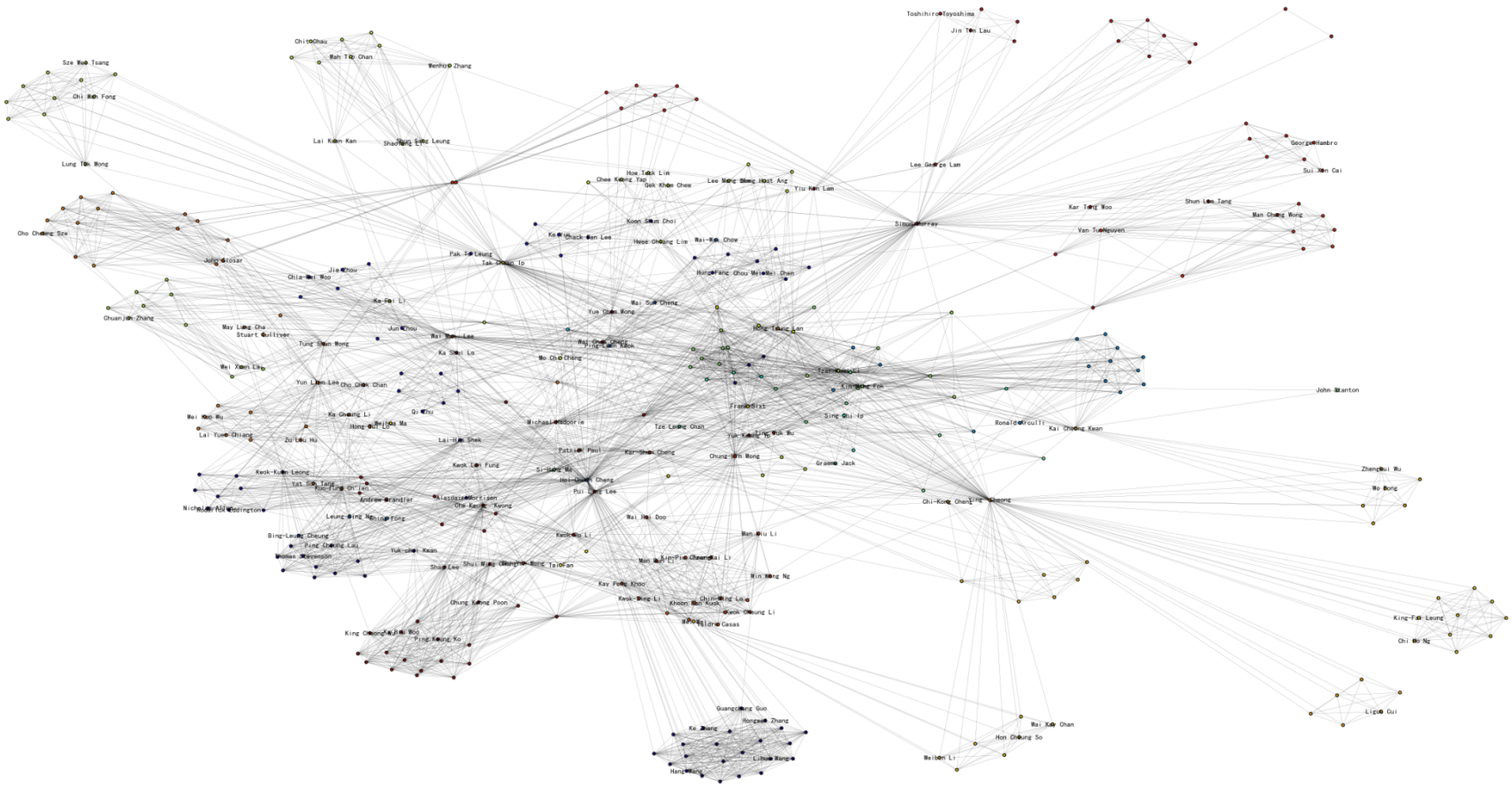
Figure 4.1 presents the network map based on listed firms in Hong Kong and Singapore in our subsample using the clique concept. Information relating to the board of listed firms in Hong Kong and Singapore, and their characteristics are collected from *CapitalIQ* for the period 2007 to 2014. The sample period was selected as the data available during this period is more complete. Stock price data is collected from *Datastream*.

From *CapitalIQ*, we extract data relating to 199,406 board positions with 32,210 unique board members. These represent 2,642 listed firms in Hong Kong and Singapore

during the sample period. From these a total of 22,947 firm-years of data, with 70,643 director-firm pairs were collected. After removing observations with missing data and financial services firms, the final dataset comprises 9,934 firm-years of data, representing 1,653 unique firms

We posit that clique connectedness creates more value for a member of a network, over and above the commonly used centrality measures of connectedness, because a clique is defined such that all members must know each other directly. Anecdotally, a clique is like a *Whatsapp* chat group. Each member in the chat group has their own contact list which defines the extent of their influence and connections in their network. From this viewpoint, a clique can be regarded as the connections to the inner circle of the network, whereas centrality is just about being linked to someone in the wider directors' network. If a member leaves the clique, that member will not be as privileged as before, with respect to timely information flow. While he/she will still have connections to the individual members of the clique, he/she will only be able to hear what members in the clique choose to tell him/her.

Figure 4.1 – Network diagram for listed firms in Hong Kong and Singapore using clique concept



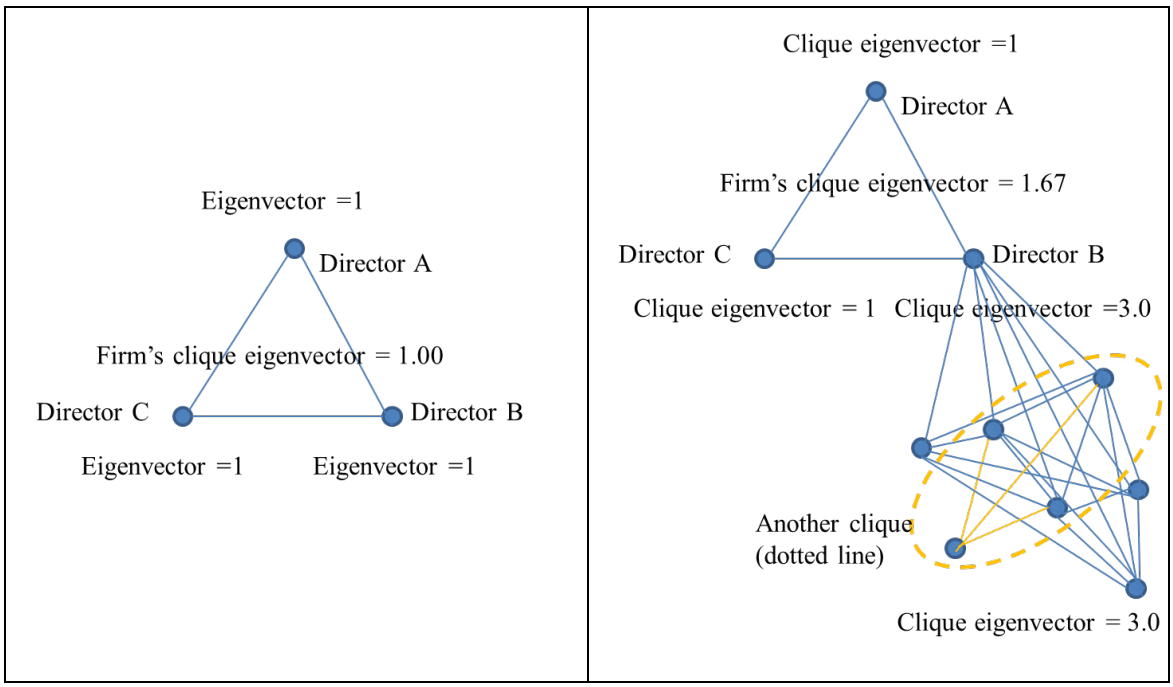
4.3.2 Computation of the clique measure

The basis for computing the main variable, clique, is the measure eigenvector, which is one of the centrality scores computed in Larcker, So et al. (2013)[16]. Eigenvector centrality measures a board member's connectivity via the high levels of connectivity of that individual's direct links. As such, an individual with high eigenvector centrality is connected to other highly connected individuals in the directors' network. In the context of this measure, a board is highly connected when it is perceived to be more prestigious and powerful. It is measured with reference to the extent of connectedness of those direct links.

Each director in the network would have an eigenvector score that reflects the extent of his or her connectivity to the directors' network (their own contact list in a *Whatsapp* chat group). There is a baseline eigenvector score for the board which is the average eigenvector score for a single board that director serves, since the board is itself a clique. This score will be replaced by the average score for a more influential clique the director belongs to, in the directors' network. In other words, the first firm's eigenvector clique score will be augmented by that director's connection to a more influential clique. When a director belongs to several cliques at the same time, only the score for the most powerful clique is included. Each director could be connected to a clique or a number of cliques, as it is possible for an individual to be in several cliques at the same time. The clique score for each director on the respective boards is a function of the size as well as the composition of the clique(s). The clique score for the firm is the average score for the entire board. Figure 4.2 illustrates how the clique scores for our directors' network are constructed.

[16] It is possible to use the other centrality measures, such as *degree*, *betweenness* and *closeness*, to construct the clique score measure. For this study, we chose eigenvector to compute the clique score measure as it relates to connections to influential people in the network which is consistent with the concept of clique in its emphasis on quality of connections rather than number of connections, per se.

Figure 4.2 – Depiction of the computation of clique score measure



4.3.3 Dependent variables

We employ four dependent variables for the four borrowing decisions: borrowing cost, bank debt, unsecured debt and short-term debt. The dependent variable for the borrowing cost (*borrowing_cost)* hypothesis (*H1*) is an estimate for the company's cost of borrowing based on the interest expense charged and the average debt balance over a particular period, and is computed in the following manner:

$$borrowing\_cost = \frac{Interest\ Expense_t}{\frac{(Total\ Debt_t + Total\ Debt_{t-1})}{2}}$$

The dependent variable relating to the bank debt hypothesis (*H2*) is defined as the total bank debt as a percentage of total debt (*bankdebt_totaldebt*)[17]. The dependent variable used to test this unsecured debt hypothesis (*H3*) is the total unsecured debt as a percentage of total debt *(unsecuredebt_totaldebt*)[3]. The dependent variable we use to test short-term debt hypothesis (*H4*) is the total short-term debt as a percentage of total debt (*st_totaldebt*)[3].

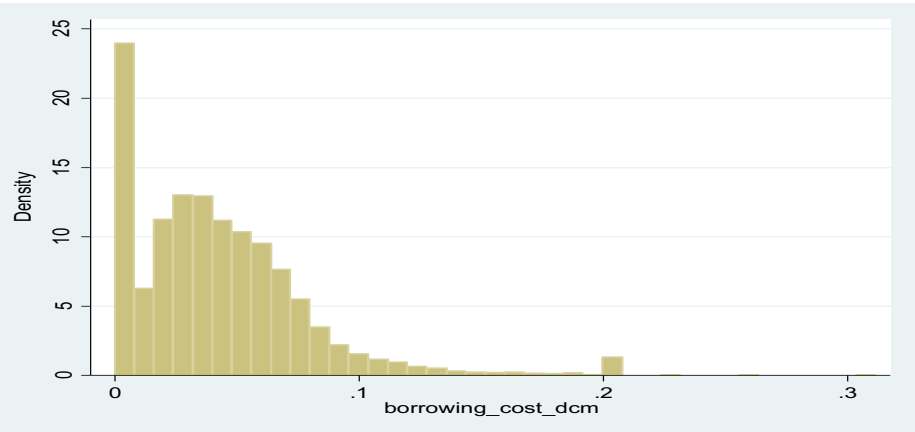
4.3.4 Presence of large numbers of zeros and ones in the research setup

Our sample contains a large number of firms that are not leveraged, either in the entire sample period or in some of the years within the sample period. Additionally, our dependent variables range between 0 and 1 ("proportions") and have a considerable number of observations that take the values of 0 or 1 as well. Figure 4.3 shows the distribution for the dependent variables we use for our study and the histograms show the large number of 0s and 1s for the dependent variables used in our study, although we note that there are no observations taking the value 1 for the borrowing cost variable.

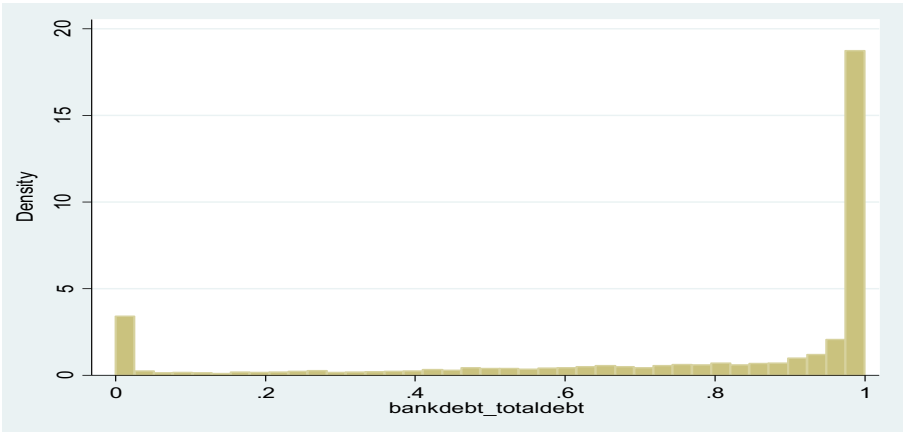
[17] As an alternative, we used the ratio of bank debt, unsecured debt and short-term debt as a portion of total assets instead of total debt. For reason of brevity these sets of results are not reported here but our results are robust to these changes.

Figure 4.3 –Histogram for the dependent variables used in our study

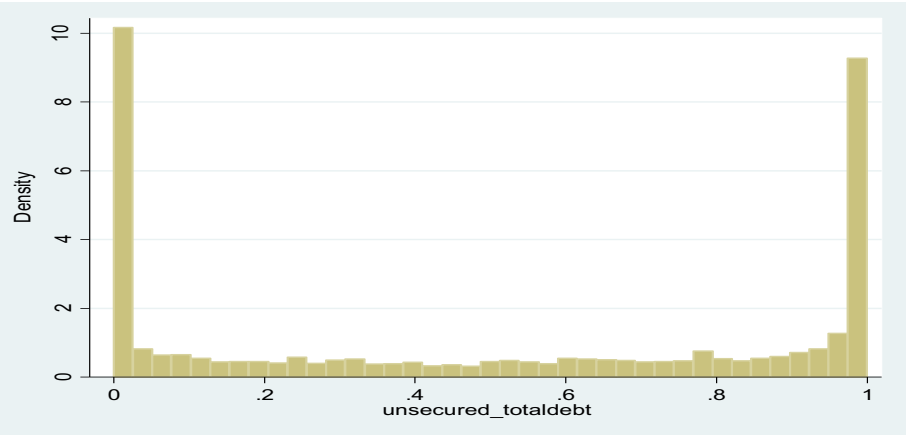
borrowing_cost



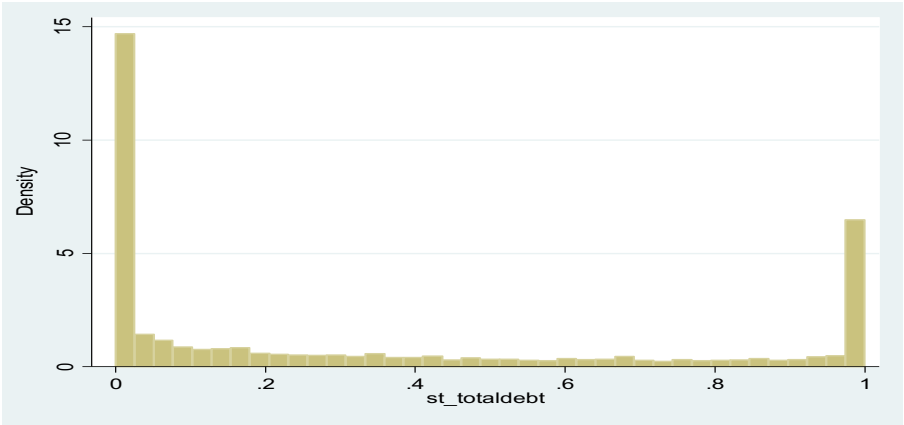
bankdebt_totaldebt



unsecured_totaldebt



st_totaldebt



When the dependent variable in the analysis is bounded between 0 and 1, Ordinary Least Squares (OLS) would be inappropriate (Ferrari & Cribari-Neto, 2004; Cook, Kieschnick et al., 2008; Buis, 2010). This is because, OLS can produce values that are anywhere on the whole real line which is inconsistent with data that have clear boundaries (truncated data). Furthermore, the effect of explanatory variables tends to be non-linear, and the variance tends to decrease when the mean gets closer to one of the two boundaries, rendering OLS unsuitable in such situations. The problem is exacerbated when the number of 0s and 1s are significantly larger than would be expected in a normal distribution. Models exist to handle proportions data (beta distribution models) but the data in those models cannot take the value of 0 or 1. Alternative approaches exist, such as fractional polynomials as advocated by Papke and Wooldridge (1996) that can handle proportions data. However, these methods cannot manage excessive numbers of 0s and 1s as we have here. In view of these considerations, a mixture model using a beta distribution model for the proportions and logit models for the observations taking the values of 0s and 1s seems to be the only viable approach.

This model is a combination of the logit estimates for probabilities of 0s and 1s with a two-parameter beta function for the region in between (proportion). The probability of the respective borrowing decision (borrowing, having bank debt, unsecured debt and short-term borrowings) is ($\boldsymbol{\alpha}'$ $\mathbf{x}i$) in the respective models, where C is the cumulative logistic function. Conditional on these decisions, the firm makes its respective borrowing decision $yi \in (0, 1)$, leaving the remainder, $1 - yi$. With conditional probability ($\boldsymbol{\gamma}'$ $\mathbf{x}i$), a firm that has a certain level/type of borrowing exhausts all the alternative choices with respect to borrowing decisions.

The ZOIB models can be depicted in the following manner:

$$f(y_i = 0|x_i) = 1 - \mathrm{C}(\alpha' x_i), \qquad y_i = 0$$

$$f(y_i = 0|x_i) = \mathrm{C}(\alpha' x_i)(1 - \mathrm{C}(\gamma' x_i)\left[\frac{\Gamma(\mathrm{p}+\mathrm{q}(x_i))}{\Gamma(\mathrm{p})\Gamma(\mathrm{q}(x_i))} y_i^{p-1}(1-y_i)^{q(x_i)-1}\right], \qquad y_i \in (0,1)$$

$$f(y_i = 1|x_i) = \mathrm{C}(\alpha' x_i)\mathrm{C}(\gamma' x_i), \qquad y_i = 1$$

where $q(x_i) = p \exp(-\beta' x_i)$ and p is the parameter of the beta function. $\hat{\alpha}, \hat{\beta}$ and $\hat{\gamma}$ are simultaneously estimated with maximum likelihood (Cook, Kieschnick et al., 2008)[18].

4.3.5 Sample selection and endogeneity concerns

Another issue that we encounter in our study is that of sample selection. In particular, our sample for firms undertaking various borrowing decisions may be unrepresentative of the population we are interested in, e.g. firms may choose not to report borrowing costs. To address this issue, we utilize the approach proposed by Heckman (1976), treating the selection issue as an omitted variable problem which is proxied for using the inverse Mills ratio (*imr*). The Heckman correction for selection bias involves a two-stage process. The first stage involves a probit regression that models the determinants

[18] We are very grateful for Dr. Maarten Buis for making his STATA add-in program available for the estimation of the ZOIB models.

of the specific borrowing decisions. From the probit regression, the *imr* is computed and deployed in the second stage as a proxy for the omitted variables.

Furthermore, in our research design we attempt to address a potential endogeneity issue that arises because the independent key variable (*clique*) may be correlated with the error term. As an example, in our study we are using the board connectedness to explain borrowing decisions. However, it is equally plausible that the borrowing decisions made by the firm could also influence the directors' choice of firm to serve. We address the issue of endogeneity inherent in our research design via a two-stage model (Greene, 2000). This involves a logit model in the first stage which is employed to generate the predicted values of the endogenous variable which is then used in regression equation for the second stage. As explained earlier, we have used a ZOIB model in the second stage, and we also control for country-, year- and industry-fixed effects.

4.3.6 Presence of insider ownership

There is ample evidence of the use of pyramid structures, dual class shareholding and cross holdings to gain effective control over the firm with a relatively small level of shareholding (Porta, Lopez-de-Silanes et al., 1999; Faccio & Lang, 2002; Anderson & Reeb, 2003b; Lemmon & Lins, 2003). These arrangements essentially decouple cash flow and control rights, conferring disproportionately more control rights than cash flow rights to the controlling shareholder (also known as the "control-ownership wedge"). Such structures create another situation in which there is a separation of control and ownership, this time between shareholders which exacerbate the primary conflict between majority and minority shareholders (Shleifer & Vishny, 1997). A recent study

by Masulis, Pham et al. (2011) finds that the group structures created by these arrangements serve not only to achieve control but also to ease financing constraints at the country and firm levels. Incidences of control-ownership wedge are particularly severe in some Western European and East Asia countries, compared to firms in the US (Lin, Ma et al., 2011).

In prior studies, such chains of control are considered with respect to the weakest link, and are determined at the intermediate and ultimate level. Several studies, including Porta, Lopez-de-Silanes et al. (1999); Faccio and Lang (2002); Lin, Ma et al. (2011)) have adopted a 10% threshold to denote effective control. Firms where a single owner owns at least 10% is considered tightly held, and vice-versa. In our study, we have adopted a 5% threshold. The 5% shareholding reflects the threshold for the disclosure of substantial shareholders under the Securities and Futures Ordinance and Securities and Futures Act in Hong Kong and Singapore, respectively. Firms listed on the Hong Kong Exchanges and Clearing Limited (HKEx) and the Singapore Stock Exchange (SGX) must maintain a register of substantial shareholders as part of the listing obligation.

4.3.7 Summary statistics

A detailed description of the variables used in our study can be found in the Appendix of this chapter. For our study, the independent variables are from the fiscal year prior to the one that the dependent variable represents. Table 4.1 shows the summary statistics of the variables that we use in our study, as well as tests of the differences in means and medians between the highly-connected and less connected boards in our sample.

In our sample there the average of members per clique is 8.5 (median of 8.0 members per clique) and directors in our network are in 1.4 cliques (median of 1.0 clique), on an average. This is much smaller than the average number of 17.6 board members per firm (median of 15.0), which underlies the exclusiveness of such groupings.

We find that highly connected boards (above the median of the clique measure) are associated with larger board sizes (*board_size*) and slightly older directors (*ave_dir_age*). On average, they are less diverse in terms of the percentage of female board members (*percent_female*), but have more independent directors (*precent_non_exec*) than less connected boards. Firms with highly connected boards are also likely to have higher levels of institutional shareholdings (*institutionalholding*), lower spending on organizational capital (*sga_asset*), are older (*firm_age*), perform better (*roa*), are less liquid (*quick_ratio*), have more debt, have lower asset growth rates (*asset_growth*), are larger (*sales*); has less firm risk (*idio_stdev*), and operate in less competitive industries (*h_index*).

Table 4.1 – Summary statistics[19] and differences in means and medians

The table outlines the summary statistics of key variables used in our empirical analyses. Our sample period is from 2007 to 2014. Our dataset comprise a total of 199,406 board positions with 32,210 unique board members. This represents 2,642 listed firms in Hong Kong and Singapore during the sample period. After accounting for datapoints with missing data, our final dataset comprises 9,934 firm-years of data, representing 1,653 unique firms. All variables are winsorized at the 99th and 1st percentiles. Definitions of variables are detailed in the Appendix of this chapter. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Key variables	**Overall**	**Eigen_Clique – High**	**Eigen_Clique Low**	**Difference in means / medians**
Cliques				
Average number of directors per cliques	8.5			
Median number of directors per clique	8.0			
Average number of clique membership per director	1.4			
Median number of clique membership per director	1.0			
eigen_clique				
Mean	4.73	9.10	0.26	8.84***
Median	0.46	2.95	0.04	2.91***
Minimum	0.00	0.00	0.00	
Maximum	68.70	68.7	33.43	
Standard deviation	11.34	14.66	1.04	
ave_dir_age				
Mean	51.89	53.21	50.52	2.69***
Median	52.00	54.00	51.00	3.00***
Minimum	24.00	24.00	24.00	
Maximum	86.00	86.00	81.00	
Standard deviation	8.63	8.52	8.53	
duality				
# of dummy variable coded as 1	2,894	1,517	1,377	
percent_female				
Mean	0.052	0.042	0.062	-0.020***
Median	0.00	0.00	0.00	0.00***
Minimum	0.00	0.00	0.00	
Maximum	1.00	1.00	1.00	
Standard deviation	0.12	0.12	0.12	

(continued)

[19] The summary statistics show the mean and median for each independent variable when the board clique connectedness is high or low. For the first stage model, high (low) clique connectedness is defined as firms with above (below) median.

Table 4.1 – *Continued*

Key variables	Overall	Eigen_Clique – High	Eigen_Clique Low	Difference in means / medians
percent_non_exec				
Mean	0.63	0.66	0.61	0.05***
Median	0.67	0.69	0.64	0.05***
Minimum	0.00	0.00	0.00	
Maximum	1.00	1.00	1.00	
Standard deviation	0.21	0.19	0.22	
founder_chairman				
# of dummy variable coded as 1	1,823	905	918	
insiders5pct				
# of dummy variable coded as 1	3,945	1,636	2,309	
institutionalholding				
Mean	26.76%	28.94%	24.48%	4.46%***
Median	14.00%	20.00%	11.00%	9.00%***
Minimum	1.00%	1.00%	1.00%	
Maximum	90.00%	90.00%	90.00%	
Standard deviation	28.34%	28.72%	27.77%	
sga_asset				
Mean	0.135	0.12	0.15	-0.03
Median	0.08	0.06	0.09	-0.03***
Minimum	0.00	0.00	0.00	
Maximum	0.97	0.97	0.97	
Standard deviation	0.17	0.17	0.17	
firm_age				
Mean	28.93	31.13	26.65	4.48***
Median	23.00	24.00	22.00	2.00***
Minimum	0.00	1.00	0.00	
Maximum	196.00	196.00	170.00	
Standard deviation	22.33	25.20	18.63	
roa_prior				
Mean	3.72%	3.89%	3.53%	0.36%**
Median	4.00%	3.80%	4.20%	-0.40%
Minimum	-58.07%	-58.07%	-58.07%	
Maximum	33.95%	33.95%	33.95%	
Standard deviation	10.86%	9.48%	12.12%	
quick_ratio				
Mean	2.40	2.24	2.56	-0.32***
Median	1.31	1.26	1.36	-0.10***
Minimum	0.10	0.10	0.10	
Maximum	53.02	53.02	53.02	
Standard deviation	4.46	3.99	4.90	
debt_to_asset				
Mean	0.203	0.21	0.20	0.01**
Median	0.17	0.19	0.16	0.03***
Minimum	0.00	0.00	0.00	
Maximum	1.04	1.04	1.04	
Standard deviation	0.19	0.18	0.20	

(continued)

Table 4.1 – *Continued*

Key variables	Overall	Eigen_Clique – High	Eigen_Clique Low	Difference in means / medians
asset_growth				
Mean	0.24	0.22	0.26	-0.04***
Median	0.09	0.09	0.10	-0.01***
Minimum	-0.62	-0.62	-0.62	
Maximum	5.45	5.45	5.45	
Standard deviation	0.69	0.65	0.73	
sales				
Mean	1.28	1.28	1.28	0.00
Median	0.13	0.14	0.12	0.02***
Minimum	0.00	0.00	0.00	
Maximum	38.91	38.91	38.91	
Standard deviation	4.45	4.32	4.58	
idio_stdev				
Mean	0.36	0.33	0.40	-0.07***
Median	0.30	0.27	0.33	-0.06***
Minimum	0.08	0.08	0.08	
Maximum	1.42	1.42	1.42	
Standard deviation	0.23	0.21	0.24	
h_index				
Mean	0.35	0.34	0.36	-0.02***
Median	0.27	0.27	0.27	-0.00***
Minimum	0.08	0.08	0.08	
Maximum	0.97	0.97	0.97	
Standard deviation	0.23	0.23	0.23	
insiders5pct				
# of dummy variable coded as 1	3,945	1,636	2,309	
gdp_growth				
Mean	0.045	0.043	0.046	-0.003***
Median	0.044	0.044	0.044	0.00***
Minimum	-0.02	-0.02	-0.02	
Maximum	0.15	0.15	0.15	
Standard deviation	0.04	0.04	0.04	
wgi				
Mean	1.46	1.45	1.46	-0.010***
Median	1.45	1.44	1.47	-0.03***
Minimum	1.39	1.39	1.39	
Maximum	1.58	1.58	1.58	
Standard deviation	0.05	0.05	0.05	

In order to avoid potential issues with multicollinearity, correlation coefficients are calculated. Table 4.2 shows the correlation matrix. The board size variable (*board_size*) is highly correlated with our main variable (*clique_mean*). As a result, board size is included in the first stage models where the clique is the dependent variable, but it is excluded from the second stage models where the clique variable is used as our main independent variable.

Table 4.2 – Correlations

The table contains the correlations matrix of the variables used in our study. The table contains Pearson, Polychoric and Tetrachoric correlations taking into account the different types of variables used in the models.

	(A)	*(B)*	*(C)*	*(D)*	*(E)*	*(F)*	*(G)*	*(H)*	*(I)*	*(J)*	*(K)*	*(L)*	*(M)*	*(N)*	*(O)*	*(P)*	*(Q)*	*(R)*	*(S)*
eigen_clique_mean (A)	1.00																		
ave_dir_age (B)	0.14	1.00																	
founder_chairman (C)	-0.06	0.03	1.00																
duality (D)	0.03	0.00	0.34	1.00															
percent_female (E)	-0.13	-0.08	-0.10	-0.17	1.00														
percent_non_exec (F)	0.04	0.12	-0.01	-0.09	-0.04	1.00													
subs5pct (G)	-0.15	0.09	0.49	0.05	0.09	0.10	1.00												
institutionalholding (H)	0.03	-0.12	0.07	0.00	-0.01	-0.02	-0.08	1.00											
firm_age (I)	0.09	0.28	-0.04	-0.02	-0.06	0.01	-0.03	-0.09	1.00										
operating_roa (J)	0.03	0.00	0.08	0.01	-0.02	0.04	0.01	0.11	0.06	1.00									
sales (K)	-0.03	-0.01	0.04	0.01	0.02	-0.02	0.05	-0.01	0.01	-0.02	1.00								
sga_asset (L)	-0.13	-0.04	0.09	0.02	0.05	0.05	0.21	0.02	-0.03	-0.19	0.02	1.00							
quick_ratio (M)	-0.05	-0.05	-0.04	-0.01	0.00	0.00	-0.03	-0.02	-0.03	-0.04	0.02	-0.05	1.00						
debt_asset (N)	0.02	-0.04	-0.01	-0.01	-0.02	-0.05	0.00	-0.02	-0.04	-0.18	-0.03	-0.07	-0.23	1.00					
h_index (O)	-0.06	-0.01	-0.05	-0.06	0.03	-0.02	0.01	-0.05	-0.04	0.02	0.07	0.03	-0.03	0.03	1.00				
total_asset_growth (P)	-0.01	-0.12	-0.05	-0.04	-0.01	-0.03	-0.08	0.02	-0.10	0.09	-0.02	-0.11	0.11	0.02	0.02	1.00			
idio_stdev (Q)	-0.16	-0.13	-0.09	-0.05	0.08	0.02	0.07	-0.06	-0.15	-0.38	0.02	0.18	0.07	0.03	0.01	0.05	1.00		
gdp_growth (R)	-0.06	0.05	0.02	0.00	0.01	0.06	0.06	-0.04	0.03	0.05	-0.01	0.00	0.00	-0.02	0.02	0.02	-0.08	1.00	
wgi (S)	-0.18	0.19	0.04	-0.02	0.03	0.21	0.13	-0.25	0.07	-0.04	-0.04	0.02	0.00	0.01	0.05	-0.06	0.13	0.16	1.00

4.4 Empirical results

For all of our difference dependent variables, we use a two-stage approach in which the dependent variable for the first stage model[20] is a dummy variable, where it equals one when board connectedness is above the sample median and zero otherwise. Tables 4.3 to 4.6 show the empirical results for the second stage for each of our hypotheses in order. Table 4.3 presents the results of the ZOIB models for borrowing costs. The columns numbered 1a and 1b show the results when the main connectedness variable is the predicted value of the clique measure derived in the first stage of our combined Heckman and mixture model. The results numbered 2a and 2b present the results when the predicted clique score is interacted with the insider shareholder dummy variable (*insider5pct*) showing the effects of clique connectedness in family firms. In Tables 4.4, 4.5 and 4.6 show the results for bank debt, unsecured debt and short-term debt, respectively. The results in these tables numbered 1a to 1c show the main results and numbers 2a to 2c show the results when the predicted clique score is interacted with the insider shareholder dummy variable (*insider5pct*). In all of our models, the results denoted 'a' are estimated using the proportions data, results marked 'b' are for observations where the dependent variable is a 0 and the results where the dependent variable takes the value of 1 are denoted 'c'.

4.4.1 Effects of clique connectedness on firm borrowing cost

In Table 4.3, our results for the proportions data show that board clique connectedness is negatively associated with borrowing costs suggesting that being in the inner circle of the directors' network has significant benefits for the firm, which supports hypothesis 1

[20] For brevity, the results for the 1st stage probit model are not presented in this paper, since it is only used to calculate the predicted values used in the 2nd stage of the mixture model.

(*H1*). Our result is consistent with the findings in several studies that attributed the lower cost of financing to a reduction in information asymmetry (Ajinkya, Bhojraj et al., 2005; Karamanou & Vafeas, 2005; Wu & Sorensen, 2013), or the reduction of agency costs for debt holders giving lenders more confidence about the repayment of their loans (Bhojraj & Sengupta, 2003; Anderson, Mansi et al., 2004; Ashbaugh-Skaife, Collins et al., 2006; Piot & Missonier-Piera, 2007; Ertugrul & Hegde, 2008; Fields, Fraser et al., 2012).

In addition, our results show that firms with older directors have lower borrowing cost. Age of the director is used as a general proxy for directors' experience (Campbell, Campbell et al., 2012). Our results seem to suggest that lenders are willing to accept lower returns on their loans because the firm is in the stewardship of experienced directors. This evidence is congruent with the findings in Fields, Fraser et al. (2012) where the authors find directors' experience lowers borrowing costs.

The presence of an insider with a substantial shareholding in the firm (*insider5pct*) lowers borrowing costs for the firm which could be attributed to superior monitoring. This is consistent with findings in Grossman and Hart (1980b) that monitoring is justified only if an equity owner has a sufficiently large stake to internalize the cost of corporate control. However, we find that the presence of an insider shareholder together with a highly connected board result in higher borrowing costs, evidenced by the positive coefficient in the interaction term in Model 2a, which seems at odds with the previous finding.

Prior studies find that institutional ownership can promote higher standards of corporate governance and reporting leading to better investment decisions and a reduction in the probability of financial distress (Rajgopal & Venkatachalam, 1997;

Chung, Firth et al., 2002; Hartzell & Starks, 2003; Roberts & Yuan, 2010). However, our results indicate that institutional holdings increase borrowing costs suggesting that lenders may worry that the firms is risk shifting at the expense of lenders (Fama & Miller, 1972; Jensen & Meckling, 1976; Myers, 1977).

The results for the zero-inflated models (Models 1b and 2b) show that, firms with highly connected directors are more likely to borrow, suggesting that lenders see the benefit of having highly connected directors on borrowers' boards. We also find that firms with no borrowings are likely to have a founder-chairman. This may be linked to founders' concern over potential loss of control of the business to lenders if the firm performs poorly, as this may derail their plans to hand the firm to their descendants (Anderson & Reeb, 2003b). In addition, we find some evidence in Model 2b that firms with insider shareholders are more likely to borrow. However, when such firms are associated with highly connected boards the likelihood of borrowing decreases.

Table 4.3 – Results on impact of clique connectedness on borrowing cost

The table reports results of the 2nd stage mixture model regression. The dependent variable is *borrowing_cost*. Columns 1a and 2a show the results for firms with borrowing cost (interest rate) between 0 and 1. Columns 1b and 2b present the results for zero-inflated models, for firms with zero borrowing cost (firms with no borrowings). The columns numbered 1a and 1b show the results when the main connectedness variable is predicted value of the clique measure (our main results). The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Columns numbered 2a and 2b present the results when predicted clique score is interacted with the insider shareholder dummy variable (*insider5pct*) showing the effects of clique connectedness in firms with insider shareholders. Definitions of independent variables are detailed in the Appendix of this chapter. The z-scores are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Proportions (Columns 1a and 2a)		**Zero-Inflated (Columns 1b and 2b)**	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
Predicted connectedness measures (based on clique)	-0.097 **	-0.191 ***	-0.570 **	-1.316 ***
	(-1.97)	(-3.34)	(-2.38)	(-4.46)
ave_dir_age	-0.008 ***	-0.008 ***	-0.004	-0.002
	(-5.95)	(-5.97)	(-0.58)	(-0.35)
founder_chairman	0.028	0.028	0.418 ***	0.459 ***
	(1.21)	(1.20)	(3.03)	(3.32)
duality	0.021	0.016	-0.158	-0.188 *
	(1.01)	(0.78)	(-1.51)	(-1.78)
percent_female	0.174	0.196	-0.469	-0.419
	(1.19)	(1.35)	(-0.63)	(-0.56)
percent_non_exec	-0.003	-0.021	0.029	-0.049
	(-0.04)	(-0.35)	(0.09)	(-0.16)
insider5pct	-0.077 ***	-0.191 ***	-0.089	-0.859 ***
	(-3.65)	(-4.71)	(-0.88)	(-4.26)
predicted connectedness score x insider5pct		0.220 ***		1.476 ***
		(3.29)		(4.42)
institutionalholding	0.001 **	0.001 **	0.001	0.001
	(2.23)	(2.08)	(0.62)	(0.41)
firm_age	-0.004 ***	-0.004 ***	0.005 *	0.006 **
	(-7.39)	(-7.27)	(1.74)	(2.05)

(continued)

Table 4.3 – *Continued*

	Proportions (Columns 1a and 2a)		Zero-Inflated (Columns 1b and 2b)	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**
	coefficient	*coefficient*	*coefficient*	*coefficient*
	(z-score)	*(z-score)*	*(z-score)*	*(z-score)*
roa_prior	-0.002 **	-0.002 **	0.010 **	0.010 **
	(-2.04)	(-2.18)	(2.05)	(2.02)
sales	0.003 *	0.003 *	-0.004	-0.005
	(1.75)	(1.72)	(-0.43)	(-0.5)
sga_asset	-0.104	-0.097	-1.582 ***	-1.610 ***
	(-1.63)	(-1.53)	(-5.05)	(-5.13)
quick_ratio	-0.012 ***	-0.013 ***	-0.163 ***	-0.173 ***
	(-2.77)	(-2.88)	(-6.31)	(-6.65)
debt_to_asset	0.170 *	0.174 *	-0.315	-0.177
	(1.91)	(1.95)	(-0.36)	(-0.2)
h_index	-0.055	-0.061	-0.551 **	-0.631 ***
	(-1.37)	(-1.52)	(-2.55)	(-2.90)
total_asset_growth	0.041 ***	0.039 ***	-0.002	-0.012
	(2.98)	(2.84)	(-0.03)	(-0.18)
idio_stdev	0.128 **	0.129 **	-0.982 ***	-1.025 ***
	(2.54)	(2.55)	(-3.83)	(-3.98)
gdp_growth	-0.517	-0.509	-2.665	-2.808
	(-0.67)	(-0.66)	(-0.7)	(-0.73)
wgi	-2.259 ***	-2.306 ***	-4.814 *	-5.183 *
	(-4.52)	(-4.62)	(-1.78)	(-1.91)
imr	0.292 ***	0.300 ***	7.776 ***	7.981 ***
	(3.10)	(3.2)	(12.4)	(12.69)
_cons	1.234 *	1.358 *	4.111	4.912
	(1.69)	(1.86)	(1.03)	(1.23)
χ	557.75 ***	574.31 ***	557.75 ***	574.31 ***
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

4.4.2 Effects of clique connectedness and the level of bank debt

Table 4.4 presents the results for the effects of clique connectedness on firms' use of bank debt. The results for the proportions data show that clique connectedness reduces the use of bank debt, supporting hypothesis 2 (*H2*). The results are consistent with well-connected directors who wish to preserve their reputation being more likely to challenge management decisions which, in turn, enhances monitoring (Fama, 1980b; Ruiz-Verdú & Singh, 2014). We also find the average age of directors (*ave_dir_age*) is positively associated to the dependent variable which suggests that firms with more experienced directors use more bank debt.

Furthermore, we find that having insider shareholders with substantial shareholding has a positive effect on the level of bank debt used by the firm which is shown by model 2a in table 4.4. This provides support for *H-2A* and may be due to the comfort banks have developed via the intimate relationship built with some insider shareholders including family firms, over time (Schumpeter, 1939; Roberts & Yuan, 2010).

From the zero-inflated models we report that firms that have directors with high clique connectedness and founder-chairman of the board are more likely to have bank debt which underlies the importance of relationships in bank borrowing (Schumpeter, 1939; Roberts & Yuan, 2010). In addition, we find evidence that high female representation on the board reduces the likelihood of the firm not having any bank debt, perhaps suggesting that prudent female directors recognize the benefit of bank debt as a supplement to monitoring (Fama, 1985) and the enhancement of firm value (James, 1987). Conversely, we find that high institutional shareholding increases the likelihood

of the firm not borrowing from banks (Models 1b and 2b), which may suggest a potential clash between two superior monitors of the firm.

Considering the firms that use only bank debt (the one-inflated models), we find that high clique connectedness makes firms less likely to use only bank debt, reflecting the concerns of these directors on the risk of over relying a single source of financing. Conversely, firms with older directors and a founder-chairman are more likely to use only bank debt, which once again underscores the relationship nature of bank lending. Such firms also tend to have lower levels of female representation, which suggests higher risk taking by male dominated boards when firms rely exclusively on banks (Byrnes, Miller et al., 1999; Adams & Funk, 2009; Sapienza, Zingales et al., 2009). Furthermore, firms that have more independent boards providing better monitoring (Anderson, Mansi et al., 2004; Fields, Fraser et al., 2012) are more likely to borrow solely from banks. Given that banks become the only lender to these firms, such superior monitoring affords additional security for the lenders. In addition, our results show that insider shareholders, which include family firms, are less likely to borrow only from banks which underscores the importance of managing the risk to preserve family wealth and reputation (Anderson & Reeb, 2003b; Boyde, 2013). However, such concern seems to be ameliorated when a family firm has a highly connected board, as suggested by the interaction term in Model 2c which once again provides support for *H-2A*. We also find that firms with higher institutional ownership are more likely to borrow only from banks, perhaps reflecting superior relationship these institutional investors have with banks.

Table 4.4 – Results on impact of clique connectedness on level of bank debt

The table reports the results of the 2nd stage mixture model regression. The dependent variable is *bankdebt_totaldebt*. Columns 1a and 2a show the results for firms with proportion of bank debt to total debt of between 0 and 1. Columns 1b and 2b present the results for zero-inflated models, for firms with no bank debt. Columns 1c and 2c depict the results for one-inflated models, for firms that only borrow from banks. The columns numbered 1a and 1b show the results when the main connectedness variable is predicted value of the clique measure (our main results). The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Columns numbered 2a and 2b present the results when predicted clique score is interacted with the insider shareholder dummy variable (*insider5pct*) showing the effects of clique connectedness in firms with insider shareholders. Definitions of independent variables are detailed in the Appendix of this chapter. The z-scores are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Proportions (columns 1a and 2a)		**Zero-Inflated (columns 1b and 2b)**		**One-Inflated (columns 1c and 2c)**	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**	**(1c)**	**(2c)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
Predicted connectedness measures (based on clique)	-0.606 ***	-0.807 ***	-0.644 **	-0.365	-0.800 ***	-1.391 ***
	(-5.16)	(-5.79)	(-2.05)	(-0.94)	(-4.33)	(-6.33)
ave_dir_age	0.020 ***	0.020 ***	-0.003	-0.003	0.009 *	0.009 *
	(5.93)	(5.88)	(-0.29)	(-0.29)	(1.7)	(1.78)
founder_chairman	0.033	0.034	-0.686 ***	-0.69 ***	0.158 *	0.169 *
	(0.57)	(0.60)	(-3.90)	(-3.92)	(1.81)	(1.92)
duality	0.065	0.056	0.149	0.157	-0.034	-0.058
	(1.32)	(1.14)	(1.12)	(1.18)	(-0.44)	(-0.74)
percent_female	0.225	0.276	-1.894 *	-1.969 **	-1.315 **	-1.199 **
	(0.61)	(0.74)	(-1.91)	(-1.98)	(-2.18)	(-2.00)
percent_non_exec	0.217	0.188	0.208	0.248	1.096 ***	1.031 ***
	(1.44)	(1.25)	(0.54)	(0.64)	(4.64)	(4.35)
insider5pct	0.227 ***	-0.008	-0.078	0.193	-0.108	-0.804 ***
	(4.34)	(-0.08)	(-0.57)	(0.73)	(-1.35)	(-5.05)
predicted connectedness score x insider5pct		0.433 ***		-0.54		1.285 ***
		(2.68)		(-1.20)		(5.06)
institutionalholding	0.001	0.001	0.005 **	0.005 **	0.006 ***	0.006 ***
	(1.56)	(1.58)	(2.07)	(2.10)	(4.70)	(4.48)
firm_age	0.000	0.000	0.004	0.003	-0.002	-0.002
	(-0.36)	(-0.24)	(1.27)	(1.12)	(-1.19)	(-1.00)

(continued)

Table 4.4 – *Continued*

	Proportions (columns 1a and 2a)		Zero-Inflated (columns 1b and 2b)		One-Inflated (columns 1c and 2c)	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**	**(1c)**	**(2c)**
	coefficient	*coefficient*	*coefficient*	*coefficient*	*coefficient*	*coefficient*
	(z-score)	*(z-score)*	*(z-score)*	*(z-score)*	*(z-score)*	*(z-score)*
roa_prior	0.007 **	0.007 **	-0.035 ***	-0.034 ***	-0.005	-0.005
	(2.22)	(2.19)	(-5.41)	(-5.38)	(-0.99)	(-1.13)
sales	0.010 **	0.010 **	-0.054 ***	-0.055 ***	-0.013 *	-0.013 *
	(2.09)	(2.12)	(-2.91)	(-2.95)	(-1.70)	(-1.73)
sga_asset	-0.128	-0.105	0.992 ***	0.98 ***	0.474 **	0.515 **
	(-0.81)	(-0.66)	(2.75)	(2.71)	(2.08)	(2.25)
quick_ratio	0.001	0.001	0.149 ***	0.150 ***	0.042 ***	0.042 ***
	(0.13)	(0.08)	(7.48)	(7.53)	(2.67)	(2.64)
debt_to_asset	0.197	0.190	-4.770 ***	-4.756 ***	-2.731 ***	-2.785 ***
	(1.35)	(1.30)	(-10.95)	(-10.91)	(-10.88)	(-11.07)
h_index	-0.216 **	-0.237 **	1.440 ***	1.467 ***	0.378 **	0.336 **
	(-2.11)	(-2.30)	(5.45)	(5.53)	(2.34)	(2.06)
total_asset_growth	-0.160 ***	-0.165 ***	0.371 ***	0.377 ***	-0.210 ***	-0.224 ***
	(-4.03)	(-4.16)	(4.69)	(4.75)	(-2.64)	(-2.81)
idio_stdev	-0.095	-0.092	2.366 ***	2.361 ***	-0.128	-0.115
	(-0.65)	(-0.63)	(7.40)	(7.39)	(-0.52)	(-0.47)
gdp_growth	-2.826	-2.966	-10.446 **	-10.418 **	1.920	1.823
	(-1.50)	(-1.58)	(-2.00)	(-1.99)	(0.65)	(0.61)
wgi	-2.609 **	-2.730 **	1.402	1.500	1.651	1.375
	(-2.13)	(-2.23)	(0.43)	(0.46)	(0.84)	(0.70)
imr	-0.591	-0.619	-9.191 ***	-9.170 ***	-2.659 *	-2.731 *
	(-0.66)	(-0.69)	(-5.52)	(-5.53)	(-1.69)	(-1.74)
_cons	4.190 **	4.493 **	-4.248	-4.502	-3.381	-2.687
	(2.34)	(2.51)	(-0.88)	(-0.93)	(-1.17)	(-0.92)
χ	294.98 ***	304.49 ***	294.98 ***	304.49 ***	294.98 ***	304.49 ***
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

4.4.3 Effects of clique connectedness and the level of unsecured debt

Table 4.5 presents the results for the effects of clique connectedness on the firm's use of unsecured debt. The results for the proportions models for unsecured debt show a positive relation with the clique measure providing support for hypothesis 3 (*H3*), which states that high clique connectedness increases the use of unsecured debt. This presents a funding advantage for firms as they are able obtain higher level of leverage with a given amount of assets. Our finding is consistent with prior studies that attribute this phenomenon to both the reduction of information asymmetry (Ajinkya, Bhojraj et al., 2005; Karamanou & Vafeas, 2005; Wu & Sorensen, 2013) as well as the enhancement of monitoring with reputable directors on the board (Fama, 1980b; Masulis & Mobbs, 2014; Ruiz-Verdú & Singh, 2014).

The coefficients of both board diversity and independence (*percent_female* and *percent_non_exec*) are negative. This may be explained that the risks and the indirect costs of using high levels of unsecured debt may be countered by the benefit of having a more risk averse board (Byrnes, Miller et al., 1999; Adams & Funk, 2009; Sapienza, Zingales et al., 2009), since such directors are concerned about their professional reputations (Masulis & Mobbs, 2014). In addition, we find some weak evidence of a positive association between institutional ownership and the level of unsecured debt. This could be explained by firms extending the use of unsecured debt to deliver superior firm performance in order to meet the return expectations of institutional investors, since firms can obtain higher level of leverage with a given level of assets.

From the zero-inflated models, we find that firms with highly connected boards are less likely to have no unsecured debt which seems reasonable since the use of some amount of unsecured debt may alleviate any constraints on borrowing that the firm may

have. These firms tend to have older directors, which is consistent with the findings in Muth and Donaldson (1998) that older directors are more risk averse about unsecured borrowing. In addition, firms with a founder-chairman on their boards are also more likely to use unsecured debt. We find these firms have a higher likelihood of more diverse boards, in terms of female representation and independent directors, which is consistent with these directors being relatively risk averse. Furthermore, we find that firms with no unsecured debt are more likely to have higher level of institutional shareholding, which seems to suggest that these investors are worried about risk of unsecured borrowing. Our results from the one-inflated models in respect of female representation and institutional shareholders are similar to those in the models for the proportions.

Table 4.5 – Results on impact of clique connectedness on level of unsecured debt

The table reports the results of the 2nd stage mixture model regression. The dependent variable is *unsecured_totaldebt*. Columns 1a and 2a show the results for firms with proportion of unsecured debt to total debt of between 0 and 1. Columns 1b and 2b present the results for zero-inflated models, for firms with no unsecured debt. Columns 1c and 2c depict the results for one-inflated models, for firms that only borrow on an unsecured basis. The columns numbered 1a and 1b show the results when the main connectedness variable is predicted value of the clique measure (our main results). The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Columns numbered 2a and 2b present the results when predicted clique score is interacted with the insider shareholder dummy variable (*insider5pct*) showing the effects of clique connectedness in firms with insider shareholders. Definitions of independent variables are detailed in the Appendix of this chapter. The z-scores are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Proportions (columns 1a and 2a)		**Zero-Inflated (columns 1b and 2b)**		**One-Inflated (columns 1c and 2c)**	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**	**(1c)**	**(2c)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
Predicted connectedness measures (based on clique)	0.685 ***	0.672 ***	-1.475 ***	-1.385 ***	0.191	0.226
	(5.49)	(4.69)	(-6.73)	(-5.51)	(0.87)	(0.89)
ave_dir_age	0.002	0.002	0.022 ***	0.022 ***	-0.002	-0.002
	(0.68)	(0.68)	(3.76)	(3.76)	(-0.30)	(-0.30)
founder_chairman	-0.026	-0.026	-0.339 ***	-0.338 ***	-0.056	-0.056
	(-0.43)	(-0.43)	(-3.16)	(-3.15)	(-0.49)	(-0.50)
duality	-0.032	-0.032	0.028	0.027	0.097	0.098
	(-0.61)	(-0.61)	(0.30)	(0.29)	(1.02)	(1.02)
percent_female	-1.640 ***	-1.642 ***	2.382 ***	2.379 ***	-3.000 ***	-2.996 ***
	(-3.14)	(-3.14)	(2.65)	(2.65)	(-2.93)	(-2.92)
percent_non_exec	-1.007 ***	-1.007 ***	1.986 ***	1.99 ***	-0.064	-0.062
	(-5.58)	(-5.59)	(5.98)	(5.99)	(-0.20)	(-0.19)
insider5pct	-0.007	-0.024	0.025	0.127	0.070	0.118
	(-0.15)	(-0.24)	(0.31)	(0.78)	(0.80)	(0.61)
predicted connectedness score x insider5pct		0.031		-0.218		-0.086
		(0.18)		(-0.72)		(-0.28)
institutionalholding	0.002 *	0.002 *	0.006 ***	0.006 ***	0.003 **	0.003 **
	(1.70)	(1.69)	(4.08)	(4.09)	(2.19)	(2.20)
firm_age	0.000	0.000	-0.004 *	-0.004 *	0.003	0.003
	(0.42)	(0.41)	(-1.67)	(-1.66)	(1.47)	(1.47)

(continued)

Table 4.5 – *Continued*

	Proportions (columns 1a and 2a)		Zero-Inflated (columns 1b and 2b)		One-Inflated (columns 1c and 2c)	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**	**(1c)**	**(2c)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
roa_prior	0.006 *	0.006 *	0.013 **	0.013 **	-0.021 ***	-0.021 ***
	(1.68)	(1.68)	(2.36)	(2.34)	(-4.09)	(-4.10)
sales	-0.008	-0.008	-0.026 **	-0.026 **	0.02 **	0.021 **
	(-1.42)	(-1.42)	(-2.42)	(-2.41)	(2.41)	(2.41)
sga_asset	0.798 ***	0.796 ***	0.933 ***	0.934 ***	0.23	0.231
	(4.47)	(4.46)	(3.50)	(3.5)	(0.77)	(0.77)
quick_ratio	-0.009	-0.009	0.101 ***	0.101 ***	-0.001	-0.001
	(-0.94)	(-0.95)	(5.64)	(5.65)	(-0.05)	(-0.05)
debt_to_asset	0.195	0.195	-3.026 ***	-3.02 ***	-2.435 ***	-2.436 ***
	(1.08)	(1.08)	(-8.20)	(-8.19)	(-7.21)	(-7.21)
h_index	0.254 **	0.254 **	0.126	0.128	0.346 *	0.347 *
	(2.42)	(2.42)	(0.68)	(0.70)	(1.91)	(1.92)
total_asset_growth	0.042	0.043	-0.240 ***	-0.241 ***	0.008	0.008
	(1.09)	(1.10)	(-2.74)	(-2.75)	(0.12)	(0.12)
idio_stdev	0.268 *	0.268 *	0.618 ***	0.614 ***	-0.224	-0.225
	(1.84)	(1.84)	(2.70)	(2.69)	(-0.84)	(-0.85)
gdp_growth	-2.125	-2.122	1.211	1.175	4.267	4.245
	(-1.06)	(-1.06)	(0.34)	(0.33)	(1.08)	(1.07)
wgi	-1.356	-1.342	-2.595	-2.691	1.787	1.742
	(-1.02)	(-1.01)	(-1.15)	(-1.19)	(0.65)	(0.63)
imr	0.847	0.849	-2.033 **	-2.030 **	1.971 *	1.964 *
	(1.57)	(1.57)	(-2.30	(-2.29)	(1.90)	(1.90)
_cons	2.331	2.316	0.166	0.273	-3.127	-3.076
	(1.20)	(1.19)	(0.05)	(0.08)	(-0.77)	(-0.75)
χ	191.98 ***	192.03 ***	191.98 ***	192.03 ***	191.98 ***	192.03 ***
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

4.4.4 Effects of clique connectedness and the level of short-term debt

Table 4.6 presents the results for the effects of clique connectedness on the use of short-term debt. The results for the proportion models show that stronger board connectedness is associated with lower levels of short-term debt, supporting hypothesis 4 (*H4*). This result is in line with that of several prior studies that find firms with well-connected boards use less short-term debt as their directors are concerned about the loss of reputation following the failure of the firm (Fama, 1980b; Masulis & Mobbs, 2014; Ruiz-Verdú & Singh, 2014). The explanation for this result is similar to that of bank debt, i.e. in their attempt to preserve their reputation well-connected directors would not wish to expose the firm to the higher risk associated with increased levels of short-term debt.

We find weak evidence of the positive effects of average directors' age on the level of short-term borrowing. In addition, we find weak evidence of the negative impacts of duality on firms' use of short-term debt, which is consistent with the findings in Kim and Buchanan (2011) that duality reduces risk-taking propensity. Furthermore, our results show positive associations between board independence and institutional ownership and the use of short-term debt. These findings seem inconsistent with the risk inherent in the excessive use of short-term debt but may be reconciled with the need for firms to use cheaper short-term debt in order to achieve better efficiency, or that debt providers are less willing to lend to these firms on a long-term basis (Ang, 1992).

From the zero-inflated models, we find that firms with no short-term debt are likely to have younger and more independent directors, which seems to indicate that these directors may care for their careers and may not wish to bear the risk of refinancing with respect to short-term borrowings (Diamond, 1991). In addition, we find

weak evidence of a founder-chairman preferring their firms to borrow debt on a short-term basis. This could be due to long standing ties that founders build with short-term debt providers, which are largely banks, and is in line with the findings in Schumpeter (1939) and Roberts and Yuan (2010). Finally, our results also show that institutional investors in this group are likely to shun the use of this type of debt.

Our results from the one-inflated models show firms that borrow only on a short-term basis are less likely to have directors possessing inner circle connectedness. In addition, such firms are likely to have younger directors and lower levels of female representation, which are usually associated with higher risk taking. The independent directors and the institutional shareholders seem to have a different view on risk-taking from those in the zero debt subsample, as evidenced by the higher likelihood of the firm using only short-term debt. Additionally, we find some evidence that insider shareholder prefer their firms to fund themselves solely with short-term debt, which exposes the firms to refinancing risks (Diamond, 1991).

Table 4.6 – Results on impact of clique connectedness on level of short-term debt

The table reports the results of the 2nd stage mixture model regression. The dependent variable is *st_totaldebt*. Columns 1a and 2a show the results for firms with proportion of short-term debt to total debt of between 0 and 1. Columns 1b and 2b present the results for zero-inflated models, for firms with zero short-term debt. Columns 1c and 2c depict the results for one-inflated models, for firms that only have debt of equal or less than one year (short-term basis). The columns numbered 1a and 1b show the results when the main connectedness variable is predicted value of the clique measure (our main results). The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Columns numbered 2a and 2b present the results when predicted clique score is interacted with the insider shareholder dummy variable (*insider5pct*) showing the effects of clique connectedness in firms with insider shareholders. Definitions of independent variables are detailed in the Appendix of this chapter. The z-scores are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Proportions (columns 1a and 2a)		**Zero-Inflated (columns 1b and 2b)**		**One-Inflated (columns 1c and 2c)**	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**	**(1c)**	**(2c)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
Predicted connectedness measures (based on clique)	-0.709 ***	-0.731 ***	0.037	0.019	-1.435 ***	-1.126 ***
	(-5.57)	(-5.05)	(0.19)	(0.09)	(-4.69)	(-3.26)
ave_dir_age	0.006 *	0.006 *	-0.012 **	-0.012 **	-0.019 **	-0.019 **
	(1.76)	(1.77)	(-2.38)	(-2.38)	(-2.5)	(-2.48)
founder_chairman	0.019	0.019	-0.198 *	-0.198 *	-0.090	-0.093
	(0.27)	(0.27)	(-1.81)	(-1.81)	(-0.53)	(-0.55)
duality	-0.095 *	-0.094 *	0.028	0.028	0.098	0.094
	(-1.81)	(-1.81)	(0.35)	(0.35)	(0.83)	(0.79)
percent_female	-0.453	-0.452	-0.039	-0.040	-3.184 ***	-3.177 ***
	(-1.04)	(-1.03)	(-0.06)	(-0.07)	(-3.14)	(-3.13)
percent_non_exec	0.368 **	0.366 **	0.778 ***	0.777 ***	1.677 ***	1.696 ***
	(2.11)	(2.10)	(2.96)	(2.96)	(4.21)	(4.26)
insider5pct	-0.004	-0.031	-0.013	-0.037	0.194 *	0.527 **
	(-0.08)	(-0.32)	(-0.18)	(-0.24)	(1.68)	(2.50)
predicted connectedness score x insider5pct		0.051		0.044		-0.721 *
		(0.32)		(0.18)		(-1.88)
institutionalholding	0.002 *	0.002 *	0.004 ***	0.004 ***	0.012 ***	0.012 ***
	(1.74)	(1.74)	(3.22)	(3.22)	(6.23)	(6.21)
firm_age	-0.001	-0.001	0.000	0.000	-0.008 **	-0.008 **
	(-0.52)	(-0.52)	(0.26)	(0.26)	(-2.01)	(-1.98)

(continued)

Table 4.6 – *Continued*

	Proportions (columns 1a and 2a)		Zero-Inflated (columns 1b and 2b)		One-Inflated (columns 1c and 2c)	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**	**(1c)**	**(2c)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
roa_prior	-0.003	-0.003	0.004	0.004	-0.004	-0.004
	(-1.00)	(-0.99)	(0.94)	(0.94)	(-0.7)	(-0.73)
sales	-0.006	-0.006	-0.017 *	-0.017 *	-0.046 ***	-0.046 ***
	(-1.23)	(-1.24)	(-1.93)	(-1.93)	(-3.21)	(-3.21)
sga_asset	0.833 ***	0.831 ***	0.101	0.100	1.351 ***	1.360 ***
	(3.85)	(3.84)	(0.3)	(0.30)	(2.75)	(2.76)
quick_ratio	0.017	0.017	0.083 ***	0.083 ***	0.060 **	0.060 **
	(1.52)	(1.53)	(4.47)	(4.47)	(2.38)	(2.36)
debt_to_asset	-0.868 ***	-0.868 ***	-1.573 ***	-1.573 ***	-5.038 ***	-5.029 ***
	(-6.26)	(-6.26)	(-7.00)	(-7.00)	(-12.22)	(-12.2)
h_index	0.087	0.087	-0.067	-0.067	0.095	0.100
	(0.84)	(0.83)	(-0.42)	(-0.42)	(0.40)	(0.42)
total_asset_growth	-0.061	-0.060	-0.033	-0.033	-0.146	-0.149
	(-1.47)	(-1.46)	(-0.56)	(-0.55)	(-1.45)	(-1.48)
idio_stdev	0.772 ***	0.773 ***	0.037	0.037	1.000 **	0.987 **
	(4.35)	(4.36)	(0.14)	(0.14)	(2.50)	(2.46)
gdp_growth	0.741	0.722	-0.659	-0.655	-3.474	-3.503
	(0.37)	(0.36)	(-0.22)	(-0.22)	(-0.75)	(-0.76)
wgi	-3.347 **	-3.338 **	-1.084	-1.064	-5.186	-5.474 *
	(-2.43)	(-2.42)	(-0.52)	(-0.51)	(-1.60)	(-1.69)
imr	-0.529	-0.528	1.951 **	1.953 **	0.683	0.622
	(-0.86)	(-0.85)	(2.28)	(2.28)	(0.41)	(0.38)
_cons	4.67 **	4.665 **	0.604	0.581	6.684	6.985
	(2.35)	(2.34)	(0.20)	(0.19)	(1.43)	(1.50)
χ	382.63 ***	382.77 ***	394.56 ***	382.77***	382.63 ***	382.77 ***
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

4.5 Robustness tests

4.5.1 Controlling for the level of unsecured borrowing

In analyzing the borrowing costs we have used the explicit interest cost incurred by the sample firms. However, the presence (absence) of collateral could reduce (increase) the cost of borrowing, since the level of comfort that lenders derive from possessing (not possessing) collateral would be markedly different. As a robustness test, we take into account and control for the level of unsecured borrowing. We do so by introducing a new control variable, the ratio of unsecured debt over total assets (*unsecuredebt_totalasset*), even though we have already controlled for the overall level of leverage using the variable, *debt_to_asset*[21].

Table 4.7 shows the results for these models and we find that our main regression results remain robust. The main independent variable remains negatively related to the borrowing cost and statistically significant at the 1% level. The results for the other independent variables remain consistent with our main results in Table 4.3.

[21] There is no multicollinearity as these two variables are uncorrelated.

Table 4.7 – Robustness test based on impact of clique connectedness on borrowing cost controlling for level of unsecured debt

The table reports results of the robustness test which is the 2nd stage mxiture regression. The dependent variable is *borrowing_cost*. The additional control variable is *unsecured_totalassets*. Columns 1a to 3a show the results for firms with borrowing cost (interest rate) between 0 and 1. Columns 1b to 3b present the results for zero-inflated models, for firms with zero borrowing cost (firms with no borrowings). The columns numbered 1a and 1b show the results when the main connectedness variable is predicted value of the clique measure (our main results). The *predicted connectedness* variable is the fitted value derived from the first stage discrete choice model (unreported). Columns numbered 2a and 2b present the results when predicted clique score is interacted with the insider shareholder dummy variable (*insider5pct*) showing the effects of clique connectedness in firms with insider shareholders. Definitions of independent variables are detailed in the Appendix of this chapter. The z-scores are reported in parentheses. The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Proportions (Columns 1a and 2a)		**Zero-Inflated (Columns 1b and 2b)**	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
unsecured_totalassets	-0.029	-0.027	0.064	0.050
	(-0.67)	(-0.63)	(0.33)	(0.26)
Predicted connectedness measures (based on clique)	-0.109 **	-0.190 ***	-0.523 **	-1.260 ***
	(-2.16)	(-3.28)	(-2.15)	(-4.22)
ave_dir_age	-0.008 ***	-0.008 ***	-0.004	-0.002
	(-5.79)	(-5.81)	(-0.53)	(-0.28)
founder_chairman	0.026	0.026	0.378 ***	0.421 ***
	(1.09)	(1.10)	(2.7)	(2.99)
duality	0.016	0.011	-0.147	-0.177 *
	(0.76)	(0.55)	(-1.39)	(-1.66)
percent_female	0.184	0.202	-0.526	-0.478
	(1.25)	(1.39)	(-0.70)	(-0.63)
percent_non_exec	0.018	0.002	-0.040	-0.116
	(0.3)	(0.04)	(-0.13)	(-0.37)
insider5pct	-0.081 ***	-0.18 ***	-0.095	-0.859 ***
	(-3.80)	(-4.38)	(-0.93)	(-4.21)
predicted connectedness score x insider5pct		0.192 ***		1.465 ***
		(2.82)		(4.33)
institutionalholding	0.001 **	0.001 *	0.001	0.001
	(2.02)	(1.89)	(0.82)	(0.63)

(continued)

Table 4.7 – *Continued*

	Proportions (Columns 1a and 2a)		Zero-Inflated (Columns 1b and 2b)	
Other independent variables	**(1a)**	**(2a)**	**(1b)**	**(2b)**
	coefficient (z-score)	*coefficient (z-score)*	*coefficient (z-score)*	*coefficient (z-score)*
firm_age	-0.004 ***	-0.004 ***	0.004	0.005 *
	(-7.22)	(-7.10)	(1.52)	(1.82)
roa_prior	-0.003 **	-0.003 ***	0.009 *	0.009 *
	(-2.47)	(-2.58)	(1.79)	(1.74)
sales	0.004 *	0.004 *	-0.004	-0.005
	(1.82)	(1.80)	(-0.45)	(-0.51)
sga_asset	-0.119 *	-0.113 *	-1.557 ***	-1.577 ***
	(-1.84)	(-1.74)	(-4.91)	(-4.96)
quick_ratio	-0.012 ***	-0.012 ***	-0.161 ***	-0.17 ***
	(-2.57)	(-2.66)	(-6.17)	(-6.49)
debt_to_asset	0.155 *	0.157 *	-0.314	-0.190
	(1.70)	(1.73)	(-0.36)	(-0.22)
h_index	-0.055	-0.060	-0.531 **	-0.604 ***
	(-1.35)	(-1.47)	(-2.43)	(-2.75)
total_asset_growth	0.042 ***	0.04 ***	0.008	-0.002
	(2.99)	(2.86)	(0.11)	(-0.04)
idio_stdev	0.141 ***	0.142 ***	-0.943 ***	-0.980 ***
	(2.77)	(2.79)	(-3.64)	(-3.76)
gdp_growth	-0.733	-0.725	-3.486	-3.598
	(-0.93)	(-0.92)	(-0.90)	(-0.92)
wgi	-2.355 ***	-2.394 ***	-4.938 *	-5.287 *
	(-4.64)	(-4.72)	(-1.8)	(-1.92)
imr	0.268 ***	0.275 ***	7.712 ***	7.900 ***
	(2.80)	(2.87)	(12.17)	(12.43)
_cons	1.388 *	1.493 **	4.322	5.089
	(1.87)	(2.01)	(1.07)	(1.25)
χ	548.49 ***	561.32 ***	548.49 ***	561.32 ***
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

4.5.2 Different levels of insider shareholding

We adopted a 5% shareholding threshold to control for a possible control-ownership wedge, which is one of the key concerns in several prior studies relating to corporate governance in East Asian firms (Claessens, Djankov et al., 2000a; Lemmon & Lins, 2003; Lin, Ma et al., 2011; Masulis & Mobbs, 2014). As a robustness check, we altered the threshold level to 10%, 20% and 50% and re-estimated our models. For reasons of brevity, these results are not reported here[22], but our results are robust to changes in these threshold levels.

4.6 Conclusion

The value in having well-connected directors manifests in the enhancement of monitoring of management; provision of sound strategic advice to management; and the enrichment or extension of the connections of the firm to external resources for the firm to compete, survive and be successful in the long run. A strong impetus for directors to perform well is the incentive to build, safeguard and grow their reputation in the labor market for directors (Fama, 1980b; Masulis & Mobbs, 2014; Ruiz-Verdú & Singh, 2014).

The present study investigates the impact of the connections to the inner circle of the directors' network on borrowing decisions of the Asian firms, with respect to four key areas, including borrowing cost as well as the use of bank, unsecured and short-term debt. After taking into account an extensive list of factors including selection bias and endogeneity, we find that strong board connection to the inner circle of the directors' network lowers borrowing costs for borrowers; reduces the level of bank and short-term

[22] These tables are available on request.

debt; and improves the firm's ability to borrow on an unsecured basis. We also find evidence that the presence of an insider shareholder has the effect of reducing borrowing cost; and increasing relational borrowing. When insider shareholders are present with highly connected directors, we find that borrowing costs and the level of bank borrowing increase. On the other hand, we find evidence that high level of institutional shareholdings increases borrowing costs, unsecured debt and short-term debt.

With respect to the zero-inflated data, we find that firms with highly connected directors tend to borrow, have relational borrowing and unsecured debt. In addition, we find firms with high levels of institutional ownership are more likely to shun bank borrowing and avoid unsecured debt as well as short-term debt.

Our results from one-inflated data show that the presence of directors with high clique connectedness is less likely to use solely bank debt and only short-term debt. Furthermore, we find that institutional ownership increases likelihood of relying exclusively on bank debt, unsecured debt and short-term debt.

Overall, our analyses seem to suggest that strong clique connectedness of board members to the inner circle of the directors' network influences borrowing decisions of firms in Asia. We contribute to the literature on several fronts: by using a novel measure of connectedness of board members; by conducting a comprehensive study on borrowing decisions Asian firms; and by using a mixture model to reflect more accurately the borrowing patterns compared to methodologies deployed in previous studies on borrowing decisions.

4.7 Appendix: concept of clique

Clique is one of the basic concepts of graph theory and used in many problems in mathematics as well as the constructions of graphs. In graph theory in mathematics, a clique is a subset of vertices of an undirected graph such that its induced subgraph is complete. In other words, every two distinct vertices in the clique are adjacent. The study of complete subgraphs dates back at least to the graph-theoretic reformulation of Ramsey theory by Erdős & Szekeres (1935). However, the term "clique" was coined by Luce and Perry (1949). The authors used complete subgraphs in social networks to develop formal models of group structure.

A clique in a graph is defined as the maximal complete subgraph of three or more nodes (Luce and Perry (1949)). It consists of a subset of nodes, all of which are adjacent to each other, and there are no other nodes that are also adjacent to all of the members of the cliques (Luce and Perry (1949); Cartwright, Harary et al. (1965)). The clique definition is a useful starting point for specifying the formal properties that a cohesive subgroup should have. It has well specified mathematical properties that take into account the following:

- Degree to which a short path is present from each point to every other point in the subgraph;
- Robustness of the structure. This property, which is seldom discussed in literature on cliques, is best characterized with reference to the degree to which the structure is vulnerable to the removal of any given individual; and
- Degree to which such structures are tied into the total network

It also captures much of the intuitive notion of cohesive subgroup. A clique in a group may overlap. The same node or set of nodes may belong to more than one clique. Luce and Perry (1949) model cliques as complete subgraphs; meaning if everybody

knows everybody, then that is a clique. A clique is a concept that has been long studied in mathematics (Luce and Perry (1949), Festiger (1949), Hubbell (1965), Seidman and Foster (1978),Biggs, Lloyd et al. (1976), Seidman and Foster (1978), Bermond, Delorme et al. (1986)) but has been applied in social sciences to map out who knows whom in social networks. It is based on a body of knowledge known as Graph Theory and relies on algorithms to find cliques. Under this theory, a clique is, in essence, a subset of vertices (or nodes) of an undirected graph, such that it's induced subgraph is complete. In other words, every two distinct vertices in the clique are adjacent. An undirected graph consists of a set of vertices and a set of edges (unordered pairs of vertices).

Each firm will become a member of a cluster of firms that are tied together in a clique, by virtue of the connections of their respective board members. Firms in a clique will be able to leverage the information of other firms in the clique. The strength of each clique depends on the size and connectedness of individual board members in the clique. Over time, the changes in the board composition will change the memberships of such cliques, which could in turn affect the efficacy of the strength of a firm's board connectedness when taken collectively.

More recently algorithms are concentrated on optimization, finding the maximal clique, meaning that there is no more adjacent node you can add to expand the clique. The computation of a clique is based on the algorithm published by Bron and Kerbosch (1973), as adapted by Tomita, Tanaka et al. (2006) and discussed in Cazals and Karande (2008).

We compute our clique scores by using *NetworkX* which is a *Python* "software package for the creation, manipulation, and study of the structure, dynamics, and functions of complex networks". *NetworkX* utilizes the algorithm in the aforesaid papers.

4.8 Appendix: variable descriptions

Key variables	Variable names used	Descriptions
Board characteristics		
Predicted value of clique or eigenvector connectedness	*Predicted connectedness measures*	Predicted value of clique connectedness from the first stage logit model.
Average age	*ave_dir_age*	Average age of the board members.
Dual role of Chairman and CEO	*duality*	Dummy variable for CEO who also holds appointment as Chairman, and vice-versa (1=CEO with Chairman role; 0 otherwise).
Board diversity	*percent_female*	Percentage of board members who are female at t= -1.
Board independence	*percent_non_exec*	Percentage of board members who are non-executive at t= -1.
Founder as chairman of the board	*founder_chairman*	Dummy for founder serving as Chairman of the Board of Directors (1=Founder serving as Chairman; 0 otherwise) at t= -1.
Firm characteristics		
Insider ownership	*insider5pct*	Dummy for insider with equity ownership of >5% (1=insider shareholder; 0 otherwise) at t= -1. These shareholders are not institutional shareholders.
Institutional holding	*institutionalholding*	Percentage of institutional holding at t= -1. These are fund and money managers.
SG&A over assets	*sga_asset*	Percentage of Selling, General & Administration Expenses over the total assets of the firm at t= -1.
Firm age	*firm_age*	The age of the firm.
Prior period firm performance (ROA)	*roa_prior*	ROA at t= -1. ROA is defined as Net Operating Profit After Tax (NOPAT) / Average Assets.
Liquidity level of the firm	*quick_ratio*	Quick ratio at t= -1.
Leverage level of the firm	*debt_to_asset*	Leverage level for the firm at t= -1, defined as ratio of total debt over total assets.
Asset growth	*asset_growth*	Asset growth rates prior at t= -1.

Key variables	Variable names used	Descriptions
Firm characteristics (continued)		
Size of the firm	*sales*	Net sales (in USD) at t= -1.
Firm risk	*idio_stdev*	Standard deviation of stock return at t= -1.
Macro/country/industry level		
Level of industry competition	*h_index*	Herfindahl index for the industry at t= -1.
Economic performance	*gdp_growth*	GDP growth rate for the country at t= -1.
Corporate governance indicator	*wgi*	Worldwide Governance Index (WGI) for each country at t= -1. The WGI is a country level index by the World Bank Institute which covers six dimensions of corporate governance, including Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Rule of Law; and Control of Corruption.

CHAPTER 5

CONCLUSION

With the growing importance of the Asian economies and stock markets as well as the continued reliance on the global financial markets, listed Asian firms have to provide international investors with the incentive to remain invested in their firm and to provide additional funding to fuel future growth. The research in this dissertation extends knowledge in corporate governance in listed Asian firms, in the context of founder-succession, board and clique connectivity, as well as borrowing decisions. In chapter 2, we find that older founder firms with better performance prior to succession, tend to select family successors. In addition, founder firms that engage in succession planning gain better access to a larger pool of successors as well as build solid organizations. Our results show that family successors for Asian firms that are experiencing succession for the first time, deliver superior post succession operating and stock performance, after controlling for endogeneity. This finding is in contrast to prior studies in other parts of the world that also include multi-generational succession. A potential extension of the founder-succession study is an analysis of changes to corporate policies, such as amendments to dividend policies, capital structure and board memberships, founder-successors make after they gain effective control over the firm.

The results in chapter 3 show that board members who have superior *guanxi* connections to the directors' network are associated with higher operating performance, even after controlling for a wide range of factors including endogeneity. Our further examination of the channels through which such connections can translate to advantages for firms, such as acquisitions, strategic alliances and extend the pool of suppliers for the firm. However, we find that the effects of a highly connected board may not be compatible with the presence of a founder-chairman. Future research could expand this *guanxi* network to include mainland China, given the extent of trading and operating

relationships Chinese firm have with firms in Hong Kong and Singapore. However, this is dependent on the availability of detailed corporate disclosures for Chinese firms.

The results in chapter 4 show that clique connectivity lowers firms' borrowing costs, reduces bank borrowings, improves the firm's use of unsecured debt and lowers the amount of short-term debt. We attribute these to the effects of clique connectedness on borrowing decisions via the reduction in information asymmetry and/or the enhancement of monitoring. Future areas of research with respect to board clique connectedness could examine the characteristics and determinants of the formation of cliques.

The findings of this dissertation have implications for the development of Asian financial markets. Listed firms in Asia will continue to rely on the international capital markets to finance their growth. These results provide international investors insights into the nuances of Asian firms, which allow investors to make more informed decisions with respect to their investments in listed Asian firms.

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