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Implications of Board Diversity for Corporate Practices and Policies

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**IMPLICATIONS OF BOARD DIVERSITY FOR
CORPORATE PRACTICES AND POLICIES**

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Declaration

Yr wyf drwy hyn yn datgan mai canlyniad fy ymchwil fy hun yw'r thesis hwn, ac eithrio lle nodir yn wahanol. Caiff ffynonellau eraill eu cydnabod gan droednodiadau yn rhoi cyfeiriadau eglur. Nid yw sylwedd y gwaith hwn wedi cael ei dderbyn o'r blaen ar gyfer unrhyw radd, ac nid yw'n cael ei gyflwyno ar yr un pryd mewn ymgeisiaeth am unrhyw radd oni bai ei fod, fel y cytunwyd gan y Brifysgol, am gymwysterau deuol cymeradwy.

I hereby declare that this thesis is the results of my own investigations, except where otherwise stated. All other sources are acknowledged by bibliographic references. This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless, as agreed by the University, for approved dual awards.

Abstract

This thesis focuses on corporate practices and policy pertaining to board diversity. In the work, three questions are examined at individual director, firm and national levels of analysis, including examining: (i) how changes to diversity in board composition affect firm performance; (ii) the role of male and female director interaction networks in the underrepresentation of women at the top of corporations; (iii) the effects of legislative measures, regulatory “comply or explain” principles and voluntary policy measures and their associated enforcement, implementation and compliance dimensions.

Overall the findings indicate that promoting a purely numerical level of diversity in board composition is insufficient. Board diversity practices should be supplemented by other organizational practices to ease newcomers’ and minority (female) directors’ inclusion into interaction networks. In addition, nationwide policy frameworks can efficiently aid in enhancing gender diversity in corporate boards if an appropriate design of policy elements is in place.

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1. Introduction

1.1 Background and motivation

There has been a growing call for improved diversity in the boardroom. This appeal has resulted in the development of a prolific literature examining the correlation between business performance and board diversity internationally. The question confronting researchers and practitioners alike is not just whether diversity is imperative to business, but also how can organizations promote and manage diversity effectively. This is critical as focusing on increasing diversity alone has raised business costs (Barnes, 2017). While promoting diversity injects unique human capital into the board by changing board composition, this influx can also disrupt the continuity of board functions, and result in enhanced director turnover (Kato and Long, 2006; Rachpradit, Tang and Ba Khang, 2012). While organizations face a challenge of balancing diversity and continuity; this trade-off has rarely been examined in the academic literature.

This ambiguity has resulted in slow progress towards board diversity, and particularly gender diversity. Female talents are associated with effective board functions (Gillan, 2006; Adams and Ferreira, 2009) and ultimately, better overall firm value and performance (Huse, Nielsen and Hagen, 2009; Campbell and Mínguez-Vera, 2008; Hillman and Dalziel, 2003). Despite this,

women remain underrepresented at the top of corporations. The latest report by Egon Zehnder (2018) shows that globally, 20.4% of board seats and only 6% of executive board positions are held by women. Subsequently an extensive literature has emerged to explore the barriers preventing women from ascending to the top of corporations, albeit with inconclusive results (see a review of Gabaldon et al., 2016).

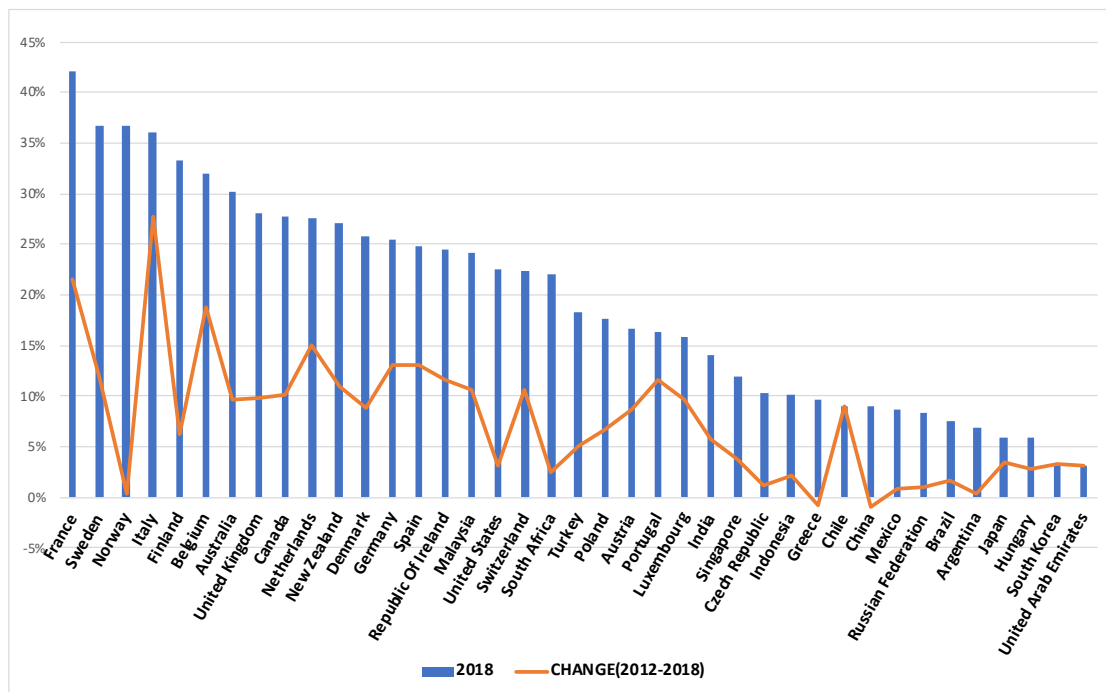


Figure 1-1 A snapshot in board positions held by women

These pressing concerns in managing gender equality have risen to the top of policy agendas. While a variety of policy frameworks have been adopted to enhance diversity on corporate boards, it remains unclear which framework is optimal. Figure 1.1 depicts the trends in gender diversity on corporate boards over 39 countries from 2012 to 2018. The effectiveness in promoting gender diversity varies even under a given policy framework. For example, the

United Kingdom has adopted a voluntary approach but outperformed Spain and Germany with a mandated gender quota in 2018. For countries with mandated gender quotas, France ranked in the first place with 42.10% board seats held by women, whereas countries, such as Poland and Spain fell far behind.

Currently, three main types of policy frameworks have been adopted worldwide. These are: mandated gender quotas, regulatory 'comply or explain' principles and the voluntary approaches. Following the Norwegian approach of mandating gender quota on corporate boards, an increasing number of countries have introduced legislative gender quotas. Other countries, such as Finland, Netherlands and Denmark, have adopted a regulatory framework, following the principle of 'comply or explain'. The United Kingdom and Australia have adopted a voluntary framework. This diversity and ambiguity echo the limited academic efforts to examine the effectiveness of different frameworks for promoting corporate gender diversity. The majority of academic research focuses on single-country settings, mainly the Norwegian context (Ahern and Dittmar, 2012; Matsa and Miller, 2013), not addressing the need for cross-national research designs (Labelle, Francoeur and Lakhali, 2015).

1.2 Summary of main findings

This thesis speaks to these trends and needs for promoting board diversity in the academic realm and in practice by conducting three studies, respectively in Chapters 4, 5 and 6. Chapter 4 examines how changes to board diversity affect firm performance. Specifically, this study examines the following hypotheses:

H_{4.1a}: The relationship between board diversity and firm performance is moderated by density of within-board networks.

H_{4.11b}: The relationship between board diversity and firm performance is moderated by brokerage position of outside-board networks.

H_{4.2a}: Changes to board diversity are curvilinearly associated with firm performance due to the curvilinear effects of network density.

H_{4.2b}: Changes to board diversity are curvilinearly associated with firm performance due to the curvilinear effects of brokerage position.

Extant literature has focused on the correlation between board diversity and firm performance (Carter, Simkins and Simpson, 2003; Ferreira, 2010; Erhardt, Werbel and Shrader, 2003) but has largely ignored the question of how to manage diversity on corporate boards (Lawrence, 1997). This chapter contributes to this emergent literature by investigating the role of interaction networks on and outside a refreshed board and how this affects the relationship between board diversity and firm performance. Interaction

patterns of directors in 1,644 S&P 1500 companies, which have appointed at least one new director to the board, are examined during the period of 2001-2015. Furthermore, we find a moderating role with curvilinear effects of boardroom socialization in determining the relationship between diversity and firm performance.

Chapter 5 explores the differences between the interaction networks used by male and female directors. We explore demand- and supply-side reasons for this difference by examining the following propositions:

H_{5,1}: Female directors excluded from the 'old boy's' networks are subject to structural constraints from the interaction networks on corporate boards.

H_{5,2}: With equal access to interaction networks, female directors obtain less social capital than their male counterparts.

To test for these propositions, we examine 3,577 S&P1500 female and male directors' interaction patterns over their careers as board directors, and/or to the executives between 2008 and 2018. We find that gender differences in interaction patterns persist when we control for the availability of contacts. Women would still like to connect with other females, even if they are allowed to access to male-dominated networks. Furthermore, we examine whether women can access social capital that is equivalent to their male counterparts by joining interaction networks. We find that the predominance

of men in positions of power limits women's access to embedded resources and preserves these resources for other males. Our findings suggest progress towards corporate board diversity will be slow due to the prevailing patriarchal culture, an aspect often overlooked in organizations.

Chapter 6 answers calls for further international study by comparing the effectiveness of legislation, regulatory 'comply or explain' principles and the voluntary approaches in promoting gender diversity on corporate boards. Using 13,657 firms, 78,514 firm-year observations across 76 countries from 2000 to 2018, we find that all three frameworks are effective. The legislative approach is the most effective, followed by the voluntary measures and lastly regulatory 'comply or explain' principles. Furthermore, we explore the interaction effects of different policy dimensions on the effectiveness of the different frameworks. We find that the effectiveness of a policy framework can be weakened or strengthened by the use of sanctions, compliance date and the target percentage of women on boards. Sanctions can always enhance the effectiveness by punishing non-compliance, in particular under the legislative framework. Shorter compliance periods and a lower percentage of women on boards can also facilitate the effectiveness of all three policy frameworks, as affected firms find such policies easier to comply with.

1.3 Contributions

Overall, this thesis makes a number of contributions. First, this work adds to the corporate governance literature on board diversity, board appointment, and board composition. We consider individual, firm, and national levels to provide a holistic understanding of the role of different parties in corporate governance. Second, this thesis sheds light on why there has been slow progress towards board diversity. Measures to help tackle barriers to greater diversity and their success are considered. Third, we provide a social network perspective and conduct network analysis. Furthermore, we provide empirical evidence on the relationships that evolve within and outside the board due to board appointments. Lastly, our empirical evidence provides implications for enhancing policy and practices, aimed at improving diversity.

1.4 Thesis structure

The thesis organization is illustrated in Figure 1.2. The next chapter provides a review of prior empirical findings and theoretical constructs used for examining diversity. Chapter three outlines the research methodologies employed in the thesis. These include the role of the socialization process in the relationship between board diversity and firm performance. We then undertake a network analysis to assess interaction patterns between directors within and outside the board. In our analysis, we use fixed-effects models as

well as a correlated random-effect model to examine the causes of gender inequality on corporate boards. The latter is used to assess women's exclusion from interaction networks on boards. Lastly, a comparative analysis is undertaken using a fixed-effects model to examine the effectiveness of policy in increasing the proportion of women on boards using legislative, regulatory and voluntary approaches.

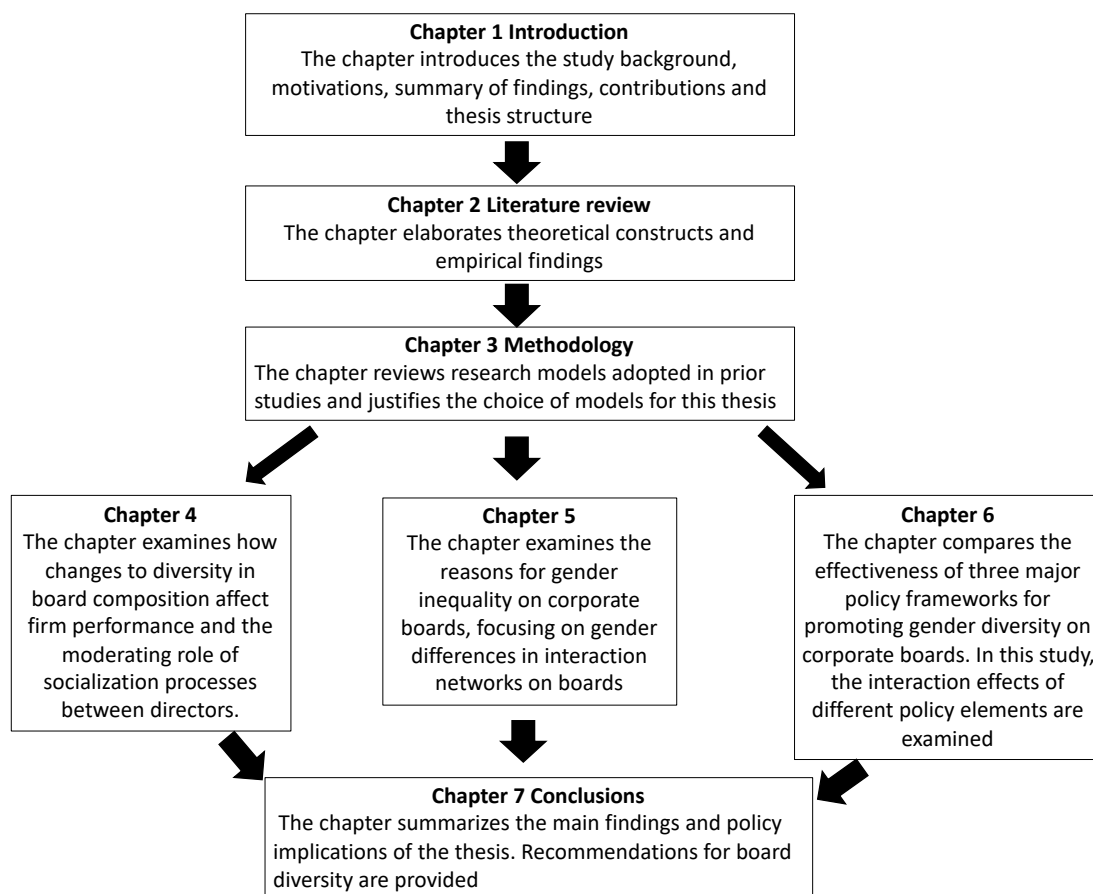


Figure 1-2 Structure of the thesis

Chapters 4, 5, 6 respectively examine: (i) the mechanism for improving firm performance by revising the level of diversity in board composition; (ii) the reasons for gender inequality on corporate boards; (iii) the effectiveness of different policy frameworks worldwide in promoting gender equality on

corporate boards.

Chapter seven concludes the thesis. This chapter provides a summary of the results and proposes policy recommendations for regulators and other gatekeepers. This chapter also discusses the limitations of the thesis and provides suggestions for future research.

2. Literature review: Board diversity, composition, and appointment

2.1 Introduction

Boards of directors play a vital role in corporate governance and are important for firm success and survival (Hillman and Dalziel, 2003; McIntyre, Murphy and Mitchell, 2007). When considering a firm, the first place that investors, regulators, and analysts examine is the board and how it makes its decisions. This scrutiny forces directors to contemplate their composition through a diversity lens to ensure the board possesses the right skills to perform their duties satisfactorily. This literature review chapter explores theories and empirical findings that are relevant to board diversity, appointment, and composition.

Board composition diversity measures directors' characteristics, such as educational and functional background, industry experience, social connectedness, insider status, gender, and race. Directors' characteristics reflect their underlying beliefs, values, and cognitive perspectives that predict how boards function and organizational outcomes (Hambrick and Mason, 1984; 2007). Board diversity therefore becomes an outstanding criterion to assess board appointments and an imperative for corporate success and survival.

Theoretical constructs used to examine diversity effects are reviewed first. Generally, these theoretical constructs are divided into two streams. One stream of research suggests that increased diversity provides a greater variety of talent, skills, idea generation, creative decision making, or problem-solving (Jehn, Chadwick and Thatcher, 1997; Pelled, Eisenhardt and Xin, 1999). In contrast, the other stream of research argues that increasing diversity can lead to relational conflicts (Gruenfeld et al., 1996; Ilgen et al., 2005), impeding communication and cohesion, reducing capabilities to complete tasks and ultimately, retarding performance ratings and social integration within the group (e.g., Chatman, 1991). The findings of diversity effects are therefore contradictory. Reasons forwarded for this ambiguity pertain to the “black box” that leaves the process of how diversity affects outcomes, unmeasured and untested (Lawrence, 1997).

Prior empirical evidence on board diversity and board appointments is then reviewed. Directors' demographic and cognitive characteristics influence directors' behaviors and decision making, which eventually affect firm outcomes (Finkelstein, Hambrick and Cannella, 1996; Gabarro, 1986; Wiersema and Bantel, 1992; Boeker, 1997; Datta et al., 2003). A broad literature has emerged to explore the role of board diversity in appointment and succession practices, with mixed findings as to firm outcomes (e.g., Davidson,

Nemec and Worrell, 2006; Cai, Nguyen and Walkling, 2017).

Lastly, gender diversity is addressed by reviewing the causes for women's underrepresentation on corporate boards, and particularly the link between gender, career outcomes and networks. Gender diversity is one of the key dimensions of board composition that matters from business and ethical perspectives. Female talents are considered to be a valuable resource for firms' success and survival (Huse, Nielsen and Hagen, 2009; Campbell and Mínguez-Vera, 2008; Hillman and Dalziel, 2003). However, female networks operate differently to male networks (Blau, 1977; Belle, 2002). This creates a barrier preventing women from ascending to the top of corporations and eventually resulting in female underrepresentation on corporate boards.

Diversity and diversity management has received increasing attention regarding the effectiveness of corporate governance. To harness board diversity, good governance practices need to be developed. Healthy board dynamics, feasible measurement tools, and external regulation are expected to be effective in enhancing diversity in corporate boards. Therefore, a review of prior findings associated with board characteristics and board appointments and their impact on firm outcomes is provided to suggest effective governance mechanisms for firms.

2.2 Theoretical constructs of board diversity effects

Various theoretical constructs that have been used to examine the relationship between diversity and performance and are outlined in Figure 2.1. These theoretical constructs are divided into theories that support positive and negative effects of diversity. Resource dependency theory and information/decision making theory follow the “value-in-diversity” hypothesis. Social identity/self-categorization theory and similarity-attraction theory focus on negative diversity effects on psychological relationships. In the following sections, these theoretical constructs are discussed with respect to the association between diversity and performance, moderators/mediators and diversity-related outcomes. Then social capital theory is proposed as an integrated framework for examining this nexus, and specifically, the socialization processes that link diversity to performance and other outcomes.

2.2.1 *Resource dependence theory*

Resource dependence theory (Pfeffer and Salancik, 1978; Hillman et al., 2000) views directors and their diverse characteristics as a human capital base. A diverse board comprises a wide range of knowledge, skills, and ideas that can address a company’s decision-making and problem-solving abilities, competitive advantages (Jackson and Alvarez, 1992; Bantel and Jackson, 1989; Williams and O'Reilly, 1998) and eventually firm performance. However,

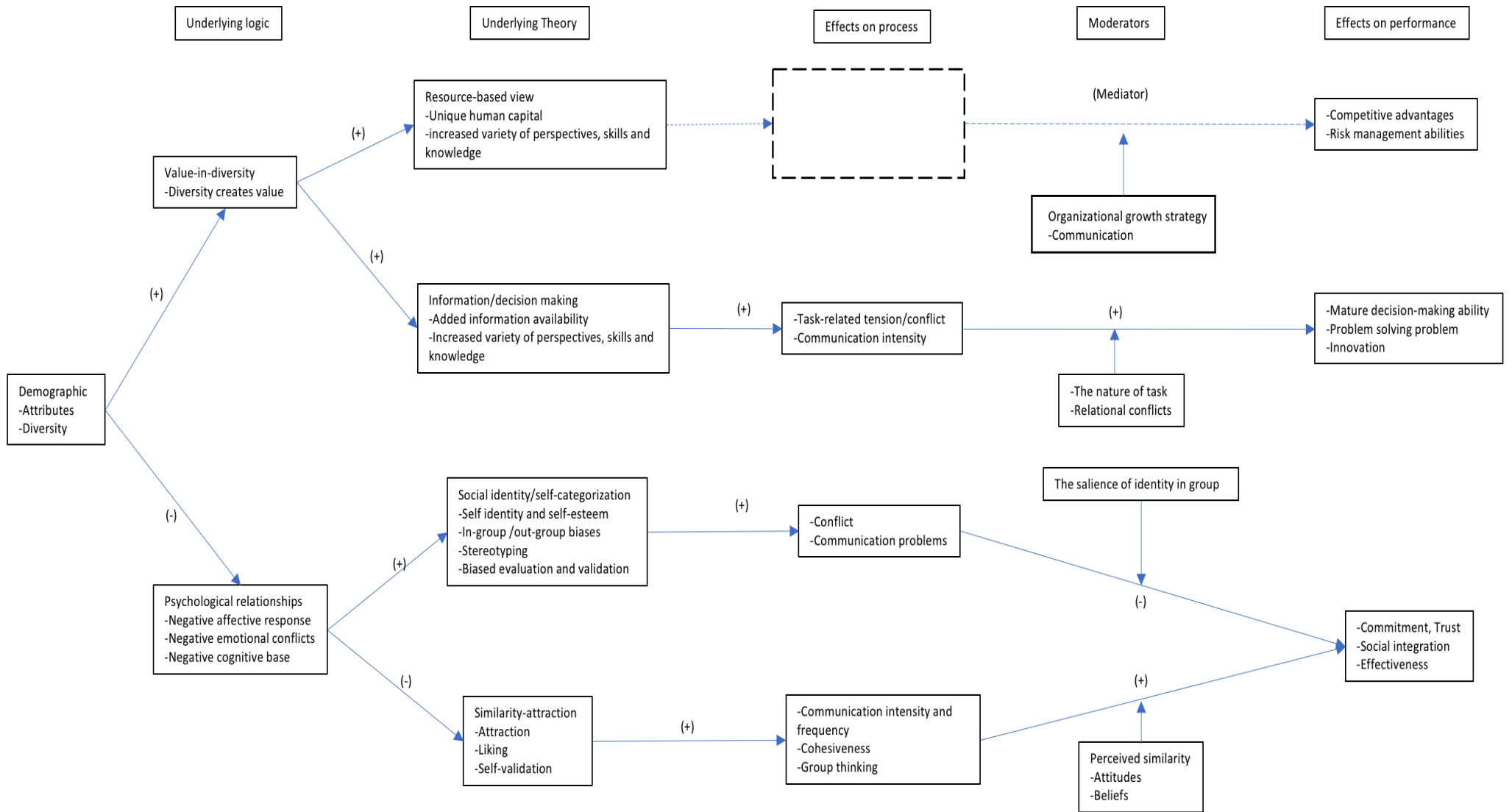
these board diversity effects can be mediated by managerial communications. These are vital for accessing and effectively using resources embedded in board diversity. For example, Richard (2000) finds that cultural diversity (gender and race) of the top management team cannot necessarily enhance firm performance unless managers are encouraged to embrace and express their diversity. Laboratory studies (e.g., Watson, Kumar and Michaelsen, 1993; McLeod, Lobel and Cox, 1996; Cox, 1994) also support the proposition that cooperative behaviors facilitate performance in heterogeneous groups.

2.2.2 *Information/decision-making theory*

The other theoretical perspective supporting the "value-in-diversity hypothesis" is information/decision-making theory. This perspective proposes that demographically diverse directors provide a wider range of information and perspectives (An et al., 2019). These attributes contribute to task-related conflicts that can facilitate idea generation, the quality of decision making, and problem-solving (Jehn, Chadwick, and Thatcher, 1997; Pelled, Eisenhardt and Xin, 1999).

Diversity in information and perspectives is more likely to engender task-related tensions. This results in more time required to discuss and reach a mature consensus (Van Knippenberg et al., 2004; Williams and O'Reilly,

Figure 2-1 Summary of Theoretical Constructs in Demography Research



1998). For example, Phillips and Loyd (2006) conducted two laboratory studies on group processes and found that task-related conflicts experienced by functionally diverse groups resulted in long discussions in order to share unique task-related perspectives. Nevertheless, psychologists have debated that the efficiency of task-related conflicts also depends on relational conflicts, such as affective tensions arising from relationships between individuals.

Diversity, in this regard, is related to negative aspects of diversity on interpersonal and intragroup relations. A diversity of demographics is viewed as a combination of individuals' social identities (e.g. Useem, 1980). Social identities often guide individuals' attitudes, sentiments and behaviors towards others (Westphal and Milton, 2000). Individuals often have negative evaluations and stereotypes of others with dissimilar identities, which creates tensions in relationships and lowers overall performance (Westphal and Khanna, 2003). On this point, Gruenfeld et al. (1996) observed that relational conflicts, rather than functional conflicts, have a primary role in the information sharing process. Specifically, heterogeneous groups experience less effective discussion processes and did not perform as well as homogeneous groups. Similarly, Ilgen et al. (2005) suggest that constructive groups are characterized by high task-related conflicts and low relational conflicts.

2.2.3 *Social identity/self-categorization theory*

Social identity/self-categorization theory (Ancona and Caldwell, 1992; Tsui, Egan and O'Reilly, 1992; Baskett, 1973) suggests that individuals identify themselves based on other's identity and categorize themselves accordingly as in-group or out-group members (Tajfel and Turner, 1986). Identities are therefore likely to be segregated into several groups on a diverse board. Individuals who categorize themselves as out-group members are more likely to perceive increased anxiety, frustration, stereotypes and negative evaluation (Loden and Rosener, 1991). Therefore, a diverse board is often characterized by lower levels of cohesiveness, communication, and cooperation (e.g., Stephan, 2014; Martin and Shanrahan, 1983) all of which ultimately negatively affect performance.

2.2.4 *Similarity-attraction theory*

Similarly, the similarity-attraction theory advocates the negative effects of diversity deriving from the dissimilarities of social identities. Similarity-attraction theory demonstrates attractions between individuals who are similar in terms of demographics (Tajfel, Sheikh and Gardner, 1964; Byrne, Clore and Worchel, 1966; Baskett, 1973; Brewer, 1996; Williams and O'Reilly, 1998). Similarity reduces the psychological discomfort arising from cognitive or emotional inconsistency (Heider, 1982), increasing the intensity

and frequency of communication (Rogers and Bhowmik, 1971). In contrast, diverse boards often experience lower levels of communication, more misunderstandings, and conflicts (e.g., Barnlund and Harland, 1963; Triandis, 1960).

Social identity/self-categorization, and similarity-attraction theory both highlight that diversity is negatively associated with psychological relationships arising from identity identification and categorization. These negative effects of diversity may be moderated by contextual influences (Westphal and Milton, 2000; Brewer, 1996). Demographic identity may no longer be salient, when alternative bases of identity, such as attitudes, beliefs or social features (e.g., Huo et al., 1996) prevail (e.g., Pulakos and Wexley, 1983; Brewer, 1996; Kraiger and Ford, 1985). For example, Westphal and Milton (2000) find that out-group biases arising from dissimilar demography are more likely to be avoided when boards of directors share common social capital (i.e. shared membership ties and indirect ties) and similar prior experience.

Various theoretical constructs have been adopted to explore these diversity effects, with mixed results. One reason for this ambiguity pertains to the missing process between diversity and associated outcomes, creating a "black box" filled with multiple theoretical constructs (Lawrence, 1997). To reconcile

the negative and positive effects of diversity Van Knippenberg et al. (2004) outlined a categorization-elaboration model (CEM) incorporated into social categorization and information/decision making processes. In this thesis, we follow this approach and argue that social capital theory provides a framework for incorporating these two processes.

2.2.5 *Social capital theory*

As people are localized in a socio-demographic space, various demographic characteristics segregate people into different clusters of networks, influencing interaction, interdependence and knowledge exchange between people (Kilduff and Tsai, 2003; Phelps, Heidl and Wadhwa, 2012). Diversity in age, gender, values, personality, functional background, education, social status, tenure and occupation (e.g., Coleman, 1957; Marsden, 1988; Lincoln and Miller, 1979) can induce individuals to interact frequently and connect with others who are similar to themselves, while loosely connecting with dissimilar individuals (McPherson, 1983). These connections serve as a conduit for transmitting human capital, such as information, knowledge, and resources between individuals and converting human capital into social capital (Adler and Kwon, 2002).

The social capital literature provides evidence of these antecedents and the

implications of social capital in organizational contexts (Kilduff and Brass, 2010; Carpenter, Li, and Jiang, 2012). For instance, demographics provide a personal inducement to connect or disconnect with others, whereby females and minorities (racial) are associated with weaker ties, constituting a more diverse network largely composed of white males (Ibarra, 1992; 1993). The structural patterns of relationships across individuals and resources that are embedded in the network are documented as social capital (Adler and Kwon, 2002) and provide instrumental benefits for individuals and the collective (McPherson, Popielarz and Drobnic, 1992; Lin, Ensel and Vaughn, 1981; Ahuja, 2000). Social capital theory therefore provides an integrative framework for understanding how board diversity affects firm performance and why there is a lack of diversity on corporate boards.

2.3 Theoretical framework

2.3.1 *How diversity affects firm performance?*

Social capital theory can integrate social-categorization theory and information/decision making perspectives to explain the process between diversity and performance. A theoretical framework is therefore developed, and shown in Figure. 2.2. Relational links underpin the social-categorization processes, with embedded resources underpinning information/decision-making processes. Diversity affects performance

through these two processes.

Specifically, diversity induces social categorization processes by providing a range of references, such as gender, ethnicity, and age (Tajfel and Turner, 1986) for individuals to identify and categorize themselves as in-group or out-group members (Kanter, 1977; Tajfel et al., 1979). Actual relationships are created and developed based on similarities and differences in the identity in this process. These relationships constitute a network and locate an individual into a social position within the network. The structure of the network can reflect and explain how individuals understand and recognize similar others' talents, competences, and the potential accrued from diversity (O'Reilly, Caldwell and Barnett, 1989).

Relationships established in the social-categorization process act as preconditions for information/decision-making processes. Relationships serve as a channel, whereby resources and information embedded in diversity are transmitted between individuals (Adler and Kwon, 2002). These resources and information aid decision making (Amason, 1996). We argue that social capital theory provides a uniform theoretical construct for investigating the process between board diversity and firm performance.

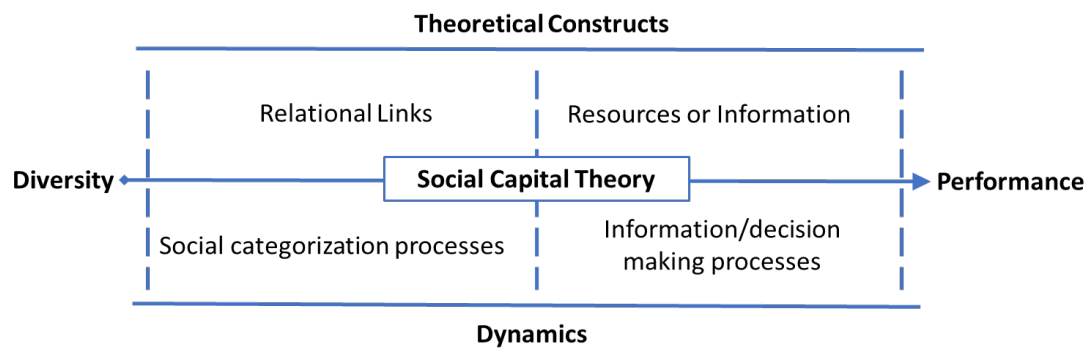


Figure 2-2 A framework for diversity, networks, and performance

2.3.2 Why corporate boards lack gender diversity?

Gender differences in networking

Many gender differences in networking have been identified. Men and women differ in how and why they use networks and their opportunities for using networking in organizations (Durbin, 2011; Ibarra, 2003). Males often occupy higher positions in hierarchical structures (Higgs, 2003) and this elevated status leads society to place greater value on men than women (McDonald, Toussaint & Schweiger, 2004). In addition, individuals tend to interact and share sentiments with others with similar characteristics (Karimi et al., 2018). Male networks are larger, with overwhelmingly male connections, more professional acquaintances and consultants affiliated with a larger association (Rankin, 2001 ; Robinson and Stubberud, 2011). In contrast, women are located at a relatively disadvantaged socioeconomic position (Leblanc, 2020) and are endowed with more responsibilities of childcare and

housekeeping (Melesk, 2020). Therefore, women tend to be located in smaller and more peripheral organizations and their networks consist more of kin and females and fewer business-related coworkers (McPherson et al., 2001).

Such structural inequality across gender often leads to an imbalance in the distribution of and access to social capital (Van Emmerik, 2006; Cross & Lin, 2008). Males and females participate in organizations with significant differences in sizes and types. Females have a relatively disadvantageous socioeconomic status (Leblanc, 2020). This limits potential contacts and other resources for females relative to males, even if they have almost the same number of memberships (Lin, 2000). Furthermore, individuals tend to reserve valued resources for others based on similarity in ascriptive characteristics (Pan et al., 2019). Men are likely to receive preferential access to social capital when they are in a network with many male connections. Correspondingly, women will receive relatively fewer benefits from these cross-gender connections. Therefore, gender differences in network structure and access can potentially explain why career outcomes differ for women and men.

2.4 Prior empirical findings

2.4.1 *Board diversity, composition and appointment/successions*

The majority of research focuses on candidates' origins, and whether they are

insiders, who are currently or used to be working in the organization, or outsiders, who have never been employed by the firm (Santora, Caro and Sarros, 2007; Behn et al., 2006). Outsiders can bring different understandings of business, perspectives, leadership styles, knowledge, and skills, based on their previous experiences in other firms, compared to insiders. However, the empirical results are mixed. Some research (e.g., Wagner III, Stimpert and Fubara, 1998; Huson, Malatesta and Parrino, 2004) suggests a positive effect of outside appointments on stock market performance (e.g., Lin, Pope and Young, 2003) and strategic reorientations (e.g., Wiersema, 1992). Other research (Beatty and Zajac, 1987) finds that both insider and outsider appointments harm market reactions or that outsider appointments have no real effects on market performance (Furtado and Rozeff, 1987).

Rising awareness of the value in directors' characteristics and multiple policy calls for promoting board diversity have shifted the research focus from directors' origins to directors' demographic and cognitive characteristics. According to upper echelons theory (Hambrick and Mason, 1984), directors' demographic and cognitive characteristics influence directors' behaviors and decision making, which eventually affect firm outcomes (Davidson et al., 2006; Finkelstein and Hambrick, 1996; Gabarro, 1986; Wiersema and Bantel, 1992; Boeker, 1997; Datta et al., 2003). These directors' characteristics, such as age, religion, gender, and education reflect their underlying values and

perspectives. For example, age is viewed as an indicator of openness to change, which is negatively associated with post-succession strategic persistence (Datta et al., 2003). Gender is another predictor of firm outcomes. Women have advantages in human and social values, communication and problem solving, which facilitates organizational and management capacity (Vicente et al., 2009; Constantinidis and Nelson, 2009).

Directors' characteristics also influence board appointments because incumbents' characteristics play an important role in determining who will be appointed. Past research has shown that incumbents often favor board candidates who are culturally and demographically similar to themselves (e.g. Bushell, Hoque & Dean, 2020), candidates who are associated with the same and well-known social circles, networks of high prestige and status (Useem and Karabel, 1986; Westphal and Stern, 2006), and those who display ingratiation behavior (Westphal and Stern, 2006, 2007; Withers, Corley and Hillman, 2012). However, limited research examines the effects of a newcomer's characteristics on firm outcomes. The majority of studies explore the effects of overall diversity in directors' characteristics towards firm outcomes (Carter et al., 2003; Farrell and Hersch, 2005; Hillman et al., 2007; Adams and Ferreira, 2009).

Overall, prior findings provide mixed results on the relationship between

board diversity and firm performance. Alleviation of this opacity requires a new consistent and integrated theoretical construct. This thesis applies social capital theory to explore the nexus between board diversity and firm performance and argues for a curvilinear relationship between board diversity and firm performance due to the effects of boardroom network. Boardroom networks display a non-linear effect, which moderates the relationship between board diversity and firm performance. Therefore, our findings suggest a curvilinear diversity-performance relationship.

2.4.2 *Gender diversity on corporate boards*

Gender diversity is one of the key dimensions of board composition that matters from a business and ethical perspective. Female talents are considered valuable resources for firms to succeed and survive (Chen et al., 2019; Huang, Diehl & Paterlini, 2020). However, harnessing these talents depends on social interactions between directors (Richard, 2000; Bae & Skaggs, 2019; O'Hagan, 2017). Women are often excluded from social activities and informal communications (Fang, 2019; Belle, 2002; Huang, Diehl & Paterlini, 2020), leading to the lack of cooperation, conflicts of interests, slow decision making and overall lower firm performance (Ferreira, 2010).

2.4.3 *Gender, networking, and career outcomes*

Gender emerges as an important variable in the context of networking and careers (Durbin, 2011; Ibarra, 2003). Social networks tend to be segregated based on gender characteristics (Mengel, 2020) and display different features in men and women's networks (Klyver and Terjesen, 2007; Renzulli, Aldrich and Moody, 2000). The differences are reflected in structural inequality (Robinson and Stubberud, 2011) and resource imbalance (Loscocco et al., 2009;) between men and women. Also, networking is an important factor in explaining career success (Seibert, Kraimer and Liden, 2001). Therefore, the career outcomes that men and women derive from networking may differ.

2.5 Conclusions

Diversity in board composition represents a combination of attributes, characteristics and expertise contributed by individual board members. Many companies, therefore, promote greater diversity to balance the skills and attributes needed for board processes and to enable governance function more effectively (Lewis, 2001; Burke, 2000). Prior empirical findings show that board diversity provides benefits which come at a cost (Barnes, 2017). Board members are required to develop familiarities in the skills, strengths, weaknesses, and idiosyncratic habits of others (Foss et al., 2008, p. 84) before they can benefit from diversity. These costs are reduced when board members

gradually establish such familiarities, enabling diversity benefits to be realized. Therefore, facilitating the socialization process between directors can offset the costs and eventually lead to a payoff from increased diversity.

Public initiatives for reforming boards should focus not just on promoting numeric diversity in board composition, but also on how diversity is managed to achieve firm success (Walt and Ingley, 2003). Prior literature (e.g., Carter et al., 2003; Erhardt et al., 2003; Farrell and Hersch, 2005; Hillman et al., 2007; Adams and Ferreira, 2009) often assumed there was a direct link between board diversity and firm performance. This created a "black box" in how we comprehend diversity affecting firm performance (Lawrence, 1997). While the literature on groups has proposed various theoretical foundations to illuminate this "black box", no empirical analysis has tested these theoretical constructs.

This chapter has provided a review of prior theoretical constructs. From this discussion, the thesis proposes social capital theory as an appropriate theoretical framework to illuminate this "black box". Social network analysis provides empirical validation for this framework. The next chapter will discuss the methods applied in prior literature and justify the methodology employed in this thesis.

3. Review of relevant methodology

3.1 Introduction

The previous chapter reviewed empirical findings and theories related to board diversity. This chapter outlines the research methodologies that are employed in the thesis. First, we examine the moderating role of the socialization process in the relationship between board diversity and firm performance. To do this, a network analysis and a fixed-effects regression model are used. Most research has examined the direct relationship between board diversity and firm outcomes, although how this process occurs has been largely ignored. Various process variables have been proposed but relative to cognitive and psychological variables these are difficult to measure and test (Pfeffer, 1981). This thesis chooses a network analysis, as it can assess actual relationships between directors, as a result of cognitive and psychological reactions.

Second, to examine whether demand- or supply-side reasons account for gender inequality on corporate boards, a quantitative research method is adopted. Prior research provides systematic reviews of the causes for women's underrepresentation on corporate boards. This thesis focuses on the reason why women are excluded from interaction networks of men and add to the demand versus supply debate by examining the role of gender (supply)

and organizational context (demand). To examine the role of gender, this thesis adopts a correlated random-effects model instead of a fixed-effects model in order to overcome deficiencies in estimating time-invariant variables.

In Chapter 6, an international study is conducted comparing the effectiveness of policy frameworks adopted worldwide to increase the proportion of women on boards. Prior literature often focuses on a single-country setting, particularly of Norway (Ahern and Dittmar, 2012; Bøhren and Staubo, 2012). Some comparative studies have been performed, usually focusing on two policy frameworks, legislation against enabling approaches. This thesis compares three policy frameworks, legislation, the regulatory and the voluntary framework within 76 countries.

This chapter is organized as follows. It starts with a description of data sources and data collection and selection processes. Sections 3.2-3.4 review the literature regarding the choices of models in prior studies and justify appropriate models used in the thesis relating to the three research questions. The final section concludes the chapter.

3.2 Data

3.2.1 *Data sources*

To carry out the analysis, the core database for this thesis is sourced from BoardEx and COMPUSTAT and supplemented with data from Thomson Reuter Eikon. Information about corporate directors including demographics, networks, and employment history are mainly sourced from BoardEx. Accounting and financial data at the firm- and country-level are collected from COMPUSTAT and Thomson Reuters Eikon.

BoardEx was originally established in 2001 by Management Diagnostics Ltd in the UK and has since grown to cover North America, Europe, Asia and the rest of the world, covering in total 124 countries. BoardEx database provides comprehensive coverage of more than 1.2 million senior executives and board members in more than 1.8 million public, private, and non-profit global organizations. Director demographic profiles record age, gender, and nationality. Director network information includes current and past ties of over 10 billion individuals worldwide, connected through professional activities (e.g. employment or board directorships), social organizations (e.g. charitable foundations), education (e.g. colleges, graduate schools), and others (e.g. club memberships) between 1956 to (at the time of writing) 2019. Director employment history provides information on the role in a company,

the starting and ending year of the role from 1933 to 2019.

COMPUSTAT, beginning in 1962, has collected annual and quarterly financial data on over 14,650 active companies and over 16,950 inactive companies throughout the world. The database covers 99% of the world's total market capitalization and makes the data available to bankers, universities, portfolio managers, fixed income markets, etc. Thomson Reuters Eikon is the alternative database providing global economic, company and financial data, and is used to fill the missing values in the COMPUSTAT data.

3.2.2 *Data collection and selection*

This section describes the sample collection and selection process for the three studies. The first study in Chapter 4 focuses on the S&P 1500 companies between 2001 and 2015. To construct moderating variables representing socialization processes between directors on boards of S&P 1500 companies, non-missing network information of all directors served on boards during the sample period is collected. In order to estimate the statistical models, non-missing data on control variables, including firm size, net sales, leverage, board size, board independence, board experience and total changes to board composition are required. Overall, the selection procedure results in a final sample of 1,510 S&P companies with 14,707 firm-year observations during the

period of 2001-2015 for the first study.

As the second study in chapter 5 examines the variation in interaction networks on boards of men and woman directors over corporate advancements, an original dataset is sourced from BoardEx combining 98,388 director's employment history from 1933 to 2018 and network information from 1956 to 2018. To accurately capture gender differences in interaction networks on boards, directors whose first advancement to the board occurred outside the sample period of 2008-2018 are excluded. Data on 7,771 directors who have had their first and subsequent corporate advancement during the sample period have been collected. This chapter also requires that data on control variables, including board size, female ratio, return on assets (ROA), average board experience, firm size, average network size, and standard deviation of directors' age, are available. The final sample comprises 2,920 directors, 2,045 firms and 12,729 observations between 2008 and 2018.

To compare the effectiveness of three policy frameworks worldwide for promoting gender diversity on boards in Chapter 6, data on firms affected by one of three regulations are collected, comprising 4,594 firms with 45,293 firm-year observations within 24 countries over 2001-2018. The application of a comparative analysis requires the creation of a set of control samples, i.e. firms in the country not subject to any of three regulations. Therefore, the

control group comprises 17,293 firms with 132,029 firm-year observations within 85 countries during the sample period. As the analysis focuses on public listed companies, observations in Canada (Quebec) and Greece that have regulated state-owned companies are excluded from the analysis. After dropping the missing values, the final sample includes 13,614 firms and 78,358 firm-year observations across 76 countries over 19 years from 2000 to 2018.

Overall, the datasets of Chapters 4, 5 and 6 are constructed in a longitudinal format containing a time-series and cross-section dimensions. This panel data records the before- and after-impacts of receiving the treatment of the same individual (within effects) and between different individuals (between effects). Hence, panel data can provide more data variation, more freedom and less collinearity that can improve the overall econometric estimates. The next section discusses the specific methods used in the three studies in detail.

3.3 The indirect relationship between board diversity and firm performance: network analysis and a fixed-effects model

Chapter 4 proposes an indirect relationship between board diversity and firm performance, specifically, proposing a moderating role of the socialization processes within and outside a board. To capture the socialization processes,

network analysis is applied to assess the actual relationships evolving in the socialization between directors. To uncover the dynamic relationship between board diversity and firm performance due to the socialization processes, a fixed-effects model is used. The use of a fixed-effects model can reveal the variation in the relationship between board diversity and firm performance before and after changes to board composition. The introduction of interaction terms for diversity and the dis/connections between directors can estimate the moderating role of socialization processes, thereby validating the indirect relationship between board diversity and firm performance.

The majority of research has examined a direct relationship between board diversity and firm performance. One stream of studies has emphasized the socialization process between diversity and performance (McGarth, 1984). Similarly, Jackson et al. (1995) propose that the socialization process mediates the relationship between diversity and performance and other outcomes. This process involving information exchange and affective reflections are engendered by diversity, and in turn, affect performance and other outcomes. Milliken and Martins (1996) also suggest that socialization process mediates the diversity-performance relationship through a review of group and board diversity literature. However, the role of socialization processes has not been empirically validated in the abovementioned studies.

Empirical research examining the role of socialization processes has relied on experiments and surveys. A laboratory study by Watson, Kumar, and Michalsen (1993) examining 173 upper-level undergraduates suggests that socialization effectiveness is associated with cultural diversity. This is based on the observation that culturally diverse groups have more difficulties in communication and expressing their ideas than homogeneous groups. Simon and Peterson (2000) interviewed 79 top management teams suggesting that diversity in top teams causes task-related and relation-related conflicts, which can be moderated by the trust. Indirectly, this evidence indicates the moderating role of the socialization process in the diversity-performance relationship. While helpful, this body of research has lacked well-developed theoretical explanations and empirical evidence to clarify the ways in which the socialization processes differ before and after changes to diversity.

This thesis distinctly uses network analysis to examine the actual socialization patterns between directors, which is more accurate and reliable than socio-metric data (Bernard, Kilworth and Sailer, 1979). The measure of network density and structural holes are constructed to capture the socialization between directors within and outside a corporate board. Network density (Freeman, 1978) captures the presence or absence of connections between directors at a focal board and the measure of structural holes (Burt, 2002) to assess the degree to which directors can bridge gaps

between directors on other boards.

Apart from density and structural holes, network analysis can be applied to construct different dimensions of networks, revealing a human's or a cohort's behaviors and the embedded intentions (Adler and Kwon, 2002). Chapter 6 uses this technique to construct the network dimensions of homophily and closeness centrality at the node level, thereby exploring directors' preferences for interacting with other directors on boards.

3.4 Demand or supply? The underrepresentation of women on boards: network analysis and a correlated random-effects model

Knowledge of the reasons for gender inequality on corporate boards is still segmented. Whether demand- or supply-side factors account for this inequality is unclear. Gabaldon et al. (2016) is one of the few studies to provide a systematic review of the barriers keeping women from reaching the top of corporations from a demand and supply perspective. Other researchers have focused on either the demand or supply sides. Some researchers suggest that demand effects such as gender discrimination and biased conception (Vinkenburg, Jansen and Koopman, 2000) account for few women on boards. Other researchers support supply effects, such as gender differences in values

and attitudes, expected gender roles, or family conflicts that result in a relatively limited pool of qualified female candidates for board positions (Bygren and Gähler, 2012; Gregory-Smith, Main and O'Reilly, 2014). This thesis focuses on gender differences in interaction networks and uses network analysis to assess actual relationships that evolve over corporate advancement.

Previous research relies on surveys and anecdotal accounts, focusing on the feelings about and perceptions of social involvement (Miller, 1975). Alternatively, membership of categories, have been used as proxies for likely interaction patterns (Wellman, 1983). This body of research has lacked well-developed theoretical explanations and empirical evidence to clarify the ways and extent to which the interaction networks differ within and between individuals and firms, as well as indicating the potential consequences of observed differences. This thesis constructs two network analytic concepts to estimate the power of the demand- and supply-side in explaining gender differences in interaction networks. The concept of homophily and closeness centrality is constructed respectively emphasizing supply and demand factors resulting in the exclusion of women from the interaction network on a corporate board. Homophily indicates the tendency to connect to people who are similar to a focal actor and closeness centrality demonstrates the ability to access resources and information embedded in the interaction networks.

This chapter adopts a correlated random-effects model (CRE model, Mundlak, 1978; Wooldridge, 2010) to examine whether gender effects in explaining the differences in interaction networks are eliminated when homophily and closeness centrality are included in the model. Gender is time-invariant, which cannot be estimated using traditional fixed-effects models. Morris (2012) uses the Hausman-Taylor estimates for panel data to estimate the relationship between these time-invariant demographics and debt burdens, allowing for potential correlation between some variables and the unobserved heterogeneity. Unfortunately, appropriate instruments for gender have not been found. CRE model allows estimation of the impact of time-invariant variables, which cannot fit in the fixed-effects model.

Furthermore, the CRE model can estimate and distinguish between within- and between-effects, which cannot be done using the traditional random-effects model (Schunck, 2013). This is, therefore, a hybrid model (Allison, 2009) which can fix the two above mentioned drawbacks, whilst the assumption of the equivalence of within and between estimates still has to hold. However, a Wald test rejects the equality for within and between estimates indicating that unobserved heterogeneity can be correlated with observed individual characteristics. Therefore, this thesis adopts a correlated random-effects model to examine the demand-and-supply debate on

women's underrepresentation on corporate boards by examining the reasons for women's exclusion from interaction networks.

While the reasons for gender inequality on corporate boards have been explored widely, the policy perspective at national levels has not been considered. Many nations have adopted different policy measures to tackle these barriers, and have reported mixed results. Chapter 6 frames this question in a global context, assessing the role of policy measures in promoting gender equality on corporate boards.

3.5 Which approach is the best to promote gender diversity on corporate boards? Comparative analysis and fixed-effects model

To assess the effectiveness of global policy in addressing gender equality on corporate boards, a comparative analysis is conducted. This differs from the majority of previous research which is conducted under single-country settings (Ahern and Dittmar, 2012; Matsa and Miller, 2013). The evidence derived from single-country design cannot be generalized to other countries that differ in institutional and environmental factors (Terjesen and Singh, 2008; Terjesen, Couto and Francisco, 2016). Most research focuses on legislative quotas. Legislative quotas provide researchers with a set of

quasi-natural experiments that can circumvent both endogeneity and reverse causality issues (Adams, Scherpereel and Jacob, 2016) when studying causal effects of gender quotas on firm performance and country-specific effects of this action (Comi et al., 2020; Bruno, Ciavarella and Linciano, 2018). Chapter 6 addresses the need for more empirical and cross-country research (Rhode and Packel, 2014; Terjesen and Singh, 2016) evaluating the effects of legislative measures, regulatory 'comply or explain' principles and voluntary approaches within 76 countries from 2000 to 2018.

A few studies have adopted a cross-country design (Labelle et al., 2015) but have focused on evaluating post-quota effects in terms of the number of women on boards (Comi et al., 2020), follow-up outcomes in the labor market (Bertrand et al., 2014) and economic benefits (Labelle, Francoeur and Lakhali, 2015). Terjesen and Sealy (2016) have suggested that extending the examination to consider what factors affect the success of quotas would be informative for understanding how quotas can be effective. This literature has to date been limited. Only a few comparative studies of quotas explore institutional factors (Terjesen, Aguilera and Lorenz, 2015), differences in media coverage (Tienari et al., 2009) and cognitive perceptions to the quota (Casey, Skibnes and Pringle, 2011). This chapter is augmented by assessing the enforcement, implementation and compliance elements of these policy measures.

3.6 Limitations

Chapter 4 used panel data analysis to investigate variation in diversity effects over time. A further step would be to consider diversity changes as a repeated event in the life of a firm. Such consecutive diversity changes on firm performance could be assessed using the analysis of growth curve models. In Chapter 5, gender may be correlated with other unobserved and time-invariant characteristics that determine network development. This implies our results cannot be estimated with a correlated random effects model. The adoption of the Hausman-Taylor estimates allows us to estimate the relationship between gender, and network development concerning advancement, whilst allowing for potential correlation between some variables and the unobserved heterogeneity. Chapter 6 provides early evidence of policy measures to promote gender diversity. As the compliance date for many policy measures evaluated in this chapter are due after 2020, further research is critical to provide a comprehensive evaluation of these future deadlines and targets.

4. Spanning the Chasm between Diversity and Firm Performance: An Assessment of the Moderating Effect of Boardroom Networks

4.1 Introduction

Increasing the diversity of corporate boards has gained significant momentum in recent years. Many firms have sought to improve diversity levels on their corporate boards to enhance creativity, innovation, governance and performance (Carter et al., 2003; Erhardt et al., 2003; Terjesen, Couto, and Francisco, 2016). This movement has led to a major increase in director turnover. The percentage of directors among the S&P 1500 firms with a tenure of fewer than 3 years increased from 16% in 2011 to 23% in 2017 (ISS Analytics, 2018). These levels of director turnover inevitably disrupt a board's ability to function continuously and efficiently (Kato and Long, 2006; Rachpradit, Tang and Ba Khang, 2012). This presents a challenge for firms attempting to benefit from diversity change. This chapter examines the effectiveness of board functions in boards with changing board diversity and the subsequent effects on firm performance.

We argue that boardroom networks are key to comprehending how corporate boards function, and subsequently how boards can affect firm performance. In this chapter, we focus on two major functions of boards of directors, decision making and resource provision (McIntyre, Murphy and Mitchell, 2007). The effectiveness of these two functions are dependent on the collaborative ability in generating diverse ideas and perspectives (Haythornthwaite and Wellman, 1998; Wasko and Faraj, 2005), and the ability to acquire external resources (Hillman and Dalziel, 2003), respectively. Boardroom networks provide a conduit for the collaboration between directors and a pool of external resources for connecting to outside organizations (Adler and Kwon, 2002). We, therefore, propose and test the hypothesis that boardroom networks play a moderating role between board diversity and firm performance.

To test this proposition, we assemble an interlocking directorship network of 28,887 directors between 2001 and 2015. We find that boardroom networks do indeed, play a moderating role between board diversity and firm performance. The findings indicate that diversity changes have a negative impact on firm performance. This is partially due to the disrupted function of decision making, and particularly of resource provision. Furthermore, the management of board functions, decision making and resource provision,

creates a curvilinear relationship between diversity change and firm performance. We find that boardroom networks have negative consequences that can impede the collaboration and weaken resource dependency. Our findings indicate that it is important to maintain the continuity of board functions in order to harness board diversity and improve firm performance. Boardroom networks are key to maintaining such continuity.

This chapter is important for two reasons. First, while multiple policy makers and governments have called for greater board diversity, this can lead to unintended consequences. The promotion of board diversity comes at the costs of conflict, lack of cooperation, and insufficient communication (Zander, 1979; Adams and Ferreira, 2007; Ferreira, 2010). A key success factor for board diversity practices is not just the numerical increase in diversity, but rather how the implementation process is introduced and managed in a sustainable way.

Secondly, firms that alter the composition of their boards to maximize firm value should ensure that the implementation process is measurable and accountable. There may be an optimal level of diversity in board composition that can maximize firm value. Firms should also acknowledge the challenge to implementing board diversity and gauge the level of success in this regard.

The chapter makes two contributions to corporate governance and diversity literature. First, this chapter applies social network analysis to assess and examines the “black box” (Lawrence, 1997) of how board diversity affects firm performance. Previous research addressing this question, has mainly relied on surveys and experiments, focusing on the emotions about and perceptions of diversity (Lauring and Villeseche, 2019). Communication frequency is often used as a proxy for likely interaction patterns (Valls, González-Romá, and Tomás, 2016). This work answers this question distinctly by identifying the moderating effects of diversity on decision outcomes (Van Knippenberg et al., 2004).

Secondly, the work examines board diversity changes in a dynamic setting. This provides insights as to how board networks affect firm performance. This chapter is conducted in a longitudinal setting (Richard et al., 2007; Zainal et al., 2013) with a curvilinear relationship reported. This helps reconcile previously conflicting propositions within the diversity literature (Boerner, Linkohr and Kiefer, 2011; Ali, Ng and Kulik, 2014).

The chapter is organized into five sections. After this introduction, we provide an overview of the extant literature. The third section outlines the data and the form of the analysis. The fourth section reports the empirical results. Lastly, we present a summary of the research, policy implications,

and conclusions.

4.2 Literature review and hypotheses

The characteristics of boards of directors have important implications for organizational outcomes (Hambrick and Mason, 1984; 2007). Companies revise, refresh and alter the diversity of boards to ensure firms have the right set of director's skills to fulfill business needs. Despite multiple calls for greater diversity in the boardroom, the level of diversity in S&P 1500 companies has remained low relative to many developed economies. In 2019, S&P 1500 companies inclusive to BoardEx are reported to have 21.6 percent of women on their corporate board. In 2017, the Institutional Shareholder Services Inc. (2018) reported that women and ethnic minorities occupied only 19 percent and 10.6 percent of directorships in S&P 1500 firms respectively. Similarly, the 2016 Global Board Diversity Analysis reported that there had only been a 1 percent growth in the average percentage of women on boards between 2012 and 2016 in the USA.

Reasons for this slow progress include uncertainty as to the benefits of diversity (Ferreira, 2010) and how diversity may actually enhance the bottom line (Lawrence, 1997). Some studies suggest board diversity enhances firm performance (Carter et al., 2003; Erhardt et al., 2003), while other work

contradicts this view (Shrader et al., 1997; Shehata et al., 2017). Further studies (Dwyer, Richard and Chadwick, 2003, Dimovski and Brooks, 2006) find no direct relationship between diversity and firm performance at all (Carter et al., 2010; Randøy, Thomsen and Oxelheim, 2006). Subsequently, the influence of moderating or intervening variables between gender diversity and firm performance is essential to examine (Kochan et al., 2003; Miller and del Carmen Triana, 2009).

Due to challenges in accessing corporate boards and conducting group research (Barrick et al., 2007), there is little theoretical guidance and a scarcity of empirical findings informing this transmission process. We propose that the social capital theory (Lin, 2002) and social network analysis (SNA) provide a mechanism to explain how changing board diversity influences firm performance. Specifically, we propose that boardroom networks have a moderating role between board diversity and firm performance *via* the effectiveness of board functions.

Boards of directors play an important role in securing resource dependency (Pfeffer and Salancik, 1978) and in decision making (Petrovic, 2008). According to social capital theory, boardroom networks provide both a pool of resources and information and a conduit for transmitting these assets between directors (Adler and Kwon, 2002). We argue that intra-board

networks provide a conduit for the transfer of resources and knowledge, reinforcing the collaboration between directors. Inter-board networks also help directors to acquire external resources through connecting directors on different boards. These process eventually affects firm performance (Brown and Duguid, 2000; 2001; Richard, Murthi and Ismail, 2007).

Changes to diversity in board composition also disrupts board functions. This is reflected in the breakdown of boardroom networks. Within a network, directors are located in a socio-demographic space based on their characteristics (Cota and Dion, 1986; McGuire et al., 1978). Director arrivals and departures will force directors to re-localize themselves on the board thereby modifying networking patterns with other directors. This occurs as following the principle of homophily (McPherson, 1983). Individuals tend to connect to people who are similar with themselves, based on demographics or other characteristics, such as age, gender, values, personality, functional background, education, social status, tenure and occupation (e.g., Coleman, 1957; Marsden, 1988; Lincoln and Miller, 1979). This influences directors' tendency and ability to connect to others. Changes to diversity, therefore, affect the actual relationships that evolve between board incumbents and board newcomers and with directors outside the board.

Within the board, dissimilarity between directors can lead to negative

stereotypes, prejudice and discrimination (Loden and Rosener, 1991). This results in directors being likely to be loosely connected or not connected (Granovetter, 1973). Alternatively, similar directors are likely to be closely connected, with relationships characterized by trust, honesty, and willingness to cooperate (Brewer, 1979). According to the theory of the strength of ties (Granovetter, 1973), dissimilar directors are more likely to be connected by weak ties. It is attributed to the fact that they tend to display negative stereotypes, prejudice and discrimination against each other (Loden and Rosener, 1991), whereas strong ties between similar directors, characterized by trust, honesty and willingness to cooperation (Brewer, 1979). Directors on a diverse board are more likely to find themselves dissimilar with others, which reduce the possibility of developing strong ties between each other, characterized at least initially by a sparse network. In contrast, a homogeneous boardroom consisting of directors with many shared traits is more likely to display a dense network of relationships, as directors more readily connect with each other.

Density is a measure of the presence or absence of connections within a network (Freeman, 1983). An increased board diversity is more likely to be composed of dissimilar directors, resulting in loose connections or disconnections between directors on boards; this is indicated by the low density of the network. Such a low density network is often associated with

conflicts and poor efficiency of communication between directors on the board. By contrast, decreased board diversity is more likely to be characterized by a relatively high density. This is an indicator of cohesiveness and collaboration (Gulati, Nohria, and Zaheer, 2000; Kim, 2005). Therefore, the higher level of diversity, the lower level of density.

Changes to diversity affect the amount of resources obtained from outside the board. Within networks, clusters form around certain demographics, such as gender, ethnicity, and age and are loosely connected or disconnected to other clusters (Granovetter, 1973). The gap between clusters is referred to as structural holes (Burt, 2002). The structural hole is expected to occur to the external network of diverse boards, since directors on a diverse board are more likely to be dissimilar. Hence, directors are less likely to locate in the same cluster, increasing the presence of structural holes. Therefore, the higher level of diversity, the more clusters directors located in, the higher chance of bridging structural holes between the clusters.

Moreover, bridging these structural holes can help firms in accessing different clusters and the resources embedded within them. Director arrivals and departures alter the clusters to which directors belong. An increased board diversity is expected to lead to more opportunities to bridge structural holes as directors on a diverse board are less likely to locate in the same cluster. By

contrast, homogeneous directors are likely to belong to the same cluster with little chance of bridging structural holes, and less ability to accessing limited resources from outside the organization (Pfeffer and Salancik, 1978; Ancona and Caldwell, 1992).

Overall, firms that change board diversity face the trade-off between the benefits of enhancing diversity and the costs related to the disrupted continuity of board functions (Fairfax, 2005). A board that can facilitate increased levels of communication and interaction amongst its directors and gain access to external resources, is more likely to outperform a board that does not have the integration and coordination and scarce resources. This moderating role of network effects is examined in the following hypotheses:

H_{1a}: The relationship between board diversity and firm performance is moderated by density of within-board networks.

H_{1b}: The relationship between board diversity and firm performance is moderated by brokerage position of outside-board networks.

A low or high network density could lead to negative effects on firm performance. If directors are very close to each other, they may resemble an “old boys club” and not perform a monitoring role (Kim, 2005). As maintaining strong connections is costly in terms of time, this may distract directors from

functioning efficiently and effectively (Jackson and Wolinsky, 1995). If connections between directors are too weak then they will be unable to transfer complex resources to other directors in the boardroom (Hansen, 2002). Our final hypothesis considers this relationship:

H_{2a}: Changes to board diversity are curvilinearly associated with firm performance due to the curvilinear effects of network density.

H_{2b}: Changes to board diversity are curvilinearly associated with firm performance due to the curvilinear effects of brokerage position.

4.3 Data and methodology

4.3.1 Social network analysis

Social network analysis (SNA) has been increasingly popular in examining socialization processes among individuals and resources embedded within the networks (Bourdieu, 1989; Lin 1982; De Graaf and Flap, 1988; Coleman, 1988).

We use two network-analytic concepts, network density and aggregate dyadic constraint (hereafter referred to as brokerage position), to assess the ability of collaboration and resource dependency. Network density (Freeman, 1983) measures the presence or absence of connections between directors at a focal board. Connections between directors provide channels to transfer

diverse ideas and perspectives. This reinforces any collaborations. Therefore, a board characterized with high level of network density is more likely to collaborate. Dyadic constraint ('brokerage position') quantifies the degree to which a director can serve as an effective broker between other boards. If the space between two disconnected individuals, termed a structural hole (Granovetter, 1973), can be bridged, individuals can obtain a range of information and resources. For example, if an actor A is connected with actors B and C, and B and C are disconnected, then actor A is in a brokerage position. Alternatively, if B and C are connected, then A loses its advantageous position and may receive redundant information. As such, the lower the director's dyadic constraint, within the network of connections, the more external resource acquired from connecting other boards. Thus, a good brokerage position is negatively related to the dyadic constraint.

Measure of network density

Network density (Freeman, 1978) describes the portion of the potential connections in a network that are actual connections. A "potential connection" is a connection that could exist between two individuals - regardless of whether or not it actually does. The potential connections are calculated as follow:

$$PC = \frac{n*(n-1)}{2} \quad (1)$$

For example, if a network comprises 10 individuals, then the number of potential connections is $10 \times (10-1) / 2$ (i.e. 45). Suppose the number of actual

connections is 9, then network density equals $9/45=0.2$.

Measure of dyadic constraints (brokerage position)

The brokerage position is based on Burt's (2002) concept of structural holes. The simplest structure in which dyadic constraint is expressed is the triad, a fully or partially connected set of three nodes. As all structures however complex can be decomposed into triads, these are used to break down network structures to calculate a dyadic constraint. Using the software from Pajek (de Nooy et al., 2005) we calculate the aggregate dyadic constraint using the following formula (Burt, 2002, pp.54-55):

$$C_{ij} = (p_{ij} + \sum_q p_{iq}p_{qj})^2, \quad \text{for } p \neq i, j \quad (2)$$

where p_{ij} is the proportion of i 's relations invested in actor j . The sum $\sum_q p_{iq}p_{qj}$ is the extent of i 's relations invested in actor q 's relations, which are invested in actor j . The total in parentheses is the proportion of i 's relations that are directly or indirectly invested in its connections with actor j . The brokerage position of the board's network is the mean of total brokerage position of all directors on the board. We use an example of a network below (Figure 4.1) to calculate structural holes.

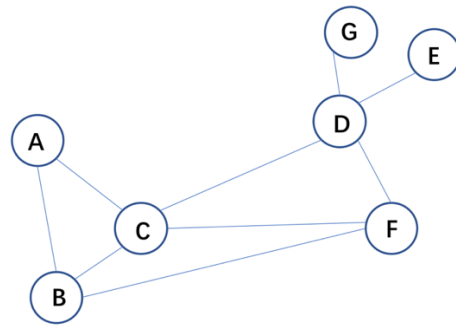


Figure 4-1 An example of a network

We calculate dyadic constraints of actor *D* using equation (2). First, we calculate the value of each of the ties that an actor is part of, as an inverse of its number of connections. Actor *D* in the example has 4 ties. Hence, each of actor *D*'s ties will have an average-weighted value of $\frac{1}{4}$, *F* ties will have a value of $\frac{1}{3}$, *C* will have a value of $\frac{1}{4}$ and both *E* and *G* will have a value of one. Second, using the values of these ties, we calculate the constraint that each of the ties imposes on *D*. Since *D* is part of triad *C-D-F*, the ties *C-F* limits the value that *D* can have from having separate connections with *C* and *F*. Therefore, the constraint that each of these actors imposes on *D* includes not only the actor's connection with *D*, but also the connection between them. The constraint on *D* attached to its tie with *F* is equal to the square of the following sum: $\frac{1}{4}$ (*D*'s investment in *F*), plus $\frac{1}{4} \times \frac{1}{4}$ (*D*'s tie to *C* times *C* tie to *F*), which approximately equals 0.098. Similarly, the constraint on *D* attached to its tie with *C* is equal to 0.11 (i.e. $[\frac{1}{4} + (\frac{1}{4} \times \frac{1}{3})]^2$). The constraint with both *E* and *G* is the squares of the proportional strengths of these ties (0.0625), because there are no in direct ties from *D* to either *E* and *G*. Once we have the constraint on all ties of *D*, we add them to obtain the aggregate

constraint. Therefore, the aggregate constraint for D is 0.333 (i.e. $0.098+0.11+0.0625+0.0625$). As the larger the aggregate constraint, the lower the brokerage, structural holes of 0.333 indicate that D occupies a relatively advantaged brokerage position with fewer aggregate constraints.

4.3.2 *The data employed*

Our sample comprises S&P 1500 companies operating over the period 2001-2015. BoardEx is the main data source, including information on board composition, director demographics and networks. Firm-level accounting information is sourced from COMPUSTAT.

Sample criteria

Since we focus on boards with an altered structure, we identify the treatment group of our sample companies which 1) have a new director or 2) have a director leaving, or 3) both. We do so by comparing board composition of a firm in two consecutive years. Companies which substantially renewed the board in a year (i.e. companies with over 50% turnover annually) are excluded. This is undertaken as renewal significantly disrupts the existing network or creates new networks and may bias the moderating effects of networks¹. We also include the control group within our sample, which

¹ A renewal may completely disrupt the continuity of board functions, as directors are required to establish a new network. This takes time and effort. This can reduce the positive impact of diversity on firm performance. The opposite could also be true, whereby the majority of directors are newcomers

contains firms without any changes to board composition, i.e. no arrival or departure, in the year. Therefore, the final sample after excluding missing accounting information comprises 1,501 S&P 1500 companies, 14,707 firm-year observations between 2001-2015. The definitions and measurements of key variables are outlined in Table 4.1.

The treatment group consists of firms with annually increasing or decreasing diversity. The control group contains firms without any changes to board composition (i.e. arrivals = 0 & departures = 0) in the year. Specifically, 1,487 firms and 7,941 firm-years have at least once increased diversity during the sample period of 2001-2015, whereas 1,307 firms and 3,259 firm-years decreased diversity. The control group is composed of 3,507 firms and 1,134 firm-year observations.

Dependent variables

Consistent with the literature, we employ the measure of Return on Assets (ROA) and Tobin's Q as measures of firm performance (Adams and Ferreira, 2009; Campbell and Mínguez-Vera, 2008; Reguera-Alvarado et al., 2015; Erhardt et al., 2003; Randoy et al., 2006). ROA and Tobin's Q are often as measures of current earnings and the market's expectation of future earnings respectively. We use these measures to proxy for a firm's competitive

who are less likely face frictions to connect with each others.

advantages (Montgomery and Wernerfelt, 1988).

Diversity measures

The measure of diversity used differs from previous studies. By integrating social categorization and information/decision making processes to comprehend board diversity processes, we follow van Knippenberg et al.'s (2004) assumption that social categorization and information/decision making processes are not tied to specific dimensions of diversity. Therefore, we conjecture that all dimensions of diversity impact on the subsequent

Table 4-1 Variables with measurements

The data has been obtained from BoardEx and COMPUSTAT. For each variable of interest, the table gives an explanation of the characteristic and the way it is measured.

Variable	Definitions
(1) ROA	The ratio of net income to total assets.
(2) Tobin's Q (Compustat)	$\frac{[\text{Total assets} + (\text{the net number of all common shares outstanding at year-end} * \text{Price Close} - \text{Annual} - \text{Fiscal}) - \text{Common/Ordinary Equity}]}{\text{total assets}}$
(3) Firm Size	Log of total assets
(4) Liquidity	(Cash equivalents + marketable securities + accounts receivables) divided by current liabilities
(5) Board Size	The total number of directors in the years
(6) Independence	The ratio of independent directors to the total number of directors on a board in the years
(7) Experience	The mean of the number of years that directors have served on any boards in the years
(8) Density	The ratio of the existing connections to potential connections between directors within a board in the years. The measurement in detail is provided in Section 3.1
(9) Brokerage position	An ability of a director to bridge the disconnection between two directors who are within or out of the board. The measurement in detail is provided in Section 3.1

processes and can ultimately affect firm performance.

If this conjecture holds, new board arrivals alter at least one dimension of diversity regardless of the number of departures. Departures develop similarities with other directors in attitude (Kilduff, 1990; Umphress et al., 2003), behaviours (Burkhardt, 1994; Galaskiewicz and Burt, 1991) and personality (Pastor, Meindl and Mayo, 2002). Arrivals are not expected to have such cognitive similarities, though they may have similar demographics with the existing directors (Westphal and Zajac, 1995). Therefore, regardless of the number of departures, the level of diversity is increased as long as the board has arrivals in the year. While, if a board does not have any arrivals but only depatures, then board diversity is decreased. Consistent with this conjecture, we classify companies as having increased diversity if directors arrived on a given board (arrivals), regardless of directors leaving a given board (departures) in the year. Decreased diversity is identified as directors leaving from a given board (departures), regardless of directors arriving on a given board (arrivals) in the year.

Network measures (moderators)

To measure brokerage position, we construct the external network of connections linking 27,840 directors and 76,044 directorship-years. We identify company directors using a unique identification number (director ID)

to identify their involvement with all current and previous directorships. Network information includes the details of focal directors, connecting directors with unique ID and title of role position during the connection, the start and end date of connections, types of educational connections and organization types or categories (i.e. listed, unlisted, and other organizations, non-for-profit, clubs and societies). Our analyses considers all types of connections with other directors active during the sample period. This means any connections formed via any of the above mentioned types of organization.

4.3.3 *Descriptive statistics*

Table 4.2 reports the descriptive statistics of key variables by each group. Compared to the firms without changes to board composition, firms without diversity changes outperform those with increased and decreased diversity in terms of Tobin's Q and ROA. Firms with increased diversity present the best performance on ROA and Tobin's Q, followed by these with decreased diversity and lastly these without diversity changes.

Surprisingly, density level of firms that increased diversity is 0.50, which is higher than these of firms that decreased diversity and without any diversity changes, with 0.49 and 0.47, respectively. This is inconsistent with our

Table 4-2 Descriptive statistics

The descriptive statistics are reported for the treatment (increased/decreased diversity) and the control group. The treatment group of increased diversity represents the firms whose board have arrivals regardless of departures in the year, while of decreased diversity representing the firms whose board have departures but no arrivals in the year. The control group represents the firms without any change in board composition in the year. Standard deviation and mean are reported by each group. T-test is conducted to examine the significance of the differences in mean of all key variables between firms with no changes and those of decreased diversity and increased diversity, respectively.

No.firms=1,501; Observations=14,707	Increased diversity		T-test (vs No changes)	Decreased diversity		T-test (vs No changes)	No changes	
Observations	7,941			3,259			3,507	
Variable	Mean	Std. Dev.		Mean	Std. Dev.		Mean	Std. Dev.
ROA	0.04	0.16	0.001***	0.04	0.11	0.001***	0.05	0.09
Tobin's Q	2.05	1.44	0.000***	1.97	1.24	0.000***	2.09	1.32
Firm size	7.71	1.65	0.05**	7.70	1.59	0.011*	7.38	1.49
Liquidity	2.33	2.14	0.000***	2.38	2.19	0.103	2.57	2.19
Board size	9.65	2.24	0.010***	9.26	2.13	0.001***	8.51	2.03
Independence	0.85	0.08	0.080*	0.84	0.08	0.089*	0.83	0.09
Experience	7.45	3.58	0.000***	9.11	3.89	0.010***	9.41	4.03
Density	0.50	0.28	0.000***	0.49	0.28	0.08**	0.47	0.29
Brokerage position	0.03	0.04	0.06**	0.04	0.04	0.000***	0.04	0.04

proposition that increasing diversity is negatively related to density level. Potentially firms may prefer to appoint directors who already have connections with the existing directors (Westphal and Zajac, 1995). Brokerage position of our sampling boards, regardless of diversity changes, is stable at the level of 0.03-0.04. In other words, firms with increased diversity have a relatively few dyadic constraints, indicating that increasing diversity may improve the ability to acquire external resources.

We control for firm and board-level characteristics. Firms that changed board diversity are relatively larger with higher liquidity. Their boards comprise more than 9 directors, of approximately 84% of directors are independent directors. The number of years that directors served on board has an average of 7.45 and 9.11 for boards with increased and decreased diversity, respectively.

Figure 4.1 depicts the variation in boardroom networks since changes to board diversity, shown on the Y-axis. The X-axis displays an event time window of [0,4]. Year 0 denotes the year of implementation and Year 1 denotes one year after the implementation. Figure 4.1a captures the variation in density and shows that regardless of the direction of diversity change, altered diversity disrupts the integration and collaboration between directors

on the board. After 2 years of the change, firms with declining diversity continue to work nearly as well as the initial point of the change, whereas boards with increased diversity perform worse over time.

Figure 4.1b describes the variation of brokerage position over changes to diversity. A time lag is detected indicating that no impact on brokerage position occurs until the first year of diversity changes. After that, the resources obtained from the outside rise with the level of diversity changes. Specifically, firms with decreased diversity have a relatively advantageous position to broker information by bridging structural holes. The brokerage position presents an inverted U-shaped pattern over time regardless of diversity changes.

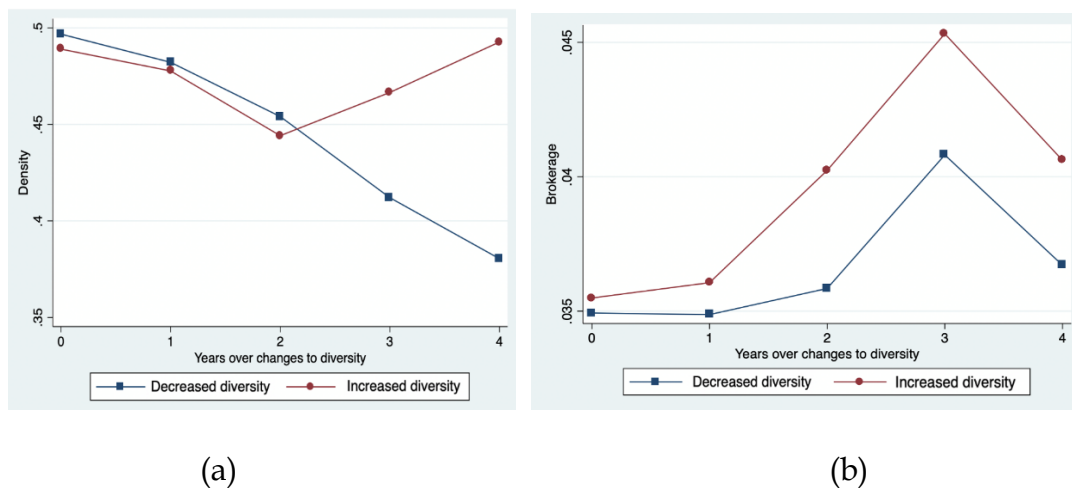


Figure 4-2 The variation in boardroom networks since changes to board diversity

4.3.4 The Testing Framework

The testing framework is divided into two parts. Initially, descriptive statistics of the dataset are considered. We first estimate the models using ordinary least squares (OLS). The Shapiro-Wilk W test (Royston, 1983) for normality ($P=0.000$) indicates the residuals (errors) are not independently and identically distributed. A Breusch-Pagan test (Waldman, 1983) for heteroscedasticity ($p > \chi^2 = 0.000$) suggests that the variance of residuals is not constant. As the data spans a diverse set of firms, we control for unobserved heterogeneity among the firms to avoid bias in the estimates. Pooled OLS, between-effects, fixed-effects and random-effects models are all tested. The Hausman test (Hausman, 1978) is used to distinguish between fixed effects and random effects model with results implying the fixed-effects model is the correct specification.

We estimate the fixed-effects models clustered by firms to examine the moderating role of density and brokerage position in the relationship between board diversity and firm performance. This is presented as:

$$\begin{aligned} Performance_{it} = & \beta_0 + \beta_1 Increased_{it} + \beta_2 Decreased_{it} + \beta_{3-4} Increased_{it} * \\ & Network_{it} + \beta_{5-6} Decreased_{it} * Networks_{it} + \sum_{\gamma} CV_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

Where $Performance_{it}$ means firm performance for firm i in year t measured as return on assets (ROA) and Tobin's Q respectively. $Increased_{it}$ is a

dummy variable, coded 1 if the board of $firm_i$ increased diversity through changes to board composition in year t , otherwise coded 0; $Decreased_{it}$ is a dummy variable, coded 1 if the board of $firm_i$ decreased diversity through changes to board composition in year t , otherwise coded 0; $Networks_{it}$ refers to either of two network variables, density and brokerage position of $firm_i$; $Increased_i * Networks_{it}$ is the interaction term of increasing diversity and network variables of density and brokerage position; $Decreased_i * Networks_{it}$ is the interaction term of decreasing diversity and network variables of density and brokerage position and CV is a vector of control variables, including board-level and firm-level control variables. Hence the coefficients β_{1-3} and β_{4-6} are the parameters of our primary interest in this paper.

4.4 Results

4.4.1 *Does changes to diversity in board composition have an impact on firm performance?*

The results for the board and firm-level control variables without considering network variables are reported in Table 4.3 of 2 Columns (1)-(2). The results show that firms, regardless if they increased or decreased board diversity, underperform these firms without diversity changes, in terms of ROA. This

supports our proposition that diversity changes in board composition may disrupt board functions and then lower firm performance. For Tobin's Q, only firms with a decreased diversity report a significantly negative relationship ($p=0.045$, at 5% significance).

We propose that the effects of diversity change on firm performance may be due to board functions disrupted by diversity changes. Boardroom networks are vital to harness and realize the underlying value of diversity through socializing amongst directors. Therefore, we use boardroom networks as a proxy for board functions. Specifically, we examine two functions of board functions, decision making and resource provision, quantified by density and brokerage position respectively.

4.4.2 *Do boardroom networks moderate the diversity-performance nexus?*

Table 4.3 Columns (3)-(4) report the results including the interaction terms, changes to board diversity and density and brokerage position. Diversity change no longer has impact on ROA regardless if firms increased or decreased diversity in the year. Brokerage position are positively associated with ROA ($p\text{-value}=0.101$, at 10% significance), justifying a moderating role of brokerage position. Decreased diversity remains negatively associated with Tobin's Q ($p=0.166$, at 1% significance). This result is consistent with prior

findings, that decreasing diversity often results in group thinking, which impedes innovation and eventually decreases firm performance (Miller and del Carmen Triana, 2009). Furthermore, the role of density and brokerage position are reported in mediating the effects of decreasing diversity on Tobin's Q. Increasing density

Table 4-3 Results of panel data analysis on diversity in relation to network density and brokerage position

The table reports the results of the moderating role of boardroom networks in the relationship between board diversity and firm performance. Two measures of firm performance are used, respectively Return on Assets (ROA) and Tobin's Q. Increased diversity is a dummy variable, coded 1 if the board of a firm increased diversity through changes to board composition in the year, otherwise coded 0; Decreased diversity is a dummy variable, coded 1 if the board of a firm decreased diversity through changes to board composition in the year, otherwise coded 0; Moderators of boardroom networks are density and brokerage position. Density measures the presence or absence of connections between directors within the board, whereas brokerage position measure the possibility of directors to bridge the disconnection between the other two directors on different boards. The interaction term is introduced, i.e. board diversity and boardroom networks. We use a clustered standard error to obtain heteroscedasticity-robust standard errors.

VARIABLES	(1)	(2)	(3)	(4)
	ROA	Tobin's Q	ROA	Tobin's Q
Increased diversity	-0.006** (0.002)	-0.003 (0.022)	-0.002 (0.006)	-0.089 (0.054)
Decreased diversity	-0.004* (0.002)	-0.045** (0.021)	-0.008 (0.006)	-0.166*** (0.054)
Brokerage position			0.101* (0.055)	-0.188 (0.903)
Increased diversity*Brokerage position			0.004 (0.048)	0.995 (0.617)
Decreased diversity* Brokerage position			0.037 (0.053)	1.384** (0.589)
Density			0.003 (0.013)	0.205 (0.131)
Increased diversity*Density			-0.008 (0.008)	0.102 (0.071)
Decreased diversity*Density			0.005 (0.007)	0.144** (0.073)
Firm size	0.010* (0.005)	-0.437*** (0.052)	0.010* (0.005)	-0.446*** (0.052)
Liquidity	0.005** (0.003)	0.003 (0.015)	0.005** (0.003)	0.003 (0.015)
Independence	-0.054* (0.031)	-1.045*** (0.236)	-0.050 (0.031)	-1.039*** (0.231)
Experience	0.000 (0.001)	0.006 (0.007)	0.000 (0.001)	0.004 (0.006)
Board size	0.001 (0.001)	-0.020* (0.011)	0.001 (0.001)	-0.017 (0.011)
Constant	-0.038 (0.053)	6.453*** (0.444)	-0.048 (0.052)	6.391*** (0.448)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	14,707	14,707	14,707	14,707
R-squared	0.028	0.108	0.029	0.110
Number of companyid	1,501	1,501	1,501	1,501
Adj. R-squared	0.03	0.11	0.03	0.11

Notes: Unstandardized coefficients. Two-tailed tests reported. Standard errors in parentheses.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

within the board can almost offset the negative impact of decreased diversity on Tobin's Q by 0.144 (at 5% significance). Meanwhile, increasing brokerage position can enhance Tobin's Q of firms with declining diversity by 1.384 (at 5% significance). In other words, despite the negative impact of decreased diversity on Tobin's Q, firm performance can be improved through strengthening the collaboration within a board and gaining additional access to resources outside a board. To further verify our results, we examine the effects density and brokerage separately. The results still holds, consistent with our initial results. Overall, our finding supports our Hypotheses 1a and 1b and is consistent with the literature (Richard, Murthi and Ismail, 2007; Kim, 2005; Tseng et al., 2016).

4.4.3 Does a curvilinear relationship exist between board diversity and firm performance?

Hypothesis 2 states that there is a curvilinear relationship between diversity and firm performance as the effects of network density and brokerage position are argued to be non-linear. A low or high network density could lead to negative effects on firm performance (Kim, 2005). For example, a high network density is costly because of maintaining strong connections, this may distract directors from functioning efficiently and effectively (Jackson and Wolinsky, 1995). Similarly, if connections to bridge structural holes are too

weak then they will be unable to transfer complex resources to other directors in the boardroom (Hansen, 2002). Therefore, we further examine whether the non-linear effects of density and brokerage position exist and whether these effects lead to non-linear relationship between diversity and firm performance. This is examined by introducing the interaction term for the squared network density and brokerage position. No curvilinear relationship is reported on ROA, as shown in Table 4.4 Column (1). Column (2) reports that increased diversity has no impact on Tobin's Q whereas decreased board diversity is negatively associated with Tobin's Q. Increased diversity and decreased diversity both interact with density squared to affect Tobin's Q, which supports hypotheses 2a. The negative effects of decreased diversity can be offset by increasing the squared density, which turn into the positive effects. Brokerage position squared only interacts with decreased diversity to affect Tobin's Q, which partially supports hypotheses 2b. The results suggest that the effect of increased and decreased diversity on Tobin's Q is conditional on density squared ($p=0.113$; 0.140 respectively). The effect of decreased diversity on Tobin's Q is conditional on brokerage position squared ($p=5.407$, at 5% significance).

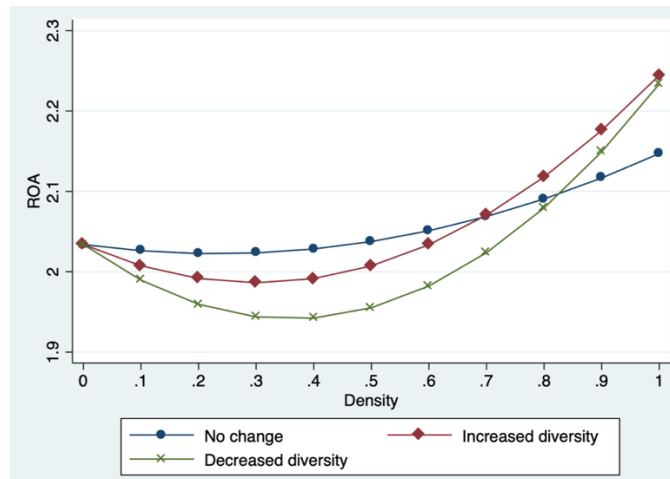
Table 4-4 Results of panel data analysis on diversity in relation to network density and brokerage position

The table presents the results for the curvilinear effects of network density and brokerage position on the relationship between board diversity and firm performance. We introduce the interaction term of increased diversity with network density and brokerage position and with the square of network density and brokerage position. Two measures of firm performance are used, respectively Return on Assets (ROA) and Tobin's Q. Increased diversity is a dummy variable, coded 1 if the board of a firm increased diversity through changes to board composition in the year, otherwise coded 0; Decreased diversity is a dummy variable, coded 1 if the board of a firm decreased diversity through changes to board composition in the year, otherwise coded 0. Moderators of boardroom networks are density and brokerage position. Density measures the presence or absence of connections between directors within the board, whereas brokerage position measures the possibility of directors to bridge the disconnection between the other two directors on different boards. The interaction term is introduced, i.e. board diversity and boardroom networks. We use a clustered standard error to obtain heteroscedasticity-robust standard errors.

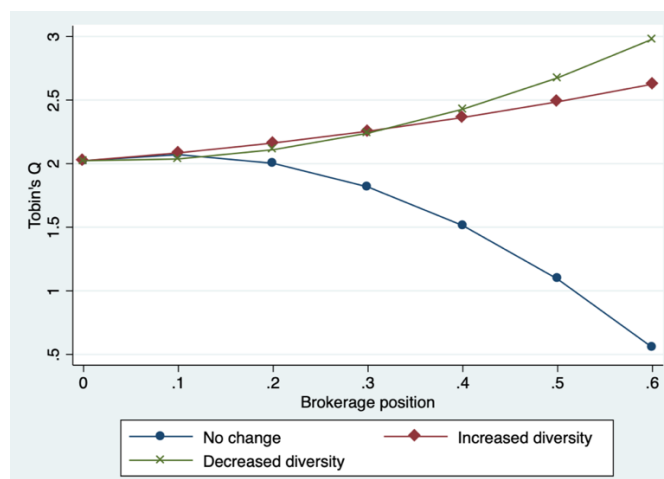
VARIABLES	(1)	(2)
	ROA	Tobin's Q
Increased diversity	-0.004 (0.004)	-0.051 (0.034)
Decreased diversity	-0.006* (0.004)	-0.105*** (0.033)
Density	0.011 (0.040)	-0.284 (0.347)
Density ²	-0.008 (0.031)	0.398 (0.278)
Brokerage position	0.073 (0.099)	0.756 (1.210)
Increased diversity*Density ²	-0.006 (0.008)	0.113* (0.064)
Decreased diversity*Density ²	0.006 (0.007)	0.140** (0.067)
Brokerage position ²	0.133 (0.329)	-4.566 (4.312)
Increased diversity*Brokerage position ²	0.043 (0.151)	5.000 (3.076)
Decreased diversity*Brokerage position ²	0.062 (0.153)	5.407** (2.209)
Control variables	Yes	Yes
Constant	-0.049 (0.052)	6.450*** (0.454)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	14,707	14,707
R-squared	0.029	0.111
Number of companyid	1,501	1,501
Adj. R-squared	0.03	0.11

Notes: Unstandardized coefficients. Two-tailed tests reported. Standard errors in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Overall, these findings indicate that raising density and brokerage position squared is effective to convert the negative effects of diversity changes into the positive effects, and eventually into firm performance.



(a)



(b)

Figure 4-3 Interaction Effects of Board Diversity and Boardroom networks

For clarity, we develop graphs of these moderating effects of density and brokerage position squared on Tobin's Q, as shown in Figure 4.3. We divided the data set into firms which have increased, decreased and have no change in board diversity. Figure 4.3a captures the curvilinear relationship between board diversity and Tobin's Q due to the squared density. The U-shaped

relationship between density and Tobin's Q is prominent in firms increased and decreased diversity. In firms with no change in board diversity, we do not find a significant effect.

Figure 4.3b captures the curvilinear relationship between board diversity and Tobin's Q due to the squared brokerage position. The curvilinear relationship between brokerage position and Tobin's Q is prominent in our full sample of firms, regardless of diversity changes. Nevertheless, firms with no diversity change show a concave slope suggesting that brokerage position of directors deteriorate Tobin's Q. Directors who share similar demographics are more likely to locate at the clusters with similar resources. Thus, these directors are more likely to acquire similar resources through bridging structural holes between these clusters. This increases the redundancy of resources, eventually lowers firm performance. Decreased diversity breaks the existing social patterns, which may drive these directors to develop new connections. Thus, resources obtained by promoting directors' brokerage position are diverse, contributing to team thinking and higher firm performance.

4.5 Conclusions and implications

This chapter sheds lights on how board networks of directors influence the relationship between board diversity and firm performance. We used a

sample of 1,501 S&P1500 companies with 14,879 board changes between 2001 and 2015 to examine the moderating role of boardroom networks in this relationship. We constructed a network of the entire population of S&P 1500 companies comprising 28,887 interlocking directorships. Two network analytic concepts of density and brokerage position illuminate how the internal and external network determines diversity effects on firm performance. We suggest that both networks moderate the relationship between board diversity and firm performance with a curvilinear relationship between diversity and firm performance reported.

This assessment is important as multiple calls² demanding greater diversity in the boardroom have accelerated levels of boardroom change. We argue that adding “new” directors to S&P1500 boards and enhancing diversity may disrupt existing socialization processes between directors. Each replacement or appointment of directors involves socialization into the new role and settling (Glaser and Strauss, 2011), and new appointees and existing directors often experience a transition period before they collaborate effectively. This ability to socialize and its influence on the diversity and firm performance

² Numerous proposals (e.g., the Teachers Insurance and Annuity Association of America-College Retirement Equities Fund, i.e. TIAA-CREF, 1997; The National Association of Corporate Directors, i.e. NACD, 1994) and government interventions (e.g., gender quotas; see details in Women on Boards Davies Review Five Year Summary in 2015; Egon Zehnder, Global Board Diversity Analysis 2016) with emphasize the value of diversity, yet offer little guidance on how to realize such value.

relationship has been largely neglected (Lawrence, 1997). Our empirical evidence suggests that boardroom networks help to uncover the socialization process critical to explaining how diversity may enhance firm performance. This nuanced understanding of how board diversity and board refreshment intersects with social networks to affect firm performance, helps reconcile conflicting views on diversity effects (van Knippenberg et al., 2004).

Previous literature mainly focuses on examining the impact of director demographics (Zhang and Rajagopalan 2003; Shen and Cannella, 2002) and network characteristics (Larcker, So and Wang, 2013) on firm performance separately. Our results suggest that boards with different distribution of diversity experience different dynamics amongst directors. This, in turn, affects firm performance. Diversity effects on firm performance are reported to be curvilinearly associated with the level of network density and brokerage position, highlighting the importance of network effects when managing diversity.

There are limitations of the chapter. Our data collection was limited to archival sources of data. Future research using primary sources could reveal more about board processes to explain how diverse boards make decisions. For instance, the social network constructed in this chapter cannot capture all possible avenues through which a director can connect to other directors. This

would include religious activities and political affiliations. These social or grey ties add noise to our network analysis and could dampen the interaction effects between diversity and social capital of boards of directors. Finally, this chapter used panel data analysis to investigate variation in diversity effects over time. A further step would be to consider diversity changes as a repeated event in the life of a firm. Such consecutive diversity changes on firm performance could be assessed using the analysis of growth curve models. In conclusion we do hope such data-driven social network analysis can further help boards and companies to succeed in managing corporate board diversity.

5. Supply or Demand? An Investigation into the Causes of Gender Inequality at the Corporate Top

5.1 Introduction

Why are there few women at the top of corporations? Several potential explanations have been offered in the academic literature and both demand and supply side have been examined separately accounting for this issue (see a review Gabaldon et al., 2016). On the demand side, possible reasons for the underrepresentation of females on boards are related to gender discrimination and biased conception (Vinkenburg, Jansen and Koopman, 2000). On the other hand, the supply-side causes are attributed to female considerations and constraints, such as different values, personal considerations about the family, and career decisions that result in a relatively limited pool of qualified female candidates for board positions (Bygren and Gähler, 2012; Gregory-Smith et al., 2014). This ambiguity calls for a comprehensive understanding of the causes as well as potential solution instruments to promote more women on corporate boards (Withers, Hillman and Cannella, 2012). This chapter, therefore, answers this call by empirically examining the causes of gender inequality on corporate boards from a demand and supply perspective.

It is often argued that women have limited access to valuable social capital,

which is critical for career progression in the director labor market (Waldstrøm and Madsen, 2007; Janiak, 2003, Fairfax, 2006). This chapter examines this issue to cast light on the factors that are likely to be driving female underrepresentation on corporate boards. One reason forwarded for unequal access to social capital pertains to the demand-side barriers in an organizational context. The interaction networks of corporate directors, who in most cases are predominantly men, known as the 'old boy's' club (Ramirez, 2004) allocate a variety of instrumental resources critical for career advancement (Tharenou, Latimer and Conroy, 1994; Ibarra, 1993; Lyness and Thompson, 2000; Tharenou, 2005). These networks often solidify male privilege and disadvantage female candidates by limiting access to valuable social capital to support their career progression (Westphal and Stern, 2006, 2007; Withers, Hillman and Cannella, 2012; Cullen and Perez-Truglia, 2019).

A corollary to the demand perspective is the supply-centred explanation (Riger and Galligan, 1980; Downey and Lahey, 1988), which suggests that the lack of women in the 'old boy's' club is a result of women's preference for homophily. Women prefer to connect to other females, forming a female-dominated network that provides access to relatively few labor-market resources (Putnam, 2000).

The essence of the debate between demand and supply perspectives is

whether unequal access to social capital between females and males is a result of structural constraints from the 'old boy's' club or women's preference for homophily. To test this proposition, we examine the network patterns of 2,920 S&P 1500 directors who had their first career transitions to the board and/or executive level between 2008 and 2018. We find gender differences in the accessibility of social capital exist and are attributed to both the demand and supply.

We proceed with two-step analysis and two network-analytic concepts are constructed. We first examine whether the demand or supply determines women's interaction patterns on corporate boards. Homophily can capture the tendency to connect to same-sex directors on a focal and other boards. Two homophily metrics are constructed to indicate if any structural constraint exists preventing women from breaking into the male-dominated inter-locking networks. The first one indicates a ratio of the number of director's same-sex connections to the total number of connections to directors on the focal boards and other corporate boards. The second metric, referred to as adjusted homophily, takes into account the total availability of men and women by adjusting for both the availability of different-sized gender groups and individual choices. We find that women still tend to connect to other female directors with the ease of structural constraints from these networks of men. This provides empirical evidence to support the

demand and supply perspectives.

Then we, holding the interaction patterns identical between men and women, examine whether women still access less social capital than their male counterparts. This is performed by constructing a measure of network centrality to represent the degrees of access to the resources embedded in interaction networks and to control for adjusted homophily. We find that gender has stronger effects on access to social capital than structural constraints. Women cannot necessarily access the resources embedded in 'old boy's' networks, despite having the same access to interaction networks as men. The results indicate that women may not only have dissimilar networks but also the use of networks differently from men. Overall, our findings suggest the existing differences in networking and the accessibility of social capital between women and men, produces gender inequality on corporate boards (Terjesen, Sealy and Singh, 2009). Nevertheless, promoting gender diversity requires the efforts from the demand and the supply perspectives. The diffusion of and the design of gender diversity practices need to be complemented with other practices that can foster the emergence of a more gender-balanced corporate elite (Aguilera and Jackson, 2003; Zattoni and Cuomo, 2008).

This chapter is important for a number of reasons. First, the underrepresentation of women at the top of corporations has become a

pressing issue³. A prolific amount of literature has emerged trying to identify and tackle the barriers preventing women from reaching top managerial positions (Bilimoria, 2000; Dezsö and Ross, 2012; Terjesen, Sealy, and Singh, 2009). However, additional empirical evidence and theoretical development are needed to clarify the mechanisms producing gender differences in corporate advancement.

Second, social networks strongly affect board composition (Kramarz and Thesmar, 2013). Despite this, organizations often downplay the role of the 'old boy's' networks within organizations and the benefits that males obtain from these (Rand and Bierema, 2009). Most board members are recruited through the 'old boy's' networks (Adams, 2017; Adams, Akyol, and Verwijmeren, 2018; Cai, Nguyen, and Walkling, 2018; Ferreira et al., 2017), which leads to the lack of information about qualified female candidates and eventually to women being kept out of the pipeline (Boyallian, Dasgupta and Homroy, 2019). To improve gender diversity on boards, organizations should change established boundaries and image of the old boys' club to create a fairer workplace with more equitable recruitment practices (Fanto, Solan and Darley, 2011; Palmer and Barber, 2001; Westphal and Khanna, 2003).

Lastly, the lack of female role models is often cited as a reason for the low

³ The latest report by Egon Zehnder (2018) shows that 20.4 percent of all directors across 44 countries are women, up from 13.6 percent in 2012.

numbers of women in top positions (Sealy and Singh, 2010). Women are seen to be less fit in leadership (Heilman, 2012) holding women back from leadership positions (Doldor et al., 2012; Gabaldon et al., 2016). Studying the careers of these successful women who have ultimately reached the top can motivate women aspiring to the top and guide their individual development (Gibson, 2003; 2004).

This chapter makes several contributions. This work contributes to gender studies, particularly in a corporate context by illuminating the under-representation of women in the upper echelons of corporations (see a review Gabaldon et al., 2016). This chapter builds on the past literature that social networks produce board gender inequality (McDonald, 2011) and advances our knowledge by empirically examining the demand and supply determinants of this phenomenon (McPherson and Smith-Lovin, 1987). Our results suggest that board gender imbalance is an issue of the demand and the supply, which rarely has been done in the literature (Boyallian, Dasgupta and Homroy, 2019).

Lastly, prior findings suggest that opportunities to build a new network of connections are important considerations for directors when joining a board (Fahlenbrach, Low, and Stulz, 2010; Levit and Malenko, 2016; Matveyev, 2016). Few empirical literature studies these indirect network benefits

(Fahlenbrach, Kim and Low, 2018). This chapter examines the network development of men and women over career transitions to the board and/or executive level (Schweitzer et al., 2011; Eddleston, Baldrige and Veiga, 2004). We find that access to executive networks via board appointments partially utilizes newly-appointed directors' networks and enhances their future career in the director labor market.

The rest of the chapter is organized into five sections. In the next section, we forward an overview of social networks and career outcomes and in Section 3, we describe the data and outline the empirical framework. Section 4 presents our empirical results and Section 5 concludes the chapter.

5.2 Literature review

Women in organizational settings often lack access to or are excluded from emergent interaction networks (e.g., Kanter, 1977; Harlan and Weiss, 1982; Ragins and Sundstrom, 1989; O'Leary and Ickovics, 1992). These networks provide career assistance, including advice, technical knowledge, strategic insight, and emotional support (Casciaro, Gino and Kouchaki, 2014; Whiting and de Janasz, 2004). Some researchers have therefore inferred the barriers that women encounter when joining interaction networks to explain different male and female career outcomes (Ibarra, 1997; McDonald, Lin and Ao, 2009).

This section reviews the mechanisms and empirical findings on the role of networks in creating or reinforcing gender disparity in corporate upper echelons and from the perspective of demand and supply. Lastly, hypotheses are developed.

We argue that gender differences in access to social capital, in particular to valuable resources and information (Lin, 2000) explain gender inequality on corporate boards. Social capital provides the resources including information, influence, and solidarity that are instrumental for career success (Adler and Kwon, 2002; Bourdieu, 1986). Male networks are believed to provide more job-related resources and information than female networks (McPherson, Smith-Lovin and Cook, 2001). Therefore, women's relatively disadvantageous network position impedes their advancement to the top of corporations (Terjesen, Sealy and Singh, 2009).

Two theoretical perspectives provide demand and supply-side explanations of such differences in social capital accessibility (Moore, 1990; Fischer and Oliker, 1983). On the supply side, personal-centered or dispositional explanations focus on women's preferences, personalities, and interaction patterns being inherently different from those of men (Riger and Galligan, 1980; Downey and Lahey, 1988). On the demand side, situation-centered explanations argue that the role of organizational context, rather than

women's traits, accounts for women's lack of access to interaction networks (Moore, 1990; Smith-Lovin and McPherson, 1993).

5.2.1 Preference for homophily

Preference for homophily is a supply-side reason for unequal access to social capital between males and females. Individuals prefer to interact with others who have similar attributes including gender identity (Putnam, 2000). As such, males are more likely to link to other males who hold superior positions in the opportunity structure of organizations (McPherson, Smith-Lovin and Cook, 2001). In contrast, females prefer to connect with other females, who are often located in relatively disadvantaged socioeconomic positions (Acker, 1980) with limited instrumental resources (Lin, 2002). Therefore, women's preference for homophily results in their networks being largely composed of females and with less social capital than their male counterparts.

5.2.2 Structural constraints from the 'old boy's' networks

Structuralists argue that interaction patterns can be induced by the availability of different types of contact, rather than preferences for homophily based on interpersonal attraction (Kanter, 1977). The extent of contact between male and female coworkers provides the sex composition of the group (Blau, 1977). The majority of men hold positions of power and

opportunity limiting women's availability for contacts (Burt, 2009; McDonald, 2011; McPherson, Smith-Lovin and Cook, 2001). According to social identity theory, women at the top are often perceived as threats by the traditional largely male corporate elite, challenging the prevailing masculine cultural norms and questioning the need to hide or eliminate emotions in the workplace (Oakley, 2000; Hucke, 2017). Male members coalesce to preserve male-dominated upper ranks by intentionally excluding women from informal interactions (Brass, 1985; Belle, 2002). This is evident by the "token" women that encounter difficulties in adjusting to and fitting into male managerial cultures (Kanter, 1977; Nelson and Burke, 2000). Despite being aware of the benefits associated with access to old boys' networks, women are more likely to encounter difficulties in breaking into these male-dominated networks (Wilson and Daly, 2004; Wirth-Cauchon, 2001). We, therefore, develop the hypothesis:

H₁: Female directors excluded from the 'old boy's' networks are subject to structural constraints from the interaction networks on corporate boards.

5.2.3 Access to valuable social capital

If the above structural perspective holds, the next logical question is, if women and men had equal access to the same interaction networks, would women have access to equivalent benefits as their male counterparts.

According to social closure theory (Tilly, 2015), people tend to help out in-group members; a categorization determined by gender. Males prefer to reserve valued resources for other males as they share the same gender characteristics. For example, male mentors would withhold job hunting assistance from or provide inferior assistance to female proteges, while reserving their full assistance for their proteges, based on similarity in ascriptive gender characteristics (Fitt and Newton, 1981; Shapiro, Haseltine and Rowe, 1978). Even if women ascend to the top, they benefit less from access to these networks than their male counterparts.

H₂: With equal access to interaction networks, female directors obtain less social capital than their male counterparts.

5.3 Methodology

5.3.1 Data

Our dataset, sourced from BoardEx, combines the employment history of 98,388 directors from 1933 to 2018 and network information from 1956 to 2018. This chapter selects directors who served on S&P 1500 boards between 2008 and 2018. Investigating S&P 1500 directors' career progressions and interaction networks provides insights into the role of gender differences in creating gender disparity at the corporate top. Employment histories including information about the start and end date of directors' current and

previous roles allow us to identify directors who had their first and the subsequent board or/and executive appointments during the sample period. From this, we assemble a dataset of 7,771 directors' career histories between 2008 and 2018.

Network indices

We use network analysis to explore actual relationships that evolve among females and males through career advancement. This chapter explores gender differences at two levels of network analysis-properties of individuals' sociometric choices and indices of centrality within interlocking directorship networks.

BoardEx provides directors' network information from 1956 to 2018. The network information provides information on the starting and ending year of a connection, and the name, role, company name of a focal director and connecting directors - directors to whom a focal director connects to. These connecting directors include directors in the same firm as a focal director and other firms and the connections refer to directorship interlocks that our sample directors are connected to the directors in the same and other firms via employment, education, and social activities, such as golf memberships in the year. Eventually, directorship interlocks comprise 326,192 directors including our sample directors and connecting directors in other firms over

the sample period.

Closeness centrality. Closeness centrality captures how close a director is to all other directors in the network, after taking into account direct and indirect connections to all the other directors. Closeness centrality, therefore, refers to how efficiently and effectively a director can communicate with others by either communicating directly or through intermediaries. Taking into account the size of the network, a director with high closeness can quickly transmit and receive information.

Closeness centrality is calculated as the inverse of the mean geodesic distance (i.e., the shortest path) between a vertex v and all other vertices reachable from it:

$$X_v = \frac{N - 1}{\sum_{w=1}^N u(v, w)} \quad (1)$$

where X is the closeness centrality of a vertex v in a network in which N is the number of vertices and $u(v, w)$ is the distance between the given vertex (v) and (w). The distance refers to the number of ties between (v) to another (w). For example, if vertex (v) directly connects to vertex (w), then the distance between vertex (v) to another vertex (w) is 1. If vertex (v) indirectly connects to (w) through two paths. One is through (v) - (A)- (B)- (w), then the distance

for this path is 2. The other path is through (v) - (A) - (D) - (E) - (w) , then the distance is 3. Therefore, the distance between (v) and (w) is the shortest path, i.e. the distance is 2.

Figure 5.1 depicts the centrality closeness of males and females over advancement. The X-axis denotes the years before and after one career advancement. Specifically, we construct an “event centered” time scales where the time of “0” represents the event year that career advancement to the boards occurs, $[-5, -1]$ represents 5 years before the event and $[1, 5]$ represents 5 years after the event. In the figure, females occupy a less central position relative to males before they advanced to the corporate board. This difference tends to converge after the advancement and female directors overtake their male counterparts located at a more central position in the second year after the advancement. Until the fifth year of advancement, this gender difference is diminished.

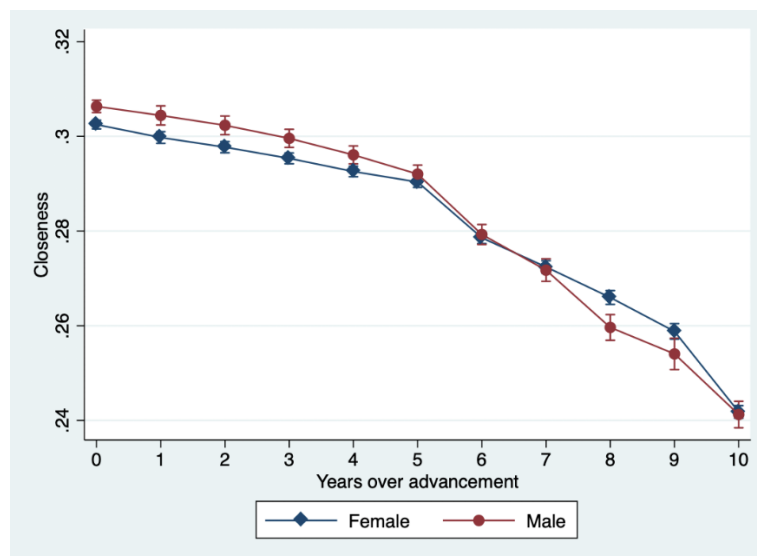


Figure 5-1 Centrality closeness of males and females over advancement

Homophily. To operationalize homophily of network contacts, we measure the number of same-sex and opposite-sex actors that a director is connected to in the section of network information on BoardEx. Two different homophily metrics are then derived for each director. The first indicates a proportion of the number of same-sex connections as a total number of contacts. While this index is easily interpretable, it is biased in that it does not take into account the total availability of men and women, which precludes or makes possible any given choice pattern (Blau, 1977).

The second homophily metric we use corrects for this bias by adjusting for both the availability of different-sized gender groups and individuals' choices. We calculate the following values for each director within the complete interlocking directorship network including direct and indirect ties: (a) the number of ties a person has with people of the same sex, (b) the number of ties a person has with people of the opposite sex, (c) the number of people of the same sex the actor could have connected to but did not, and (d) the number of people of the opposite sex the actor could have connected to but did not. The homophily measure is then derived by the following calculation:

$$H = \sqrt{\left[\left(\frac{a}{a+b}\right) - \left(\frac{c}{c+d}\right)\right]\left[\left(\frac{a}{a+c}\right) - \left(\frac{b}{b+c}\right)\right]} \quad (2)$$

This calculation produces a measure ranging from - 1 to 1; positive values

indicate a tendency for a person to choose people of the same sex, given the availability of members of the same sex; a value of zero indicates a balanced mix of male and female choices, again, given availability.

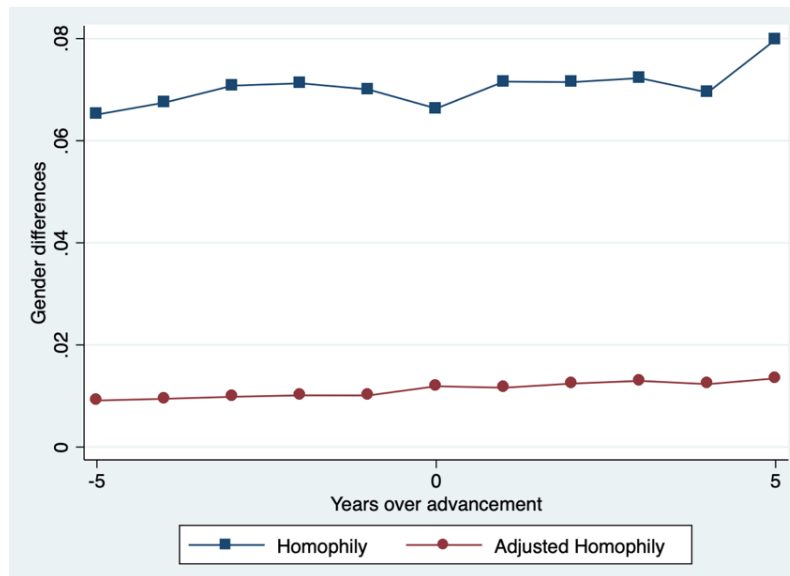


Figure 5-2 Gender differences over advancement based on two different metrics of homophily

Figure 5.2 captures gender differences based on adjusted homophily and homophily without adjustment of the availability of contacts over advancement. Gender differences in adjusted homophily are floating around 0.01. It indicates that men and women almost have no quantitative differences in homophily, once organizational constraints are taken into account. If the role of organizational context is not accounted for, a notable gender difference is reported in homophily, whereby female directors have more homophilous networks than their male counterparts by approximately 0.07. The difference between a traditional measure of homophily and adjusted homophily

provides some indications that gender differences in homophily may be subject to the availability of contacts in an organizational context, i.e. demand-side constraints.

Control variables

We control for the director and firm-level characteristics, sourced from BoardEx and Datastream, respectively. The measures of variables are outlined in Table 5.1 with descriptive statistics. After excluding observations with missing values in key variables, our final sample size is 2,920 directors, 2,040 firms and 12,817 observations.

We include director-level demographics of age, educational level, status, overseas experiences, and backgrounds, taken from previous literature to determine network development (Goergen, Limbach and Scholz, 2015; Terjesen, Sealy and Singh, 2009). In the total sample, 25% of directors are female and 75% male; female directors generally are older and better-educated and have more overseas and cross-industry working experience than their male counterparts.

We also control for firm-level characteristics, including board size, board female ratio, return on assets (ROA), average board experience, firm size, average network size, and standard deviation of directors' age. The board of directors of our sampling firms is on average composed of 9.82 directors, of

which 16% of board seats are held by females, with a standard deviation of 0.11. On average, a board has a total of 1,713 connections, the 5.69-year working experience served on the board with a standard deviation of 7.65 years.

5.3.2 The testing framework

Before proceeding to our main analysis, we examine the variation of gender differences in network structure and whether access to valuable social capital is conditional on advancing to the top of corporations. The lack of women on boards is often explained by women's networks providing limited resources and information that can support their career advancement. If this is the case, women who achieved the same career outcomes as their male counterparts are expected to have the same or similar networks. The human capital perspective argues that gender differences in network rewards are due to differences in education, expertise, and positional resources (Miller, Labovitz, and Fry, 1975). Differences between men and women concerning achievement (i.e., education, experience, and expertise) and formal position (i.e., rank, department, occupation) make women, as a group, less desirable network contacts, accounting for most observed disadvantages to women.

The distinction between the two perspectives touches on whether gender differences in networking result from inherent preferences for homophily or

structural constraints in an organizational context. Following McPherson and Smith-Lovin (1987), the former perspective can only be ascertained when the structural constraints are controlled for. That is if women have an opportunity of joining old boy networks, yet still choose to interact following their preferences, we can conclude that gender differences in networking result from women's characteristics (supply side) rather than a constraining situation (demand side). To test this proposition, we adopt the correlated random-effects model to examine if the effects of gender are limited once the availability is controlled for.

The correlated random effects model is used for three reasons. First, gender is time-invariant, which is inconsistent with the fixed-effects model. Second, a traditional random-effects model is not efficient in obtaining within and between variation separately, potentially creating a bias in gender effects estimates (Schunck, 2013). Third, while a hybrid model (Allison, 2009) can fix two of the drawbacks mentioned above, the assumption of the equivalence of within and between estimates still holds. As a Wald test rejects the equality for within and between estimates, unobserved heterogeneity can be correlated with observed individual characteristics. A Hausman test (Hausman, 1978) also reaches the same conclusion. Hence, we use the correlated random-effects model to relax this assumption with a decomposition of

Table 5-1 Control variables with measures and statistics

<i>Director-level characteristics</i>						
Total		Female (25%)		Male (75%)		T-test
N=2,919		N=730		N=2,189		
Obs.=12,817		Obs.=3,035		Obs.=9,683		
Variable	Definitions	Mean	St.D	Mean	St.D	
Nationality	An indicator variable, indicating if a director is non-American (Terjesen, Sealy and Singh, 2009)	0.2	0.4	0.23	0.42	0.080*
Age	Current year-date of birth (Goergen, Limbach and Scholz, 2015).	52.63	6.35	52.35	7.4	0.065*
Education	The number of qualifications held by a director (Terjesen, Sealy and Singh, 2009)	1.87	0.86	1.73	0.77	0.093*
Status	The number of titles besides Mr., Mrs, Miss (Matlin, 1987)	0.07	0.26	0.07	0.26	0.054*
Overseas experience	The number of overseas appointments of a director (Daily et al., 2000)	0.47	0.5	0.46	0.5	0.060*
Background	The number of SIC industries a director has worked in.	3.19	1.12	2.78	1.04	0.03**
Career advancement	An indicator variable, indicating if a director advances to the board/executive level in the year	0.58	0.49	0.56	0.50	0.000***
<i>Firm-level characteristics (Total sample)</i>						
Variable	Definitions	Mean		St.D		
Gender ratio	The percentage of female directors relative to the total of directors	0.16		0.11		0.000***
Board size	Total number of directors	9.82		2.6		0.023**
Network size	The mean of all directors' connections	1713.04		951.03		0.03**
ROA	Return on assets: Net income divided by total assets (multiplied by 100)	4.08		13.86		0.000***
Firm size	The log of total assets	6.48		28.75		0.03**
	Total assets (\$m)	23,700		136,000		0.03**
Board experience	The mean of the number of years served on boards to date	5.69		3.67		0.03**
Std. age	The standard deviation of director's age	7.65		2.19		0.000***

Note: *, **, *** denotes 10%, 5%, 10% significance, respectively.

between and within variation in a single model. This approach is not new and has become increasingly popular in panel data (Burnett and Farkas, 2009; Phillips and Loyd, 2006; Ousey and Wilcox, 2007; Teachman, 2011).

The idea of the CRE model is to decompose between and within variation and estimate the respective effects in a single model. The standard model is given by:

$$y_{it} = \beta_0 + \beta_1\chi_{it} + \beta_2\bar{\chi}_i + \mu_i \quad (1)$$

To estimate between and within effects in the model, we must first generate the cluster-specific mean of χ_{it} . The second step is to create the deviation scores, which is also known as group mean centering. Therefore, χ_{it} is a vector of time-varying individual director and firm characteristics, $\bar{\chi}_i$ is the cluster-specific mean of time-varying individual and firm characteristics. Within variation is captured by β_1 ; β_2 estimates the difference between within and between variation. Then $(\beta_2 - \beta_1)$ estimates between variation.

We apply the dataset of 2,920 directors, clustered within 2,040 firms between 2008 and 2018 into the CRE model. We start with estimating the following baseline model for gender effects on preference for homophily:

$$Network_{it} = \beta_0 + \beta_1\chi_{it} + \beta_2\bar{\chi}_i + \mu_i$$

(1)

where $Network_{it}$ refers to network structure of homophily using two different metrics and closeness centrality respectively for $director_i$ at the $year_t$. β_1 estimates the within effects of gender; β_2 estimates the between effects of gender, i.e. the fixed-effects estimate; $\beta_2 - \beta_1$ estimates the differences between within and between effects of gender; μ_i represents standard errors.

5.4 Results

Table 5.2 reports the results of gender differences in homophily and the centrality closeness using the full sample controlling for the director- and firm-level characteristics without controlling for career advancement nor the availability of contacts. Column (1) reports that gender plays a significant role in explaining the preference for homophily in which women differ from their male counterparts. Women have more homophilous networks than men. Female directors possess more same-gender connections than their male counterparts, by 3.7% in a given firm, and by 3.5% between firms (both at the significance level of 1%). Column (2) reports the results of gender differences in network access, indexed by closeness centrality. The role of gender remains significant. Female directors possess a central position in interlocking-directorship networks relative to male directors. Prior research suggests that centrality represents an advantageous position enabling individuals to access more valuable social capital (Adler and Kwon, 2002).

The results show that female directors are at a relatively advantageous position in accessing valuable social capital.

We then explore the causes underlying the results. First, we examine the human capital perspective, i.e. whether gender differences in network rewards are due to differences in career outcomes (Miller, Labovitz, and Fry, 1975). To test this proposition, we control for career advancement. The results shown in Table 5.2 columns (3) and (4) suggest that career advancement can increase homophily by 0.004 (at the significance level of 1%) and the ability to access social capital by 0.006 (at the significance level of 1%) for directors in a given firm. However, the significance and magnitude of gender coefficient remain the same as when it is without controlling for career advancement. This finding casts doubt on the human capital perspective, that female directors' network patterns remain different from their male counterparts regardless of career advancement to the top of corporations. The findings infer that differences between female and male networks are manifestations of fundamental gender differences (Ibarra, 1997; McDonald et al., 2009; McGuire, 2000, 2002; Smith, 2000).

As we discussed earlier, the traditional measure of homophily does not take into account the availability of contacts within a network. Structuralists argue that gender differences in social patterns are subject to structural constraints

Table 5-2 The results of gender differences in preferences for homophily

The table reports the results of gender differences in preferences for homophily using the correlated random effects model controlling for the individual director- and firm-level characteristics. Individual director characteristics include age, education level, overseas experience, power, backgrounds and nationality, and firm-level characteristics include board size, a standard deviation of directors' age, female ratio, average board experience, average network size, return on assets and firm size. Educational level is measured as the number of qualifications awarded by the current year; overseas experience is an indicator variable indicating if an individual work overseas or not; status is measured as the number of titles that an individual has besides Mr., Mrs, Miss; backgrounds is the number of industries an individual worked in by the current year; and nationality is an indicator variable indicating if an individual is American or not. The average board experience is calculated as the mean of the total years of directors served on boards. Firm size is the log of total assets. Average network size is the mean of the total number of connections of directors on a given board. Network indices are homophily and closeness centrality. Homophily is measured in a traditional way by the percentage of same-gender connections. Closeness centrality measures how close a director connects to other directors. Column (1) and (2) report the results of gender differences in preference for homophily and closeness centrality without controlling for career advancement and the availability of contacts, while Column (3) and (4) with the control for career advancement but not the availability of contacts.

VARIABLES	(1)		(2)		(3)		(4)	
	Homophily		Closeness centrality		Homophily		Closeness centrality	
	Within	Between	Within	Between	Within	Between	Within	Between
<i>Director-level characteristics</i>								
Gender	0.037*** (0.003)	0.035*** (0.007)	0.004*** (0.001)	0.005*** (0.002)	0.037*** (0.003)	0.035*** (0.007)	0.004*** (0.001)	0.005*** (0.002)
Age	-0.004*** (0.001)	0.000* (0.000)	-0.004*** (0.000)	0.000 (0.000)	-0.004*** (0.001)	0.000 (0.000)	-0.004*** (0.000)	0.000 (0.000)
Education	0.006*** (0.002)	0.008** (0.003)	0.001*** (0.000)	0.004*** (0.001)	0.006*** (0.002)	0.008** (0.003)	0.001*** (0.000)	0.004*** (0.001)
Overseas experience	0.003 (0.003)	-0.004 (0.005)	0.002*** (0.001)	-0.000 (0.001)	0.003 (0.003)	-0.004 (0.005)	0.002*** (0.001)	-0.000 (0.001)
Background	0.003** (0.001)	-0.001 (0.003)	0.002*** (0.000)	0.000 (0.001)	0.002* (0.001)	-0.002 (0.003)	0.001*** (0.000)	0.000 (0.001)
Status	-0.021*** (0.005)	-0.012 (0.011)	0.001 (0.001)	-0.006** (0.003)	-0.022*** (0.005)	-0.012 (0.011)	0.000 (0.001)	-0.006** (0.003)
Nationality	-0.005 (0.003)	-0.002 (0.007)	0.003*** (0.001)	0.002 (0.002)	-0.006* (0.003)	-0.002 (0.007)	0.003*** (0.001)	0.002 (0.002)
Advancement					0.009*** (0.003)	0.010 (0.007)	0.006*** (0.001)	0.006*** (0.002)

Table 5-2 Continued

VARIABLES	(1)		(2)		(3)		(4)	
	Homophily		Closeness centrality		Homophily		Closeness centrality	
	Within	Between	Within	Between	Within	Between	Within	Between
<i>Firm-level characteristics</i>								
Gender ratio	0.072*** (0.021)	0.315*** (0.023)	0.008** (0.004)	0.009 (0.005)	0.071*** (0.021)	0.313*** (0.023)	0.007* (0.004)	0.008 (0.005)
Board size	-0.001 (0.001)	0.004*** (0.001)	0.000** (0.000)	0.001*** (0.000)	-0.001 (0.001)	0.004*** (0.001)	0.000** (0.000)	0.001*** (0.000)
Network size	-0.000*** (0.000)	0.000* (0.000)	0.000* (0.000)	0.000*** (0.000)	-0.002 (0.001)	0.000** (0.000)	-0.000 (0.000)	0.000*** (0.000)
ROA	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	0.000* (0.000)	-0.000** (0.000)
Firm size	-0.002 (0.002)	-0.001 (0.001)	0.001* (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.002)	0.000 (0.000)	0.001* (0.000)
Overseas experience	-0.002** (0.001)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.002)	0.000 (0.001)	0.001** (0.000)	-0.000 (0.000)
Std. age	-0.001 (0.001)	-0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)	-0.002** (0.001)	-0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)
Constant	0.049 (0.033)		0.251*** (0.008)		0.044 (0.034)		0.249*** (0.008)	
Year effects	Yes		Yes		Yes		Yes	
Firm effects	Yes		Yes		Yes		Yes	
No. observations	12,729		12,729		12,729		12,729	
No. Firms	2,040		2,040		2,040		2,040	
Adj. R-squared	0.37		0.71		0.37		0.71	

from the interaction networks on corporate boards. Therefore, we take demand- and supply-side into account by controlling for the availability of contacts, replacing the traditional homophily measure with the measure of adjusted homophily. The results are reported in Table 5.3. Column (1) reports the results of homophily adjusted for the availability of contacts (adjusted homophily) showing that the role of gender remains significant, regardless of the availability of contacts. This finding provides partial support to the supply- side perspective that women prefer to connect to other females, despite having the same access to the old boys' networks as men. Nevertheless, a propounding decrease in the significance of gender is observed, within effects of gender is reduced from 0.037 to 0.01. This reduction indicates the existence of structural constraints from the demand side, limiting women's access to interaction networks. Hence, our results suggest that the demand and supply side both account for gender differences in preference for homophily.

Lastly, we test our hypothesis 2: whether women can access equivalent resources as their male counterparts without structural constraints from an organizational context by controlling for adjusted homophily. The results in Table 5.3 Column (2) show that gender differences in network access remain, but that women are worse-off from access to interaction networks ($\beta=-0.007$;

Table 5-3 The results of gender differences in preferences for homophily considering the availability of contacts

The table reports the results of gender differences in preferences for homophily using the correlated random effects model controlling for the individual director- and firm-level characteristics and the availability of contacts. Individual director characteristics include age, education level, overseas experience, power, backgrounds and nationality, and firm-level characteristics include board size, a standard deviation of directors' age, female ratio, average board experience, average network size, return on assets and firm size. Educational level is measured as the number of qualifications awarded by the current year; overseas experience is an indicator variable indicating if an individual work overseas or not; power is an indicator variable indicating if an individual has extra titles besides Mr., Mrs, Miss; backgrounds is the number of industries an individual worked in by the current year; and nationality is an indicator variable indicating if an individual is American or not. The average board experience is calculated as the mean of the total years of directors served on boards. Firm size is the log of total assets. The average network size is the mean of the total number of connections of directors on a given board. Network indices are homophily and closeness centrality. Homophily is adjusted by the availability of contacts, named adjusted homophily. Closeness centrality measures how close a director connects to other directors. Column (1) and (2) report the results of gender differences in preference for homophily and closeness centrality with controlling for career advancement and the availability of contacts.

Variables	(1)		Variables	(2)	
	Adjusted Homophily			Closeness centrality	
	Within	Between		Within	Between
Gender	0.010*** (0.000)	0.012*** (0.001)	Gender	-0.004*** (0.001)	-0.007*** (0.001)
Age	0.000 (0.000)	0.000*** (0.000)	Age	-0.004*** (0.000)	-0.000** (0.000)
Education	0.001*** (0.000)	0.002*** (0.000)	Education	0.000 (0.000)	0.003*** (0.001)
Overseas experience	0.001*** (0.000)	0.000 (0.001)	Overseas experience	0.001** (0.000)	-0.000 (0.001)
Background	0.000** (0.000)	-0.000 (0.000)	Background	0.001*** (0.000)	0.000 (0.001)
Power	0.005*** (0.001)	0.002 (0.001)	Power	-0.003*** (0.001)	-0.009*** (0.002)
Nationality	0.000 (0.000)	0.000 (0.001)	Nationality	0.003*** (0.001)	0.002 (0.001)
Advancement	0.003*** (0.000)	0.004*** (0.001)	Advancement	0.003*** (0.001)	0.001 (0.002)
Gender ratio	-0.007*** (0.002)	-0.009*** (0.003)	Adj.Homophily	0.764*** (0.016)	0.950*** (0.037)
Board size	0.000*** (0.000)	0.000** (0.000)	Gender ratio	0.013*** (0.004)	0.016*** (0.005)
Network size	0.000 (0.000)	0.000*** (0.000)	Board size	0.000 (0.000)	0.001*** (0.000)
ROA	0.000*** (0.000)	-0.000** (0.000)	Network size	-0.000 (0.000)	0.000*** (0.000)
Firm size	0.000 (0.000)	-0.000 (0.000)	ROA	0.000 (0.000)	-0.000 (0.000)
Board experience	-0.000 (0.000)	0.000** (0.000)	Firm size	0.000 (0.000)	0.001** (0.000)
Std. age	-0.000 (0.000)	0.000 (0.000)	Board experience	0.001** (0.000)	-0.000* (0.000)
Constant	-0.008** (0.004)		Std. age	0.000 (0.000)	-0.000 (0.000)
			Constant	0.256*** (0.007)	

Year effects	Yes	Year effects	Yes
Firm effects	Yes	Firm effects	Yes
No. Firms	2,046	No. Firms	2,046
Adj. R^2	0.44	Adj. R^2	0.77

-0.004), given that the sign changes from positive (reported in Table 5.2) to negative. It may be due to males dominated within interaction networks often privilege other male candidates but disadvantages females (Withers, Hillman and Cannella, 2012; Cullen and Perez-Truglia, 2019). Adjusted homophily explains a significant part of the closeness centrality of directors in a given firm ($\beta = 0.764$, at the significance level of 1%) and between firms ($\beta = 0.950$, at the significance level of 1%). It indicates that easing the structural constraints of contacts will facilitate social interactions between directors thereby improving the access to social capital embedded within these networks.

Overall, our results partially support hypotheses 1 and 2, whilst validating the proposition that the network process can create and reproduce gender inequality on corporate boards (McDonald, 2011). Despite a female preference to connect to other females, the limited number of women on boards constrains female directors in developing their networks and helping other female candidates to ascend to the top of corporations. This cyclical process reproduces gender inequality on corporate boards.

We note our results may be subject to possible selection and omitted variable bias. First, alternative measures of networks by weighting different types of connections may provide a robustness check for this chapter, as the impact of different networks varies. Second, gender may be correlated with other

unobserved and time-invariant characteristics that determine network development. This implies our results cannot be estimated with a correlated random effects model. The adoption of the Hausman-Taylor estimates allows us to estimate the relationship between gender, and network development concerning advancement, whilst allowing for potential correlation between some variables and the unobserved heterogeneity.

5.5 Conclusions

This chapter employs social network analysis to explore the causes of gender inequality in the upper echelons of corporations using the employment history of 2,920 S&P1500 directors between 2008 and 2018. Limited access to informal, workplace networks is reported to be a major barrier preventing women from the top positions (Ibarra, 1992). We examine the underlying reasons for this barrier from the supply and demand perspectives (Withers, Hillman, and Cannella, 2012). We use the correlated random effects model to distinguish the two explanations by examining if these arise from structural constraints in an organizational context, or as a result of women's preferences for interaction.

We find that demand – structural constraints from the 'old boy's' networks –

and supply-side – women’s preferences for homophily – both contribute to women’s exclusion from interaction networks. This results in fewer benefits for advancement. The existence of structural constraints arising from the predominance of men limits women’s access to social capital to support their corporate advancement. This constraint perpetuates gender inequality in corporate boards, as few women can access valuable social capital and advance to the top positions. Nevertheless, we also find that women tend to rely on female contacts to obtain resources and information despite being able to access the valuable social capital embedded in the networks of men (Drentea, 1998; Mencken and Winfield, 2000).

Our results provide evidence that network processes create or reinforce gender inequality on corporate boards (McDonald, 2011). Women still face barriers in informal networks with male peers after reaching the top. The predominant share of men at the top produces structural constraints excluding women from informal networks. Appointing more female directors is therefore likely to result in breaking through a critical mass that is sufficient to challenge the dominance of the old boys’ club and disrupt the status quo (Granovetter, 1985).

This chapter has practical implications. Our empirical evidence suggests that females behave differently from males, regardless of position. Such

differences partially lead to inefficient communications and poor collaboration. As such, without the removal of the barriers within the interaction network on corporate boards, despite more women on boards, collaboration would be less likely to occur in some productive ways. This evokes the necessity to review current approaches and reconsider how to meet the need of females underrepresented throughout the corporate pipeline. Raising gender consciousness and better understanding of masculine culture can help organizations to ensure a robust recruitment process and identify qualified candidates on boards (Bierema, 2003).

Future research can proceed in a number of directions. Considering that career advancement is related to the “old boy” networks, it is relevant to ask if the “old boy” networks affect the outcomes of career advancement across gender. However, this question has rarely been examined, due to the limited data can be obtained in the hiring process. Fernandez and Fernandez-Mateo (2006) is a rare exception which uses detailed data on a very controlled sample of similarly qualified individuals applying for entry-level jobs in a single production firm. This allowed for a robust test for the causality between networks and career outcomes.

6. Realizing Gender Diversity on Corporate Boards: An Assessment of Global Policy Measures

6.1 Introduction

Attaining gender equality on corporate boards has become a global policy ambition for a multitude of ethical (Terjesen and Sealy, 2016) and business reasons (Adams and Ferreira, 2009; Ferreira, 2010; Campbell and Mínguez-Vera, 2008; Hillman and Dalziel, 2003). Increasing board gender diversity improves firm value and performance, in addition to promoting a fairer representation of women in the corporate world. To achieve this outcome, twenty-four countries or states have legally mandated gender quotas for corporate boards, thirteen nations have enforced regulatory “comply or explain” principles within their corporate governance codes, and two states have adopted voluntary frameworks. In light of this multiplicity of policy actions internationally, it remains unclear which is the best approach to enhance gender equality on boards. We address this question by evaluating the effectiveness of legislative measures, regulatory “comply or explain” principles and voluntary approaches. This analysis is augmented by examining the interactions of enforcement, implementation and compliance dimensions of policy. In our empirical examination, we use a data panel of

13,614 firms and 78,358 firm-year observations from 76 countries for the period between 2000 and 2018.

We report that while all three policy approaches are effective in increasing the proportion of women on boards, legislative measures are the most effective, followed by voluntary approaches and lastly regulatory “comply or explain” principles. In complying with these policy measures, firms subject to regulatory principles respond proactively before becoming relatively reactive. Distinctly, firms affected by legislative and voluntary policies face increasing incentives to comply over time. Implementation, enforcement and compliance of these policy measures are also influential. Policy measures are most potent when they are enforced using a moderate level of sanctions, a shorter compliance period and implemented using a target for women on boards that is less distant from a firm’s precedent gender diversity level. A longer transition period means that companies have sufficient time to comply with a target and which is less challenging to achieve. In other words, the less effort the firm needs to exert to comply with a new policy measure, the more effective the policy measure. Overall, the findings indicate that the design of policy is critical to its success.

This chapter is timely for two reasons. First, if nations need to regulate gender diversity on boards, it is natural to ask whether more effective policy

measures exist. Given the high costs of compliance for both regulators and regulated firms, it is imperative to ascertain which measures are most effective. Regulatory interventions may also create unintended and unwelcome consequences. For example, in Norway, legislation imposing gender quotas both hastened female board representation and simultaneously encouraged 30–50 percent of ASA companies (the Norwegian term for a public limited company) to delist and avoid compliance with gender quotas (Ahern and Dittmar, 2012; Bøhren and Staubo, 2012).

Secondly, it is unclear if all countries should follow a single ‘one-size-fits-all’ measure to promote gender diversity on corporate boards. Despite increasing numbers of countries mandating gender quotas on corporate boards, a uniform approach may not always be appropriate, as different national institutions and environments affect diversity measures distinctly (Aguilera et al., 2006; Reguera-Alvarado et al., 2017). Thus, it is critical to determine how different policy measures work and operate in different national environments. Through examining a multinational sample of policy measures, comprehension of these national influences may be achieved.

This chapter contributes to the gender equality literature in corporate governance. Extant literature has previously focused on the economic impact of board gender quotas, and often adopted a single-country design (Ahern

and Dittmar, 2012; Matsa and Miller, 2013). As this evidence cannot be generalized internationally (Terjesen and Singh, 2008; Terjesen et al., 2015), our international analysis addresses the need for cross-national comparisons (Rhode and Packel, 2014; Terjesen and Singh, 2016). This work also extends existing comparative research (Grosvold et al., 2007; Labelle et al., 2015; Comi et al., 2020) by examining enforcement, compliance and implementation dimensions of policy.

The chapter is organized into five sections. After this introduction, we forward an overview of pertinent regulatory and academic literature. The third section outlines the data and the estimation strategy, and the fourth section reports the empirical results. Lastly, we present a summary of the research, policy implications, and conclusions.

6.2 Literature Review

6.2.1 Levels of Female Board Representation

The recent report by Egon Zehnder (2018) chronicles the low representation of women on corporate boards internationally. Only 20.4 percent of all directors across 44 countries are women, a figure rising from 13.6 percent in 2012. This lugubrious state of affairs has prompted multiple governments to introduce a variety of policy measures to enhance gender equality on boards.

These policy measures may be broadly categorized as legislative, regulatory “comply or explain” principles and voluntary approaches. They are mostly applied at the national level and generally affect a subset of larger companies within a nation or state (see Table 6.1). These companies include state-owned enterprises, publicly traded companies, and/or all companies that have a number of employees or annual revenue above a certain threshold.

There is a considerable variation in policy measures in terms of implementation, compliance and enforcement. Policies often require a numerical or percentage target of women on boards, a time period for this increase in board diversity and impose various sanctions for non-compliance. For instance, a phase-in period for compliance, typically of between three and five years is typically specified. In other cases, a compliance date is not notified, and the compliance period is infinite (e.g. Germany and Iceland). In some nations deadlines for compliance vary by firm type.

For non-compliant companies, various sanctions are implemented. For example, Spain limits access to public subsidies and state contracts for non-compliant companies, Germany requires board seats to be left unfilled if qualified women cannot be found, and in Belgium, France, and Italy, firms that fail to comply can be fined, dissolved or banned from paying existing

directors.

There are 24 countries or states that have mandated gender quotas on corporate boards. Norway pioneered this approach, passing laws requiring all public companies have at least 40% female directors on corporate boards.

Subsequently, other European countries including Finland, Spain, Iceland, Belgium, France, Italy, Austria, and Germany have introduced gender quotas, legislating pre-determined levels of female participation on corporate boards (Huse and Seierstad, 2013). Outside Europe, India, Malaysia, United Arab Emirates and Kenya have also adopted board gender quotas. Of the nation's using quotas, Austria, Belgium, France, Germany, India, Israel, Italy, Malaysia, Netherlands, Norway, Portugal, and Spain have made significant progress in board diversity, outperforming those not using quotas (Egon Zehnder, 2018).

A further thirteen nations or states within a nation (Sweden, Poland, Australia, Luxembourg, Finland, Portugal, Romania, Netherlands, Turkey, Denmark and Massachusetts, Illinois, Pennsylvania in the USA) have implemented a regulatory "comply or explain" principles. A common principle is "companies with a lower proportion [than 30% women on their boards] would have to explain [in their annual reports] if they proposed to fill a vacancy with a man."

Table 6-1 Description and classification of approaches to promote women on the board (WoB) by country
(Source from: Deloitte, 2018)

Country	Policy	Initiation date	Compliance Date	Quotas/Target	Sanctions
Austria	Legislation	2011	2013	25%	None
			2018	35%	
Australia	Voluntary	2015	2018	30%	None
Belgium	Legislation	2011	2017; 2019*	33%	Refilling and delay pay
Canada (Quebec)	Legislation	2011		50%	None
Colombia	Legislation**	2010		30%	None
Denmark	Regulation	2013		40%	Disclosure
Finland	Legislation	2005		50%	None
Finland	Regulation	2016		40%	None
France	Legislation	2011		40%	Refilling and delay pay
Germany	Legislation	2016		30%	Refilling and delay pay
Greece	Legislation	2000		33%	Lawsuits
Iceland	Legislation	2010	2013	40%	None
India	Legislation	2013	2015	At least 1 woman on board	Fines and refillings
Israel	Legislation	2007	2015	50%	None
Italy	Legislation	2011		33%	Fines, lawsuits and refillings
Kenya	Legislation	2010		No gender to occupy more than 2/3 of boardroom seats	None
Luxembourg	Regulation	2013	2019	40%	None
Malaysia	Legislation	2011	2016	30%	None
Netherlands	Regulation	2013	2017	30%	Disclosure
Norway	Legislation	2003	2008	40%	Dissolution and lawsuits
Poland	Regulation	2016			None
Portugal	Regulation	2016			Disclosure
Romania	Regulation	2016			Disclosure
Spain	Legislation	2007	2015	40%	None
Sweden	Regulation	2015	2020	40%	None
			2017	35%	
			2017	30%	
Turkey	Regulation	2012		25%	Disclosure
UK	Voluntary	2011	2015	25%	Disclosure
		2015	2020	33%	
USA (California)	Legislation	2018	2019	At least 1 woman on board	None
USA (Illinois)	Regulation	2015	2018	At least 3 women on board	None
USA (Massachusetts)	Regulation	2015	2018	At least 3 women on board	None
USA (Pennsylvania)	Regulation	2017	2020	30%	None

Countries with no quotas: Croatia; Czech Republic; Estonia; Latvia; Hungary; Lithuania; Ireland; Luxembourg; Romania; Russia; Slovakia; Switzerland; Turkey; Middle East/United Arab Emirates; Argentina; Brazil; Chile; Mexico; Peru; Trinidad and Tobago; China; Indonesia; Japan; Korea; Philippines; Singapore; Thailand; Vietnam; Australia; New Zealand; Morocco; Nigeria; South Africa

*Belgian large listed companies were required to comply by 2017, whereas small and medium-listed companies by 2019; ** Colombia has gender quotas only for state-owned companies and all government entities, none for public listed companies.

Two other countries have adopted a distinct voluntary approach, encouraging enhanced gender equality on boards while allowing corporations to determine the appropriate level of female representation individually. In the United Kingdom, Davies (2011) set a target of 25% women on FTSE 100 company boards by 2015 and 33% women on FTSE 350 company boards by 2020, but from 2012 onwards, the UK included a recommendation for gender in boards and introduced 'comply or explain' regulatory principles. In 2015 the Australian Institute of Company Directors (AICD) announced a voluntary target of 30% for women serving on boards of ASX 200 companies by 2018 (Deloitte, 2017).

6.2.2 *Corporate Board Gender Diversity Policy*

While enhancing gender equality is politically appealing (Labelle et al., 2015), its benefits are not universal. The majority of extant research has analyzed the business case for implementing gender quotas, with positive economic results reported from Spain (Reguera-Alvarado et al., 2017) and Italy (Gordini and Rancati, 2017), measuring Tobin's Q). Distinctly for Norway, Ahern and Dittmar (2012) report negative effects on firm values arising from gender quotas. Past cross-national research has also produced mixed results. Matsa and Miller (2013) compared Norway to other Nordic countries without quotas, finding no significant differences in most corporate decisions, labor costs, and

employment policy, but a negative impact on operating profits after the introduction of quotas in Norway. Comi et al. (2020) studied European countries with gender quotas and found a short-run negative relationship between female board representation and firm outcomes.

Other researchers have argued that gender quotas create ethical tensions (Terjesen and Sealy, 2016). While quotas may address equality of representation on boards, they do little to ensure equality of opportunity or access to resources for women aspiring to board positions (Dahlerup and Freidenvall, 2005). Indeed, quotas have a limited impact on the inequality of women's participation in the labor market and enrollment in business education programs (Bertrand et al., 2018). They may also create anxieties that female promotion occurs more for symbolic reasons rather than ability (Sealy, 2010). Subsequently some women do not support quotas, as they “don't want to be a token woman” (Kakabadse et al., 2015).

Given such mixed evidence as to the effectiveness of gender quota laws, other policy measures have been advocated. A few studies have empirically compared the effectiveness of using distinct regulatory “comply or explain” principles or voluntary approaches instead of legislation. Grosvold et al. (2007) compared legally regulated quotas in Norway relative to a voluntary approach employed in the UK. It is reported that while both approaches have

increased board gender diversity, quotas have been linked with more rapid growth. Similarly, Labelle et al. (2015) evaluated the effectiveness of quotas and other enabling approaches within regulations or codes of governance to convince business to increase gender diversity in 17 countries by assessing the influence of gender diversity on firm performance. The enabling approach is reported to be more effective than quotas.

Clearly, the evidence to date has not produced conclusive results as to the impact of different policy approaches for enhancing gender diversity on corporate boards. One reason pertains to inclusive links between policy actions and outcomes. Researchers often focus on the direct economic impact of gender diversity, neglecting how these effects are transmitted. From a methodological perspective, as women's representation on boards tends to increase over time it is difficult to identify whether any increase in board gender diversity is due to policy interventions, or merely the passage of time (Krook, 2008; Hughes et al., 2017). Even without policy interventions, women may already have a presence on boards, making before-and-after evaluations of policies difficult (Isidro and Sobral, 2015). This chapter limits these concerns by focusing on the relationship between policy measures and gender diversity, rather than examining the effects of gender diversity.

The different forms of policy implementation, enforcement and compliance

also affect firms distinctly including unintended consequences limiting compliance (Kagan, 1989; Reichman, 1992). For example, while a certain level of sanctions is important to ensure compliance with policy measures (de Cabo et al., 2019), extreme sanction levels may become self-defeating (Cooter, 1984).

6.3 Data

6.3.1 *The Data Employed*

Our data sources are BoardEx and Thomson Reuters Eikon, which provide corporate board information and accounting information respectively. As the coverage in the BoardEx dataset starts in 2000, we examine the effectiveness of different policy measures for promoting gender diversity on corporate boards over the period 2000-2018. As BoardEx only covers public limited companies, we focus only on public limited companies, excluding state-owned enterprises. For this reason, Canada (Quebec) and Greece, are excluded from the analysis, as policy measures only focus on raising gender equality on boards of state-owned companies. From the remaining observations, we constructed a panel dataset across 76 countries over 19 years. This dataset comprises 13,614 firms and 78,358 firm-year observations, after excluding observations with missing values. We report the distribution of companies by country in Table 6.2.

Table 6-2 Distribution of sample firms across countries

Country	No. Firms	Firm-years	Country	No. firms	Firm-years
Argentina	8	25	Malta	4	14
Australia	818	4777	Mauritius	1	1
Austria	43	306	Mexico	50	245
Azerbaijan	1	4	Mongolia	1	4
Bahamas	3	6	Morocco	2	12
Bangladesh	3	3	Netherlands	130	947
Belgium	81	613	New Zealand	53	273
Brazil	80	401	Nigeria	30	151
Bulgaria	1	3	Norway	129	867
Cambodia	1	5	Pakistan	5	18
Canada	563	2667	Panama	3	23
Chile	23	130	Papua New Guinea	4	30
China	765	3490	Peru	7	23
Colombia	8	30	Philippines	32	170
Croatia	1	2	Poland	27	177
Cyprus	19	81	Portugal	20	128
Czech Republic	1	11	Puerto Rico	8	57
Denmark	46	362	Qatar	2	6
Egypt	8	36	Republic of Ireland	99	611
Finland	67	344	Romania	3	14
France	279	1927	Russian Federation	38	125
Georgia	1	1	Saudi Arabia	7	19
Germany	316	2345	Singapore	209	921
Greece	40	276	South Africa	118	640
Hungary	3	23	Spain	106	738
Iceland	11	20	Sri Lanka	8	15
India	308	1572	Sweden	158	1195
Indonesia	44	178	Switzerland	155	1314
Israel	107	474	Thailand	18	49
Italy	99	552	Togo	1	6
Japan	439	2205	Turkey	34	182
Kenya	3	14	Ukraine	2	7
South Korea	68	315	United Arab Emirates	32	132
Kuwait	2	4	United Kingdom	1999	10808
Lebanon	2	11	United States	5741	34754
Lithuania	1	2	Uruguay	2	7
Luxembourg	45	199	Vietnam	2	10
Malaysia	65	250	Zambia	1	1
Total No. of firms	13,614		Firm-year observations	78,358	

As the primary purpose of this chapter is to assess the effectiveness of policy measures in promoting gender diversity on corporate boards, we consider the firms affected by policy measures on and after the implementation year as a treatment group. For example, in 2011, Iceland introduced legislation requiring all publicly listed boards have 40 percent of females on boards by 2013. All publicly listed companies in Iceland from 2011 onwards are included in our treatment group, whereas control group including companies before the implementation year between 2000 and 2010.

The control group contains firm years that are not affected by policy measures or firm years which were previously affected by a policy measure yet have now progressed beyond the implementation period. The treatment group consists of 2,358 firms across 22 countries, whereas the control group is composed of 12,966 firms and 70,901 firm-years. Overall, 1,123 firms and 3,811 firm-years across 12 countries face legislative measures, 815 firms and 2,284 firm-years across 10 countries are subject to regulatory 'comply or explain' principles and 430 firms and 1,363 firm-years are have engaged with voluntary methods. We note, within our sample, the UK is a special case, which initially introduced the voluntary framework by Davies in 2011. After 2012, the UK included a recommendation for gender in boards and introduced 'comply or explain' regulatory principles. Therefore, the UK is in the group of comply or explain from 2012 onwards, and the voluntary one for

previous years from 2011 to 2012.

6.3.2 *Descriptive statistics*

Table 6.3 outlines the variables of interest and reports the descriptive statistics for the treatment and control groups. At the country level, GDP growth and inflation are considered as macro-economic indicators and the percentage of females in the labor force are used as a control for gender imbalance in labor market entry. At the firm level, we consider board characteristics, including board size, average number of qualifications held by directors, the number of years that directors have served on boards, and firm characteristics including firm size (the log of total assets) and operating profits as control variables.

Ferreira & Kirchmaier (2013) examine the determinants of board gender diversity in European companies and suggest that both firm and country characteristics can explain board gender diversity. Extant research delves into country-level determinants emphasizing, for example, the importance of the gender distribution of labor force (Bertrand et al., 2019) and dominant institutions (e.g., government, family, education, religious, economic) (Grosvold & Brammer, 2011; Grosvold, Rayton, & Brammer, 2016). Hence, GDP growth and inflation are employed as national macro-economic indicators and the percentage of females in the labor force is used to control

for the gender imbalance in labor markets.

We also consider board characteristics, including board size, the average number of qualifications held by directors, the number of years that directors have served on boards, firm size (the log of total assets) and operating profits. We argue that institutional differences across countries are responsible for variation in basic firm-level characteristics and hence the differences in board-gender diversity (Hall and Soskice, 2001). By virtue of their size, large firms are most visible to the state, media, and professional groups which bring them under more pressure to conform to societal expectations (Adams & Ferreira, 2003; Hillman et al., 2007). Large firms are therefore more likely to appoint more women on boards (Agrawal & Knoeber, 2001; Burke, 2000; Carter et al., 2003; Esteban-Salvador, 2011; Hyland & Marcellino, 2002), otherwise, they suffer public outrage. The set of board characteristics, board size, the average number of qualifications held by directors and the number of years that directors have served on boards affect the quality of corporate governance and the corporate legitimacy (Coglianese, 2007; Zhuang, Chang, & Lee, 2018). Addressing gender equality in corporate boards is necessary for the expansion of the corporation's public role and strengthen the base for corporate legitimacy (Ibrahim & Hanefah, 2016; see a review of Dawar & Singh, 2016).

Comparing the treatment group to the control group over the sample period,

the average percentage of women on corporate boards is 19% against 10%, with the standard deviation of 0.14 versus 0.11. This is not surprising, since we expect companies in the treatment sample to have higher female representation on boards. Regarding other firm-level characteristics, the treatment companies are larger and more profitable over the same period. According to political cost and size hypothesis (Watts and Zimmerman (1978), the larger and more profitable firms are more likely to appoint a woman on board to avoid social scrutiny and political cost. In addition, the treatment companies have larger board size comprising on average 9.52 directors, of which 79% are independent directors. This may indicate that these companies symbolically appoint women on boards without changing board composition.

Table 6-3 Definitions and measures of firm- and country-level characteristics that may influence board gender diversity

The data has been obtained from BoardEx and Thomson Reuters Eikon. The descriptive statistics are reported for the treatment and the control group.

		Treatment								Control	
		Total (Obs=7,458)		Legislation (Obs=3,811)		Regulation (Obs=2,284)		Voluntary (Obs=1,363)		Obs=70,901	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<i>Firm-level factors</i>											
Gender ratio	The percentage of females on boards	0.19	0.14	0.19	0.14	0.21	0.13	0.19	0.14	0.09	0.11
Firm size	The log of total assets	21.60	2.26	21.57	2.40	21.88	1.93	20.20	1.93	20.92	2.31
	Total assets (in \$millions)	23.2	130	28.70	142	23.80	136	9.26	63.70	16.3	107
Board size	The number of directors on boards	9.52	3.80	10.73	4.23	9.38	2.63	6.36	1.78	8.96	3.35
Independence	The percentage of non-executive directors on boards	0.79	0.15	0.78	0.15	0.80	0.15	0.79	0.12	0.75	0.19
Educational level	Average number of educational qualifications held by directors	2.04	0.65	1.99	0.69	2.03	0.55	2.18	0.64	2.03	0.80
Experience	Directors' average number of years on boards	5.81	3.41	6.28	3.65	5.92	3.01	5.37	3.18	6.17	3.73
Operating income	Total Revenue less total operating expense (in \$millions)	5.09	13.9	6.13	17.60	5.43	12.8	1.65	5.40	4.70	15.9
<i>Country-level factors</i>											
Labor supply	The proportion of women working as a fraction of the female population	42.62	8.36	39.60	10.48	45.54	3.69	46.16	0.19	45.13	3.05
GDP Growth	Percentage change in GDP relative to the previous quarter	2.89	2.17	3.23	2.85	2.52	1.22	2.58	0.26	2.50	2.26
GDP Deflator	The ratio of GDP in current local currency to GDP in constant local currency	2.09	2.19	2.53	2.39	1.97	1.80	1.05	1.83	2.30	1.84

The treatment countries have higher GDP growth and a lower GDP deflator by 0.26%. The percentage of women in the labor market is lower by 1.33% in treatment countries. Gender board policies may be conditioned by economy condition and relatively equal entry in labor market may reduce the inertia to legislate a woman on corporate board (Terjesen et al., 2015).

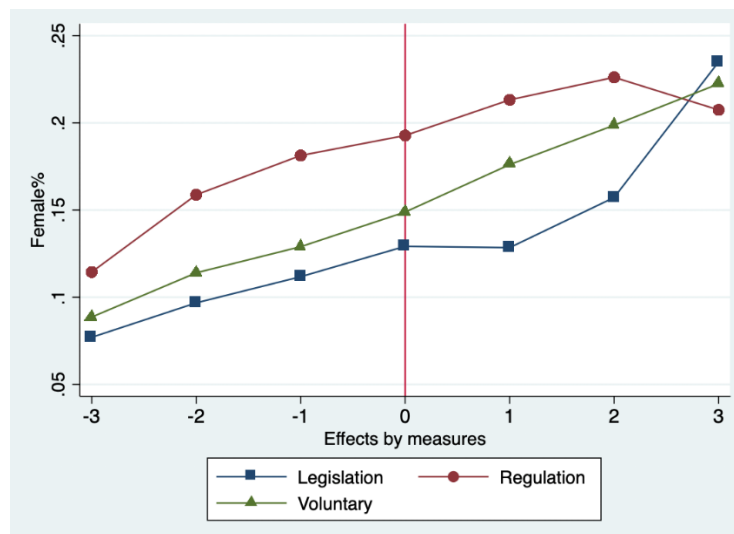


Figure 6-1 Changes in the percentage of females on boards before and after implementation of policy measures

Figure 6.1 depicts changes in the percentage of females on boards for each policy measure. The X-axis displays an event time window of [-3,3]. Year 0 denotes the year of implementation.

From this figure, the percentage of females on boards increases over time regardless of policy measures. All three policy approaches have significant impact on a rise in the percentage of women on boards, with the control for unobserved variables that bias estimates of causal effects (McEvan, 2010).

Principles and voluntary methods increase board diversity yet at a slower rate of 2.7% and 1.6% than legislative quotas with 5.3%. Besides, the figure captures that legislation is more effective in the short-term whereas, regulatory and voluntary approaches work better over a longer time frame.

Table 6.4 consists of three panels representing policy measures with varying combinations of compliance, enforcement and implementation dimensions. Panel A shows the frequency and distribution of policy measures and their sanctions. We identify six forms of sanctions including refilling, fines, lawsuits, dissolution, disclosure, and delayed pay. Refilling requires non-compliant firms to leave a vacancy empty until a woman is found. Fines are monetary penalties paid by non-compliant firms; for example, Italian firms are fined from €100,000 to €1,000,000 if the percentage of women on supervisory boards is less than 33%. Non-compliant firms in other countries, such as Greece, can be sued and sent to the administrative courts. We call these sanctions 'lawsuits'. Dissolution is a sanction whereby non-compliant firms are delisted and this is used, for example, in Norway. Other countries, such as Belgium, punish non-compliant firms by suspending directors' benefits. Firms in these countries are categorized as using 'delayed pay' sanctions. Legislative policy measures have the greatest variety of sanctions, while 'comply or explain' principles and voluntary methods have just one sanction; the disclosure of non-compliance with diversity targets.

Panel B presents the time between expected compliance and implementation between the policy approaches. Legislative quotas have an average 4.48 year phase-in period, with a minimum of 1 year and maximum 8 years. The phase-in period set by regulatory 'comply or explain' principles ranges from 3 to 6 years with a mean of 3.88 years. Under voluntary methods, the phase-in period has an average 3.01 years, ranging from 3 to 4 years. Overall 21.32% of firms face no specific compliance date.

Other policy characteristics include the discrepancy between current and desired states and the aspirations to bridge this gap (Carver & Scheier, 1998). Diversity goals are often quantified as a number or percentage of women on boards allowing firms to measure their progress (Lunenburg, 2011). If the threshold for women's representation is far from a firm's current gender diversity level, firms are more likely to reject targets (see, Englich et al., 2006, Locke & Latham, 1984, Strack & Mussweiler, 1997).

Panel C reports the target number or percentage of females expected to be represented on corporate boards. While some nations state this target numerically, such as 'at least x women on boards', most indicate an expected percentage. For example, Norway, France, Italy, and Belgium require a certain percentage of female board members, while India and the United States (Illinois and Massachusetts) mandate that one to three women should

sit on the board. Other countries, such as Poland and Portugal, do not specify a target at all and just encourage greater gender diversity on corporate boards. Legislative percentage targets range from 30% to 40% of board seats occupied by a woman. 'Comply or explain' principles have an average target of 34% females on boards, with a maximum of 40%. The targets for voluntary approaches are lower, ranging from 25% to 30%. Panel C also reports the time in which compliance is required. In the year of implementation, the gender diversity of firms is on average 21% lower than the target. For regulatory principles and voluntary approaches, the figures both are 13%.

Table 6-4 Distribution and frequency of three measures over three dimensions

We identify three policy dimensions, a) sanctions, b) compliance date, c) the target. Within the dimension of sanction, shown in panel A, we consider if there is sanction in place and if so, in which forms of sanctions. We categorize sanctions into six forms, i.e. refilling, fines, lawsuits, dissolution, disclosure and delay pay. Within the dimension of compliance date (Panel B), we consider if there is compliance date that has been set and the variation in the length of transition period, i.e. the number of years between the compliance year and the initial year. Within the dimension of the target (Panel C), we consider the way that the target is phrased, in numbers or in percent and the range of the target, if it is in percent.

Panel A: Sanction

No sanction	3,118 (41.81%)	Sanction	4,340 (58.19%)
	Legislation	Regulation	Voluntary
Refill	2,822	0	0
Fine	1,716	0	0
Lawsuits	758	0	0
Dissolution	586	0	0
Disclosure	985	1,049	10
Delay pay	679	0	0

Panel B: Compliance date

No compliance date	1,590				
Transition period	Obs	Mean	St. Dev.	Min	Max
Legislation	2,677	4.48	2.51	1	8
Regulation	1,828	3.88	0.86	3	6
Voluntary	1,363	3.01	0.09	3	4

Panel C: Target of females on boards

"At least"*	1,136				
N/A	784				
Percentage	6,674				
Percentage	Obs	Mean	Std. Dev.	Min	Max
Legislation	3,635	0.37	0.04	0.30	0.40
Regulation	1,676	0.33	0.06	0.25	0.40
Voluntary	1,363	0.30	0.01	0.25	0.30
Distance from compliance*					
Legislation	3,323	0.21	0.14	-0.35	0.40
Regulation	2,284	0.13	0.13	-0.31	0.40
Voluntary	1,363	0.12	0.13	-0.41	0.30

*"At least": some policy set up the target of females on board by putting it as "at least xx females on boards", rather than the percentage or none.

*Distance from compliance reports the subsample of firms in the countries with the gender quota in percent only, excluding which in numbe

6.3.3 *The Testing Framework*

Before justifying our model, we consider potential multi-collinearity by examining the correlation between the various demographic and network characteristics. We conduct this analysis in two stages. First, we compare the percentage of females on boards for the three policy measures, controlling for the firm and country-specific characteristics. Then we introduce interaction terms for enforcement, compliance and implementation dimensions. To justify our baseline model, we estimate a simple OLS regression using the full sample of 13,614 firms from 2000 to 2018. Then we consider time-series effects and national/state heterogeneity by introducing year and national/state dummy variables. These results are shown in Table 5.

Different panel-robust statistical inferences are considered. The results suggest that the standard errors of the conventional fixed-effect model are relatively small and the clustered standard errors are close to those obtained from the bootstrapping method. Heteroskedasticity is detected from the Wald test, so we cluster standard errors at a firm level. Our baseline model firm fixed-effects model using clusters is as follows:

$$WOB_{itj} = \alpha + \beta_1 Measures_{tj} + \beta_2 Measures_{tj} * Dimensions_{tj} + Controls_{itj} + \gamma_i + \varepsilon_{itj} \quad (1)$$

Where: WOB_{itj} is the percentage of women on board of firm i in country j in year t , $Measures_{itj}$ is a dummy variable of three policy approaches, (i.e. regulatory, “comply or explain” principles and voluntary approaches) of firm i in country j in year t ; $Dimensions_{itj}$ represents one of the policy dimensions, sanctions, transition period and disparity of target of a specific measure that affect firm i in country j in year t .

6.4 Results

6.4.1 Which approach is the most effective in promoting board gender diversity?

Table 5 Column 5 reports the results incorporating controls for firm and country-level characteristics. All three measures have significant and positive effects in enhancing female representation on boards. Legislative measures are the most effective increasing the percentage of female directors by 5.7% (at 1% significance), followed by voluntary approaches with a 3.3% upturn in female directors (at 1% significance) and regulatory principles where female representation rose by only 2.5% (at 5% significance). Laws often create deterrence power that forces firms to obey the rules to avoid the negative consequences, i.e. the sanctions. Regulatory “comply or explain” principles or voluntary approaches despite enact some sanctions but are less severe than

the legislative approaches, requiring the disclosure of 'good' and 'bad' performers for example. Therefore, in the case of promoting board gender diversity, the legislation is the most effective.

However, whether the regulation outperforms the voluntary approaches remain unclear. Hence, we test the equality of the coefficients across three policy approaches and the results report a significant difference between legislation and regulatory approach ($\text{Prob}>F=0.000$), and between legislation and voluntary approaches ($\text{Prob}>F=0.000$), whereas no differences between regulatory and voluntary approaches ($\text{Prob}>F=0.205$). Following hypothesis one, despite differences in the magnitude of the impact on board gender diversity across three policies, we can only report a distinct influence over gender diversity between the legislation and regulatory approach that the legislation is more effective than regulatory and voluntary approaches.

Table 6-5 Results of pooled OLS regression and Panel Data Model

The table reports the results of model (1) using the full sample of 13,614 firms and 78,358 firm-year observations between 2000 and 2018, shown in Columns (1)-(5). We begin with estimate the impact of three measures (legislation, regulation and voluntary approach) with no controls. The results are reported in Column (1). Columns (2) consider year and country effects. Columns (3)-(4) consider firm-fixed effects with the controls for the firm-level characteristics, and firm- and country-level characteristics. Column (5) reports the results using firm fixed-effects model, which uses a clustered standard error to obtain heteroscedasticity-robust standard errors. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

Independent variables	Simple OLS Regression		Firm Fixed Effects		
	(1)	(2)	(3)	(4)	(5)
Legislation	0.092*** (0.002)	0.066*** (0.002)	0.058*** (0.002)	0.057*** (0.002)	0.057*** (0.004)
Regulation	0.115*** (0.002)	0.073*** (0.002)	0.027*** (0.002)	0.025*** (0.002)	0.025*** (0.004)
Voluntary	0.090*** (0.003)	0.045*** (0.003)	0.034*** (0.002)	0.033*** (0.002)	0.033*** (0.005)
Board size			0.000** (0.000)	0.000*** (0.000)	0.000 (0.000)
Education level			0.014*** (0.001)	0.014*** (0.001)	0.014*** (0.001)
Independence			0.041*** (0.003)	0.041*** (0.003)	0.041*** (0.006)
Experience			-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
Operating income			0.054 (0.000)	0.054 (0.000)	0.097 (0.000)
Firm size			0.030 (0.000)	0.029 (0.000)	0.045 (0.000)
GDP Growth				0.002*** (0.000)	0.002*** (0.000)
GDP deflator				0.001*** (0.000)	0.001*** (0.000)
Labour supply				0.005*** (0.001)	0.005*** (0.001)
Constant	0.094*** (0.000)	0.045*** (0.004)	-0.024*** (0.007)	-0.269*** (0.028)	-0.269*** (0.060)
Year fixed effects	No	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes	Yes
Clustered standard errors	No	No	No	No	Yes
Observations	78,359	78,359	78,359	78,359	78,359
Adj. R ²	0.07	0.12	0.16	0.16	0.31

Firm-level characteristics, directors' average educational level and the percentage of non-executive directors (independence) of the board are positively associated with the percentage of women on boards. Board experience, defined as the average number of years served on corporate boards, is negatively associated with the proportion of women on boards by 0.003 (at 1% significance). Country-level control variables, GDP Growth, GDP deflator and the percentage of the women labor force are all significantly and positively associated with women's representation on corporate boards at 1% significance ($p=0.002$; 0.001; 0.005). In line with hypothesis three we observe the influence of institutional factors is significant in explaining variation in gender diversity.

6.4.2 How do compliance, enforcement and implementation dimensions influence. Specific policy measures?

Sanctions

We use three metrics to measure the effect of sanctions. Firstly, a dummy variable is constructed to indicate whether sanctions are imposed for non-compliance. Secondly, for legislative measures, we consider how many types of sanctions exist and the effects of different forms of sanctions. These results are reported in Table 6.6.

The results in Table 6.6 Column 1 show that legislative measures are only effective when operated with sanctions, while 'comply or explain' and voluntary approaches are effective regardless. Column (2) presents results for the interaction terms with the number of sanctions. Legislative measures are the most effective in promoting board gender diversity only if four sanction types are used ($p=0.018$, at 5% significance). While one to three sanction types have negative impact and with the increase in the number of sanction types, the less effective of legislation ($p=-0.030, -0.138, -0.152$, at 1% significance). No significant effects are reported for legislative measures without sanctions. The most effective framework for increasing the number of female directors requires a diversity of any four types of sanctions.

To determine which sanctions are the most effective, we include all sanction types separately. Column (3) reports these effects. While all six sanction types, but 'refillment' and 'fines', have significant effects on gender diversity. The 'pay delay' is the most effective in enhancing female board representation ($p=0.097$, at 1% significance), followed by 'dissolution', 'lawsuits' and 'disclosure' ($p=0.071, 0.059, 0.018$). Statistically, 'refillment' and 'fines' are the least effective sanctions with adverse effects on the appointment of women on boards ($p=-0.011; -0.007$).

Compliance date

The compliance date specifies how much time companies have in order to comply with a target female representation on boards. We argue that a deadline enhances the effectiveness of a given policy measure and shorter compliance periods are more effective in promoting gender diversity.

Table 6.7 is comprised of 3 columns. As shown in Table 2, only two countries adopted voluntary frameworks, and both employ a compliance date. Therefore, columns (1) and (2) only examines the design and the length of a compliance date within legislation and 'comply or explain' principles. The results show that Legislation and regulation both are more effective without deadline dates. Compliance dates reduce the effectiveness of legislative measures by 0.043 (at 1% significance) and the regulation by 1.7% (at 5% significance). The results are contradictory to our expectation that compliance date provides motivation for firms to increase in gender diversity (Locke, 1968). However, the proximity to deadline dates accounts more than the existence of deadline dates itself (Gilovich, Kerr, & Medvec, 1993; Shepperd et al., 1996; Taylor & Shepperd, 1998). Hence, we further consider the length of the transition period using the year difference between the compliance year and the implementation year. The results are reported in column (2).

Consistent with the results in column (1) that deadline dates have negative impact on legislation, legislation becomes less effective with deadlines regardless of the length of this compliance period. For principles, a four- or five-year phase-in period can significantly improve the level of female representation on boards by 2.7% (at 5% significance) and 4.7% (at 1% significance) respectively, whereas three-year period has adverse effects by 1.5% (at 10% significance) and six-year period insignificant. The results might be explained, firms tend to be more optimistic to comply if the deadline is four-year distant or beyond from the present. Three-year transition period makes firms to feel the deadline close at hand and eventually are demotivated to comply (Kagan, 1989; Reichman, 1992).

Table 6-6 Results of the interaction for sanctions

The table reports the results with the interaction term for sanctions controlled for firm- and country-level characteristics. We consider three measures of sanctions, 1) sanction is a dummy variable indicating if there is sanction in place, 2) sanction is a dummy variable by the number of sanctions, 3) sanction is a dummy variable by six forms of sanction, i.e. lawsuits, refilling, fine, delay pay, disclosure and dissolution. We use a clustered standard error to obtain heteroscedasticity-robust standard errors. Columns 1-3 respectively report the results of the effects of sanction using these three measures. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

	(1)		(2)		(3)
Legislation	0.003 (0.006)	Legislation	0.002 (0.006)	Legislation	0.033*** (0.007)
Regulation	0.013*** (0.005)	Regulation	0.024*** (0.004)	Regulation	0.016*** (0.004)
Voluntary	0.033*** (0.005)	Voluntary	0.031*** (0.005)	Voluntary	0.032*** (0.005)
Legislation*Sanction	0.084*** (0.022)	Legislation*	-0.030*** (0.008)	Legislation*	0.018* (0.010)
Regulation*Sanction	-0.025*** (0.007)	No. sanctions=1 Legislation*	-0.138*** (0.009)	Disclosure Legislation*	0.071*** (0.020)
Voluntary*Sanction	0.009 (0.018)	No. sanctions=2 Legislation*	-0.152*** (0.015)	Dissolution Legislation*	-0.007 (0.008)
Constant	-0.231*** (0.061)	No. sanctions=3 Legislation*	0.018** (0.008)	Fine Legislation*	-0.011 (0.009)
		No. sanctions=4 Constant	-0.278*** (0.061)	Refill Legislation*	0.097*** (0.012)
				Delay pay Legislation*	0.059*** (0.014)
				Lawsuits Constant	-0.171*** (0.061)
Control variables	Yes		Yes		Yes
Year fixed effects	Yes		Yes		Yes
Firm fixed effects	Yes		Yes		Yes
Observations	78,359		78,359		78,359
Adj. R ²	0.30		0.32		0.32
F-test	0.000***		0.000***		0.000***

Table 6-7 Results with the interaction term by compliance date

The table reports the results examining the interaction between a specific measure and compliance date. Within this dimension, we consider two measures of compliance date, 1) a dummy variable indicating if a compliance date is initiated, 2) a dummy variable by the number of years from the initial year to the compliance year. The results reported in column 1 and 2 respectively. Column 3 and 4 examines the continuous impact of a specific measure by introducing the interaction term by years since the implementation and the squared years since the implementation. We use a clustered standard error to obtain heteroscedasticity-robust standard errors. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

Independent variables	(1)		(2)
Legislation	0.078*** (0.005)	Legislation	0.080*** (0.005)
Regulation	0.035*** (0.005)	Regulation	0.014* (0.008)
Voluntary	0.035*** (0.005)	Voluntary	0.029 (0.018)
Legislation*Deadline	-0.043*** (0.005)	Legislation*year gap=1	-0.079*** (0.008)
Regulation*Deadline	-0.017** (0.007)	Legislation*year gap=2	-0.044*** (0.004)
		Legislation*year gap=5	-0.027*** (0.010)
		Legislation*year gap=7	-0.066*** (0.014)
		Legislation*year gap=8	-0.034*** (0.008)
		Regulation*year gap=3	-0.015* (0.009)
		Regulation*year gap=4	0.027** (0.013)
		Regulation*year gap=5	0.047*** (0.016)
		Regulation*year gap=6	-0.009 (0.026)
		Voluntary*year gap=3	0.006 (0.018)
Control variables	Yes		Yes
Year fixed effects	Yes		Yes
Firm fixed effects	Yes		Yes
Observations	78,359		78,359
Adj. R ²	0.31		0.32
F-test	0.000***		0.000***

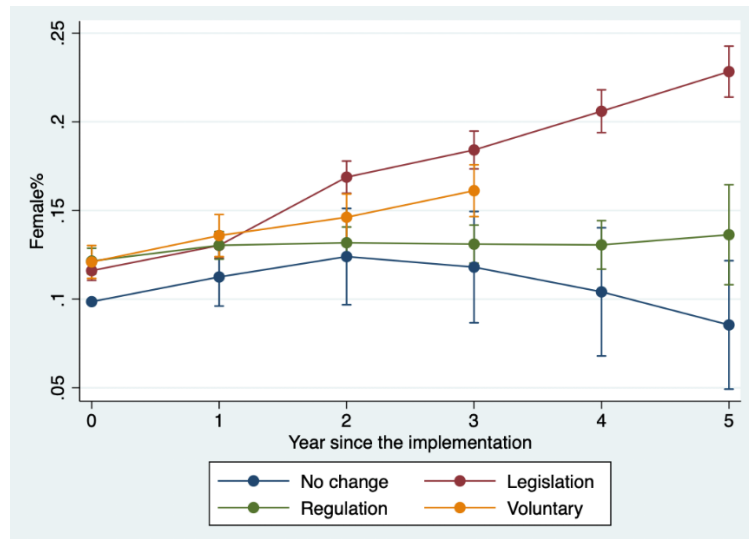


Figure 6-2 Changes in the percentage of females on boards over years since the implementation of a policy

We also examine the implementation of three policy measures over time. The results are visualized in Figure 6.2. Legislative approaches and ‘comply or explain’ principles are captured in a 5-year window and voluntary methods are considered over 3 years. The maximum length of the implementation period under the voluntary approach is 3 years. The figure shows that regulatory principles have a relatively flat change on promoting gender diversity, whereas legislative measures and voluntary approaches have an upward and continuous impact on gender diversity.

The target of women on boards

Another important aspect of measures directed towards increasing female representation on boards is the target ratio of women on boards. As discussed earlier, different countries use different compliance targets. It is therefore natural to ask whether the distance between the compliance ratio and the

current ratio affects the effectiveness of measures. The results of this analysis are reported in Table 8. Column (1) examines whether the percentage or numerical targets of gender diversity are more effective in promoting gender diversity on boards. The results show that percentage targets are more effective in enhancing board gender equality by 1.7% for legislative measures, as diversity goals quantified in percentage of women on boards often provide clarity and allowing firms to measure their progress (Lunenburg, 2011). Regulatory principles are insignificant with percentage targets, as which may be subject to sanction severity. The results in column (2) indicate if percentage targets increase by one, the effectiveness of all three policy approaches measures is enhanced by 0.7%, 7.1%, and 15.7% respectively, as this incorporates the level of aspiration to decrease the discrepancy (Carver & Scheier, 1998).

Column (3) considers the difference between the target and a firm's precedent gender diversity. The results are consistent with firms rejecting targets if there is a larger gap between the target and a firm's gender diversity level. A one percent increase to this gap reduces the percentage of women on boards appointing a woman to board by 19.4%, 15%, and 24.6%, for legislative measures, regulatory principles and voluntary approaches respectively. If targets are distant from the precedent gender diversity levels, the firm may reject the target as unreasonable and unattainable (Locke and Latham, 1984).

Table 6-8 Results with the interaction term by the third dimension of the target

The table reports the results with the consideration of the interactional effects of the target. We focus on three dimensions of the target, 1) a dummy variable indicating the way that the target is phrased, in numbers or in percent, 2) a continuous variable of the magnitude of the target if it is in percent, 3) a continuous variable measures the difference between the target and the precedent gender diversity of a specific firm. The results of three dimensions are reported in column 1-3 respectively. We use a clustered standard error to obtain heteroscedasticity-robust standard errors. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

	(1)		(2)		(3)
Legislation	0.046*** (0.006)	Legislation	0.055*** (0.006)	Legislation	0.089*** (0.005)
Regulation	0.025*** (0.004)	Regulation	0.001 (0.006)	Regulation	0.038*** (0.005)
Voluntary	0.033*** (0.005)	Voluntary	-0.003 (0.109)	Voluntary	0.067*** (0.007)
Legislation*Ratio	0.017** (0.007)	Legislation*Quota	0.007 (0.015)	Legislation*Quota gap	-0.194*** (0.016)
Regulation*Ratio	-0.001 (0.007)	Regulation*Quota	0.071*** (0.023)	Regulation*Quota gap	-0.150*** (0.027)
		Voluntary*Quota	0.157*** (0.027)	Voluntary*Quota gap	-0.246*** (0.026)
Control variables	Yes		Yes		Yes
Year fixed effects	Yes		Yes		Yes
Firm fixed effects	Yes		Yes		Yes
Observations	78,359		78,359		78,359
Adj. R ²	0.31		0.31		0.32
F-test	0.055*		0.000***		0.000***

6.4.3 *Regional and national effects*

Legislative quotas are pervasive in Europe, not least due to the European Commission promoting gender balance in European Union listed companies since 2016. The latest global data indicates that Western Europe has made significant progress in increasing female representation on boards compared to other regions (Egon Zehnder, 2018). We therefore examine if our results vary by geographical region. We divide our sample into EU countries and non-EU countries. Firms in EU member states are expected to have more female representation than non-EU member states. Our results in Table 6.9 Column 1 show a regional effect for all three measures. The influence of the EU appears to be distinctly significant over legislation and regulation whereas no differences in voluntary methods. Specifically, legislation is more effective in EU countries, whereas regulation only effective in EU countries. The results partially indicate the regional effects between EU and non-EU countries. Despite no regional effects on the voluntary approach, it may be due to limited sample with only two countries using this approach.

We also consider intra-national effects on policy measures by focusing on the USA, where four states have proposed actions to promote gender diversity on boards. These include California, which has legally required listed companies to have at least one woman on boards by the end of 2019, and Massachusetts,

Table 6-9 Regional and national effects

The table has two columns. Column (1) reports the results of regional effects on the effectiveness by introducing a dummy indicating whether a firm's headquarter located in EU member states or not. Column (2) reports the results of regional effects on the effectiveness by introducing a dummy indicating whether a firm's headquarter is located in either of four states of U.S., Massachusetts, Pennsylvania, Illinois or California or not. We use a clustered standard error to obtain heteroscedasticity-robust standard errors. ***, ** and * denote significance at 1%, 5%, and 10% respectively.

Independent variables	(1)	(2)
Legislation	0.035*** (0.005)	-0.006 (0.006)
Regulation	-0.005 (0.005)	-0.008 (0.008)
Voluntary	0.034*** (0.005)	
Legislation*EU	0.037*** (0.008)	
Regulation*EU	0.048*** (0.007)	
Voluntary*EU	-0.007 (0.018)	
Regulation *Massachusetts		-0.008 (0.012)
Regulation *Pennsylvania		-0.001 (0.011)
Regulation*Illinois		0.005 (0.000)
Constant	-0.140** (0.062)	-0.416*** (0.060)
Control variables	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	78,359	34,754
Adj. R ²	0.31	0.29
F-test	0.000***	0.053*

Pennsylvania and Illinois, which have regulated a threshold of women on boards. The national differences enable us to examine if a specific measure varies over the state or nation, whilst holding country-level characteristics constant. We use the subsample of 5,741 U.S. firms including 272 firms in Massachusetts, 215 firms in Pennsylvania and 233 in Illinois. Our results shown in Table 6.9 Column 2 suggest no intra-national effects exist within the USA and that neither legislation nor regulatory “comply or explain” principles are effective in promoting gender diversity on boards, regardless of the state considered.

6.5 Conclusions

This chapter conducts a comparative analysis of different policy measures used to address gender equality on corporate boards. In total 76 countries between 2000 and 2018 are considered. We compare the effectiveness of three policy measures - legislative quotas, regulatory “comply or explain” principles and voluntary approaches in increasing the proportion of women on boards. Our empirical evidence shows that while all three policy measures are effective; legislative measures are the most effective, followed by voluntary approaches and regulatory “comply or explain” principles.

This chapter also examines the design of policy measures by considering the

enforcement, compliance and implementation of policy. Specifically, we examine the effectiveness of sanctions, compliance dates and targets for women on boards. We find that the policy dimensions are influential in weakening or strengthening the capacity of these policy measures. Legislative quotas are enforced using a variety of sanctions and are effective only if sanctions are applied moderately. The effectiveness of policy measures also varies over time. Legislative measures can work effectively regardless of the length of the compliance period, while regulatory “comply or explain” principles only work effectively when the transition period is 4 or 5 years. The threshold for women’s representation is also influential. If the threshold is far from a firm’s current gender diversity level, firms are more likely to reject targets to appoint more women on boards (see also Englich, Mussweiler and Strack, 2006; Strack and Mussweiler, 1997).

We also examine the distance from the compliance date and the target of women on boards to investigate the variation in firms’ incentives to comply. We report firms respond to a policy measure positively when the measure has a shorter compliance period and is implemented using a target of women on boards less distant from a firm’s precedent gender diversity level.

We hope this work is a spur to future research and further discussion of policy measures to enhance gender equality on corporate boards. Further

investigation of factors affecting the views of firms in promoting gender diversity on boards is critical. For example, as a disclosure of poor and better compliance is such a widespread method of enforcement, comprehending the role of media coverage in enhancing the salience of gender equality and improving corporate governance is particularly pressing (see Bednar, 2012). Secondly, women may join boards for reputational benefits (e.g., Marcus and Goodman, 1991; Bielby and Bielby, 1994; Elsbach, 1994) and corporate legitimacy reasons (Suchman, 1995; Zucker, 1977). Regulatory “comply or explain” principles in particular may be able to address this concern by ‘naming and faming’ good operators or providing reward schemes (Wright et al., 2008) for better practice.

Lastly, this chapter provides early evidence of policy measures to promote gender diversity. As the compliance date for many policy measures evaluated in this chapter are due after 2020, further research is critical to provide a comprehensive evaluation of these future deadlines and targets.

7. Conclusion and discussion

7.1 Summary of empirical results

This thesis speaks to the current concerns and challenges in promoting the diversity of board composition. In particular, we contribute to the current debate regarding women on corporate boards. Three research questions are addressed in the thesis, namely how changes to diversity in board composition affect firm performance, why women are underrepresented on corporate boards, and which policy approach is the best to promote gender diversity on corporate boards.

Chapter 4 examines the process through which diversity affects firm performance. We report that this process operates through the socialization process between directors within and outside the board. Management of board dynamics within and outside the board is necessary to harness board diversity. While some firms promote the diversity to address gender equality on corporate boards, women still remain underrepresented on boards.

Chapter 5 examines the barriers preventing women from ascending to the top of corporations by examining gender differences in interaction networks. We find that the organizational context is a barrier, where a prevailing masculine managerial culture excludes women from interaction networks. Also, female

preferences for interaction constrains women from joining male networks, as women prefer to interact with other females.

In a wider context, an increasing number of countries are taking actions and adopting various frameworks, legislation, regulations, and the voluntary framework. However, slow progress in achieving gender equality in the corporate world has been made. Chapter 6 compares the effectiveness of these three frameworks across countries and finds that the legal framework is the most effective, following regulations and voluntary approaches. This finding is dependent on the interaction with different policy dimensions of sanctions, compliance date and the target of women on boards.

7.2 Policy recommendations

Based on the empirical findings, as well as the prior evidence reviewed, this section forwards a number of recommendations for various groups of stakeholders involved with corporate boards. These recommendations are meant to assist companies or governments in translating their commitments to promote diversity on corporate boards into concrete structural and behavioral changes.

A holistic approach to promoting diversity on corporate boards is essential.

The promotion of board diversity is not just a game of numbers. The ultimate goal is to harness the diversity of boards of directors, therefore enhancing corporate governance quality and firm performance. One challenge for refreshed boards is to maintain continuity of operations. Changes to diversity interrupt the socialization process between directors that affects the efficiency of board functions and the quality of decision making. Hence, a health board dynamic is a critical factor for the success of board diversity practices. The dynamics of the board can be manifested through the connections between directors within and outside the board.

A statistical tool is necessary to monitor, gauge and forecast the progress and the success of diversity management practices. The careful examination of the diversity-performance nexus becomes even more critical as organizations inevitably evaluate the efficiency of such programs. Unfortunately, little guidance is offered for designing and evaluating such efforts regarding managing diversity on the board. This scarcity results from a lack of solid evidence that investigates the process through which diversity affects performance. Network density measures the presence or the absence of connections between directors indicating the level of cohesiveness and the effectiveness of the resource transmission on the board. Structural holes assess the dyadic constraints that directors encounter when they access a resource outside the organization. Social network analysis provides an

analytic tool not only for the health of board dynamic but also for the selection of candidates, ensuring a balance between board diversity and the continuity of board functions.

A fair and transparent recruitment process is required to strengthen the pipeline from the bottom to the top. Board appointments are still largely made through personal networks. These networks are largely composed of men in positions of power, influence, and status named old boys' networks. These networks are more likely to preserve the privilege of male candidates but discourage female candidates and therefore, reproduce gender inequality on corporate boards. As few women on boards can breakdown the boundaries of the old boys' club, these networks continue to benefit male candidates, giving an advantage to men in board appointments. While women remain disadvantaged during the board appointment process, gender inequality remains. To increase gender diversity, directors must go beyond tapping into existing networks and increase their exposure to a wider pool of board-ready executives.

From a global perspective, careful consideration is required when selecting and designing the framework for promoting gender diversity on corporate boards. Despite the increasing number of countries mandating gender quotas on corporate boards, some countries are still in the process of debating

whether the one-size-fits-all measure should be effective for all countries. Our empirical evidence suggests that different policy features can strengthen or weaken the capacity of the effectiveness of a specific framework. There are several long-term and short-term actions that governments can take to make sure that the policy framework best fits the company's incentives.

A mix of interventions is needed to ensure compliance and optimize policy outcomes. There is a trade-off between the desire for a common regulatory framework and its tendency to reduce diversity. One-size-fits-all approaches may not always be appropriate because countries differ in institutional and environmental factors that may differentiate means of promoting board gender diversity. For example, the U.S. and the UK are both Anglo-Saxon countries sharing the characteristics of common law and similar financial and labor market institutions. The UK is more soft law-oriented (starting with the 1992 Cadbury Report of corporate governance), while the U.S. functions with hard laws and bright lines encapsulated in the 2001 Sarbanes–Oxley Act (Aguilera et al., 2006). However, regulatory frameworks excessively tailored to the specific characteristics of each country may amplify complexity.

Developing a shared understanding (regulator to regulated) of desirable outcomes can contribute to the creation of win-win situations and enhanced design of incentives. The regulator and the regulated firms both play an

important role in implementing the policy. Interpreting the role of regulation and compliance may differ between the regulated and the regulator (Kagan, 1989; Reichman, 1992) and the difference may provoke unintended reactions to regulation not fully foreseen at the time of designing the framework. The design of incentives matters. Firms respond to the design of sanctions, compliance date and the target of women on boards differently.

Fostering diversity of thought maybe more of an imperative than an option for boards in the future. Boards are a vital corporate asset. Diversity and inclusion can help boards to be more effective and enterprises more successful. Today's boardroom is a social enterprise that takes on the collective personality of its members. The presence or absence of any one person can have a significant impact on board room dynamics. Healthy boardroom dynamics allow new voices to be heard whilst enhancing board functions.

This thesis has developed social capital theory and network analysis in the diversity literature and presented the empirical evidence on the role of the socialization between directors in promoting diversity and converting diversity into firm performance. Findings from the thesis should help firms to implement diversity and inclusion strategies more effectively. This thesis also suggests that corporate strategy of diversity and inclusion can develop

together with policy development in individual countries. There is much more that can be done to address gender equality on corporate boards at national and global levels. This thesis helps to provide more concrete guidelines to design efficient regulatory policies and corporate governance mechanisms.

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