Alignment Between Firms and Board Directors: Implications for New Ventures

Tatevik Harutyunyan

ABSTRACT

The focus of this dissertation is the alignment between firms and their boards of directors in relation to outcomes such as firm growth and director exit from the firm. The thesis asks the following overarching question: *How does the interplay between the characteristics of firms and their board directors influence firm- and director-related outcomes?* New ventures are of particular interest in this study. While research provides important insights into strategic human resources in ventures (e.g. founders, managers and early employees), we lack a nuanced understanding of boards in new ventures. Furthermore, we cannot directly apply what we have learnt from corporate governance research on traditional corporate boards to the context of new ventures. New ventures' liabilities of newness, including a scarcity of critical resources, established ties, history and, hence, legitimacy, lead to increased neediness and vulnerabilities for ventures. Therefore, the role of boards in new ventures is different, with their resource-provisional role being the dominant one.

My three empirical studies examine three different aspects of the overall research question: (1) To what extent and under what environmental specificities are board directors' experiences related to the new venture's growth? (2) To what extent do board interlocks affect the new venture's growth? (3) To what extent are dissimilarities across a director's portfolio associated with the likelihood of director exit?

This dissertation accentuates and embraces the specificities of new ventures and the differences in firms in general in relation to boards. It contributes to strategic entrepreneurship and corporate governance research in four key ways. First, it extends and enriches insights into boards in new ventures and their impact on venture growth by looking at director endowments (i.e. their experiences and social ties). Second, it theorizes on and examines important moderators of board–venture growth relationships, including environmental uncertainty, something that has not been studied for new venture boards. Third, it uses a

portfolio perspective to generate fresh insights into director exit from boards, specifically its

antecedents and moderators, examining *which* firm an interlocking director is more likely to

exit. Furthermore, from an empirical perspective, the dissertation proposes a strategy for

coming closer to identifying genuinely new ventures, as well as an empirical strategy aimed at

mitigating endogeneity. All three studies are enabled by rich registry data covering the

populations of the Norwegian firms and residents. The implications of these studies extend

directly and indirectly to new ventures.

ACKNOWLEDGEMENTS

A word that is often used in the acknowledgement section of doctoral dissertations is *support.* Mine would be no different. My journey as a doctoral student would never have been possible, let alone successful, without the encouragement and support I received from the amazing individuals in my life. For that, I am deeply grateful.

I extend my deepest gratitude to my supervisor, Bram Timmermans, for believing in me and, together with Herbjørn Nysveen and Paal Fennel (then, the admission committee members), making my admission to the PhD program at NHH possible and making me feel welcome in Norway and at NHH. Words cannot express how grateful I am to all of you for that. Bram, you have been a true inspiration and enormous support throughout this journey. Thank you for your time and for always being ready to listen to me and help me shape my thoughts. I greatly appreciate your constructive academic guidance, which helps me to date to shape my mindset and, ultimately, grow as a researcher. I would also like to thank my co-supervisor, Siri Terjesen, for her great support, encouragement, and contagious energy.

In addition to co-authorships with Bram, I have been lucky to have also Lars Frederiksen and Lasse Lien as my co-authors. I am grateful for our fruitful collaborations and fun discussions. Moreover, your kindness, honesty and enthusiasm are greatly appreciated. I would also like to express my gratitude to Lasse not only as a co-author but also, maybe predominantly, as a leader of the STOP group—my academic family. Throughout my PhD years, I have always had your support both academically and personally. Your honest and constructive feedback often changed the course of my work to a much better direction. Thank you for your positive attitude, commitment, and the time you have invested in my journey. As for the STOP group, our lunch meetings and countless serious and fun daily talks (both in person and via Slack) helped me understand life as an academic and never *STOPped* making my days brighter. Thanks to each and every one of you!

To the evaluation committee members—Michael Dahl, Kristina Nyström, and Mirjam Knockaert—I am thankful for your time and consideration.

Bergen and NHH have been my home for almost the last five years. Every time my plane approaches Bergen and I look outside through the window, I feel I missed seeing the landscape—the mountains, the forests, the sea, and the fragmented shores. Bergen has become dear to me, and so have its people. I went from not having anybody I knew to building friendships and even finding love—Christer. And I am beyond grateful for that! When, almost five years ago, I started a new chapter of life over 5,000 km away from my comfort zone and from where my heart was, I did not imagine I would have these experiences.

The first family I acquired here were my flatmates, Ritvana and Huynh, who became my dearest friends and great supporters in every aspect of my life. Thank you, my girls.

I have been extremely fortunate to find myself at NHH and, especially, at the Department of Strategy and Management (SOL), where I met talented, enthusiastic, ambitious, friendly, and devoted colleagues and friends. My special thanks to Sven Arne Haugland, Herbjørn Nysveen, and the entire SOL administration for following up on my PhD journey over these years. I am also thankful to my fellow PhD scholars from both SOL and other departments for all the joyful moments and challenges we shared, especially to Cassandra, Nahid, Hege, Julie, Yi, Rabia, Beatriz, Iffat, and Rujuta, who became very dear to me and whose encouragement and belief in me accompanied me along the way.

To my dearest friends from Armenia—Gayane, Adelina, Shushan, Lilit, Narine, Lusine, Emma, Anoush and many others—thank you for believing in me from the very first days when I was having interviews with representatives of different universities to now.

When I started my PhD, I expected to learn exponentially and develop professionally. And this happened, without a doubt. But it has been a personal journey as well, something that surprised me. I have changed and learned to navigate my thoughts and feelings better (at least, I think I have) while creating something that did not exist before.

Tatevik Harutyunyan

Bergen, 31st of January, 2022

TABLE OF CONTENTS

Article 1: Board Director Experience and the Growth of New Ventures

Article 2: To Interlock or Not to Interlock? The Effect of Board Interlocks on New Venture Growth

Article 3: The Odd One Out? A Portfolio Perspective on Board Director Exit

1. INTRODUCTION

There is a long-standing interest in the strategic human resources and endowments of new ventures in relation to venture performance. Predominantly, the human and social capital of entrepreneurs and founding teams are pronounced as crucial in this regard (Bosma, Van Praag, Thurik, & De Wit, 2004; Davidsson & Honig, 2003; Fern, Cardinal, & O'Neill, 2012; Gimeno, Folta, Cooper, & Woo, 1997; Hashai & Zahra, 2021). In addition to the human and social capital of entrepreneurs, new ventures can draw on other individuals who are strategically important to the new venture, such as employees (Coad, Nielsen, & Timmermans, 2017; Pandey, Lien, Knudsen, & Timmermans, 2020). However, there is relatively little knowledge on the extent to which the endowments of the board of directors, another arguably strategic human resource, matter for new venture outcomes. A closer and more nuanced look at new venture boards is required, especially given the legal requirement for many companies to have a board of directors, although the selection of the directors is at the discretion of the owners and other stakeholders. Therefore, the following questions arise: Do entrepreneurs extract value from boards? If so, how are they able to do so?

Board directors are key strategic decision makers sitting at the apex of the organizational hierarchy. Board work encompasses a wide range of duties, including hiring and firing executives, reviewing, approving and modifying firm strategy, compensation packages and budgets, and deciding on major organizational events, such as acquisitions, going public and disposing of major assets or lines of business (Forbes & Milliken, 1999; Pugliese et al., 2009). The role of boards ranges from monitoring the firm and mitigating executive opportunism (Zahra & Pearce, 1989) to providing resources, which involves their knowledge and skills as well as the resources accessible through their social ties. In this position, board directors can help establish and enhance the legitimacy of the firm (Hillman, Cannella, & Paetzold, 2000; Pfeffer & Salancik, 1978) as well as shape the strategic direction of the firm (Zahra & Pearce,

1989). To summarize, as strategic decision makers, board directors are able to influence organizational outcomes.

Research on boards in general is well established (Mace, 1971; Pfeffer, 1972); however, a focus on boards in new ventures is relatively young by comparison, albeit growing (Li, Terjesen, & Umans, 2020). While research on boards in corporate settings emphasizes issues of agency and focuses on the monitoring function of boards (Zahra & Pearce, 1989), research on new ventures suggests that the primary function of boards in this setting is resource-provisional (Garg & Furr, 2017; Kroll, Walters, & Le, 2007; Neville, 2011). These strategic resources by board directors include their knowledge and skills, as well as their reputation. Besides the resources that directors possess themselves, they are in a position to mobilize resources that can be accessed through their social networks (Audretsch & Lehmann, 2014; Li et al., 2020). Finally, they can strengthen the legitimacy of the new venture, which eases access to suppliers, distributors, customers and other relevant external actors (Kor & Misangyi, 2008; Kor & Sundaramurthy, 2009; Stinchcombe, 1965; Zimmerman & Zeitz, 2002). Despite these possible benefits, the same way that new ventures struggle to reach out to external actors, they can have challenges reaching out to board directors, even more so—to endowed directors who presumably have higher demand in the market for corporate directors (Bjørnåli, & Gulbrandsen, 2010; Stinchombe, 1965). While resourceful and reputable directors may be highly demanded by younger firms, there are opportunity costs associated with serving at every additional board for those directors, and young firms have little to offer to be able to attract them.

Research provides no or only limited consensus on how the different characteristics of boards influence the performance of new ventures (Li et al., 2020). For example, research on board size, which is one of the more dominant topics in the field, finds evidence of positive (Boone,

Field, Karpoff, & Raheja, 2007; Cowling, 2003; Gordon, Hrazdil, & Shapiro, 2012) and negative (Eisenberg, Sundgren, & Wells, 1998) effects of board size on various aspects of new venture performance. Similar discrepancies have been found related to the role of board independence (Brunninge & Nordqvist, 2004; Boone et al., 2007; Bertoni, Meoli, & Vismara, 2014).

Let us contemplate why we can observe such discrepancies in the findings. Indeed, the independence of directors is important for the monitoring function of the board (Johnson, Schnatterly, & Hill, 2013). However, as monitoring is not the board's primary role in new ventures (Garg & Furr, 2017; Kroll et al., 2007; Neville, 2011), board independence in and of itself may not be such a decisive feature for new ventures' outcomes. Moreover, while research on board size can inform us about how firms can structure boards, it is time to go beyond the mere number of directors and explore more closely who exactly serves on new venture boards and what these directors bring to the table, especially because new ventures are limited in the size of boards that they typically assemble. Thus, the topics of both independence and board size are relevant to board research in general but possibly less so for studying new ventures. As others have already argued, the strategic resources that directors bring to the table are far more relevant for decision-making processes and firm performance than independence, specific demographic attributes (Johnson et al., 2013; Volonté & Gantenbein, 2016) and board size per se. Understanding the composition of boards in terms of their knowledge and background would be an avenue for shedding light on whether and how board directors contribute to the performance of new ventures. This would be in line with existing research that investigates the strategic human capital embedded in entrepreneurs, new venture teams and early employees.

It is here that the empirical evidence is scant. Only a few studies have examined board directors' specific experiences, diversity and tenure to understand the effect of boards on, in particular, new ventures' patenting and launch of products (Vandenbroucke, Knockaert, & Ucbasaran, 2016), as well as post-entry growth in an emerging market (Chen, Kor, Mahoney, & Tan, 2017). Yet researchers' hands are often bound, as board directorship data are not easily obtainable; many studies rely on publicly available data with a limited scope of firms and no opportunities to fetch further information on all firms and directors. Therefore, the Norwegian registry data employed in this dissertation are critical in enabling all three articles and their empirical strategies. Another hurdle that corporate governance researchers face is the limited availability of data on genuinely new ventures. Research on boards in entrepreneurial firms, therefore, mainly addresses the boards of small firms (Li et al., 2020) rather than young firms, which are not necessarily the same. Another reason we do not observe a consensus in findings can be that while new ventures have lower organizational complexity and may encounter less impediments on their way to influence firm outcomes (Johansson, Dahlander, & Wallin, 2017), it is not given that board director's influence will materialize in new ventures. Entrepreneurs can be particularly resistant to give up power and control to other actors. This can pose a complication for materialization of board's role; hence, we can observe mixed evidence on their effect on organizational outcomes.

The argument that boards' roles in new ventures are distinct from those of other boards casts doubt on the pursuit of universal recipes regarding which directors are the best for *all* firms. Rather, specific directors are potentially better suited to firms' specific needs, and research should examine the degree of firm–director alignment in relation to the desired outcomes. In the context of this dissertation, firm–director alignment is where board directors and firms are on the same page in the sense that whatever one possesses or offers is in line with what the other misses or needs at a given point in time. For example, when a firm needs a board

director to facilitate monitoring, the firm looks for a director with a reputation as an active monitor or with the knowledge and skills suited to a monitoring role (Withers, Hillman, & Cannella, 2012). Another instance is when an aspiring board director who wishes to boost their social standing joins a prestigious firm. As new or young firms are hardly prestigious, reputable directors may avoid serving in these firms, even though these young firms may actually need resourceful and reputable directors (Deutsch & Ross, 2003; Jiang, Xia, Devers, & Shen, 2021). Obviously, these needs can change over time, and, rationally, firms would continuously recalibrate their board composition, and the directors would recalibrate their portfolios at different points in time. Based on this consideration, the general argument I pose is that different characteristics of board directors can have different implications for different firms in different contexts. Therefore, in my dissertation, I explore the following overarching research question: *How does the interplay between the characteristics of firms and their board directors influence firm- and director-related outcomes?* I do not aim to answer this question in all its facets in my dissertation. Instead, I tap into certain aspects of this research question by posing sub-questions in my articles that look at different director and firm characteristics, their possible alignments and their respective outcomes.

Figure 1 illustrates the research space to which my thesis aims to contribute and the overarching research question of the thesis. The figure depicts the interplay between the characteristics of firms and their board directors in relation to firm- and director-related outcomes, aspects of which were discussed above. The underlined parts form the focus of the thesis papers.

Board director characteristics
- Experiences
- Social ties
- Education
- Demographic characteristics
- Type (outsider, family member, employee, owner, manager)
- Power in a firm etc.

Firm characteristics
- Firm age
- Firm size
- Domain/industry
- Location/country/institutional environment
- Public/privately held
- Prestige
- Innovation-oriented etc.

Firm-related outcomes
- Growth
- Innovation outputs
- Legitimacy
- Practices
- Corporate social responsibility
- Acquisition
- IPO
- Expansion etc.

Director-related outcomes
- Exit from a board
- New directorship
- Reputational benefits and costs
- Career advancement
- Knowledge and skills
- Social ties
- Remuneration etc.

FIGURE 1: Visualization of the research space and the overarching research question of the thesis. The underlined parts are at the focus of the thesis papers

If the resource provision function is the most sought-after in new ventures, the board director's human and social capital become especially relevant as an approximation of the director's ability to fulfil their responsibilities and tasks. Hence, the first paper, entitled "Board Director Experience and the Growth of New Ventures," explores *to what extent and under what environmental specificities board directors' industry-specific and directorial*

experiences are related to the venture's growth. By investigating this question, I shed light on that part of the research space that emphasizes the human capital endowment of directors obtained through experiences. The paper further argues that whether the specific experiences might contribute to the performance of the firms will depend heavily on specific industry characteristics, in this case environmental uncertainty of the industry in which the new venture operates.

The second paper, entitled "To Interlock or Not to Interlock? The Effect of Board Interlocks on New Venture Growth," investigates *the extent to which board interlocks affect new venture growth*. The focus is on a particular endowment of board directors, namely, social capital. The study argues that the bundle of mechanisms behind interlocks that board directors bring to the firm can facilitate the outcome of growth in, particularly, new ventures.

The third study, entitled "The Odd One Out? A Portfolio Perspective on Board Director Exit," investigates *to what extent dissimilarities across a director's portfolio are associated with the likelihood of director exit*. Together with my coauthors, I shed light on how the characteristics (needs) of the focal firm (venture) align with the characteristics (needs) of the other firms in the director's portfolio and whether misalignment leads to director exit.

Thus, my arguments regarding firm–director alignment in this thesis are generally reflected by the chosen direction of investigation and the expected relationships. My key assumption is that an alignment (or lack thereof) between firm and director characteristics can lead to the outcome of growth (or director exit).

The rest of this section is organized as follows. After this introduction, I outline the theoretical background and position the study. Next, I focus on board directors, both in general and in relation to new ventures, as well as elaborating on the alignment between firms and boards. I then provide a brief overview of the three articles of the thesis and link them to the

overarching research question. Data and methodological considerations follow. Finally, before presenting the articles, the thesis' overall findings and contributions are introduced.

2. THEORETICAL BACKGROUND

In what follows, I lay the foundation for the thesis by introducing the strategic human resources of interest (i.e. board directors), their roles and functions, and the notion of alignment between directors' and firms' characteristics. Furthermore, I introduce the specificities of new ventures and the roles of boards in ventures, thus providing the overall positioning of the dissertation.

2.1. Boards of directors as strategic human resources

2.1.1. The different board directors and their responsibilities

Conditional on countries' legislation, many firms are required to have boards. Typically, board directors represent the interests of shareholders (Zahra & Pearce, 1989). However, this is not the case for all directors, and there is a differentiation between the types of board directors that can inform us about both their motives and their behaviours, as addressed by different theories. Generally, research classifies board directors as insiders and outsiders. More specifically, a board can comprise top managers, family members of founders or owners, employees, representatives of affiliated organizations, and independent directors (i.e. other individuals who are otherwise unaffiliated with the focal firm) (Chen et al., 2017; Finkelstein, Hambrick, & Cannella, 2009).

The sets of tasks and duties that boards of directors are supposed to perform inform what roles they can play for the firm in which they serve. However, over time, the tasks and responsibilities of boards have changed. At first, boards had no set obligations that they needed to fulfil; often, their involvement in firms was superficial, and boards were called *rubber stamps* (Nader, 1984; Perham, 1983; Zahra & Pearce, 1989). Gradually, board work

started to encompass more and more aspects of strategic management. Some countries have developed legislation defining board responsibilities. However, multiple mechanisms define the degree to which board directors are involved in the focal firm's activities. Generally, board work encompasses a wide range of duties, including hiring and firing executives, reviewing, approving and modifying firm strategies, compensation packages and budgets, and deciding on major organizational events, such as acquisitions, going public and disposing of major assets or lines of business (Forbes & Milliken, 1999; Pugliese et al., 2009). There is a certain line between managerial actions and decisions and those of board directors. Board directors are there for strategic planning, guidance and ratification of managerial decisions, while management implements the strategy and manages the day-to-day firm activities (Larcker & Tayan, 2015; Zahra & Pearce, 1989).

2.1.2. The role of board directors

There are multiple theories on boards and their roles. Earlier studies proposed two closely related perspectives on the roles of boards: *social elite cohesion* and *class hegemony*. From these perspectives, boards are arguably meant for coordination between firms to ensure that the ruling capitalists gain and retain control over societal institutions (Zahra & Pearce, 1989). These perspectives especially address the selection process of board directors, emphasizing factors such as familiarity with the potential director, wealth and prestige. Interlocks are often pictured as a way to retain the stability of an elite network of board directors sitting on the same boards (Mizruchi, 1996).

As boards have evolved, other theories have attempted to explain their changing roles. Various theories suggest basically the same regarding the role that boards play, but they place the emphasis on different aspects of this, thus offering complementing rather than substituting theoretical perspectives. The monitoring role of boards can be better understood by *agency theory*. Agency theory is the most pronounced and applied theory with respect to the role of

boards (Boivie, Bednar, Aguilera, & Andrus, 2016; Zahra & Pearce, 1989). The separation of ownership and control gives rise to the potential for diverging interests between shareholders and managers, hence leading to executive opportunism and related agency costs (Boivie, Withers, Graffin, & Corley, 2021; Fama & Jensen, 1983). Therefore, board directors are intended to represent and protect the shareholders' interests in the firm and monitor the firm's management to ensure mitigation of opportunism and alignment of interests between management and shareholders. From an agency theory perspective, boards are mainly pictured as buffer entities bridging management and shareholders, and their role is to exercise corporate control and monitoring. Agency theory does not argue that the monitoring role of the board is the sole function that it should perform. However, the other role that the board performs are considered as infrequent and therefore insignificant for firm outcomes (Zahra & Pearce, 1989).

Unlike agency theory, which assumes a misalignment of interests between agents and principals, *stewardship theory* aims to explain the instances where there *are* aligned interests. Here, managers are pictured as *stewards* when their interests are in line with those of shareholders. In this scenario, boards take more of a nurturing and empowering role with respect to managers (Davis, Schoorman, & Donaldson, 1997). Stewardship theory acknowledges aspects such as managers' and board directors' individual reputations and further career prospects in relation to their actions. Their objectives can align with their firm's objectives, as the focal firm's performance ultimately shapes perceptions regarding managers' and board directors' individual performances (Fama, 1980). Apart from shareholders' interests, other stakeholders' interests should be decisive in defining the board's role. The *stakeholder perspective*'s central tenet is that all stakeholders' interests should be accounted for within the governance of a firm (Gibson, 2000), as firms affect the lives of a wide range of people and entities, including their suppliers, employees and customers.

Grounded chiefly in *resource dependence theory* (RDT), the other major role that boards are argued to play is their resource-provisional role (Pfeffer & Salancik, 1978). From this perspective, board directors are considered as boundary spanners and links between a firm and its environment. Due to their social ties, board directors can enable access to and secure resources otherwise unavailable to the firm. Not only do they alleviate the dependencies on external actors and the environment that firms experience, but changes in the environment are also often reflected in the board's composition (Hillman, Withers, & Collins, 2009). Due to their reputations and social ties, board directors help firms establish and/or enhance their legitimacy (Hillman et al., 2000; Huse, 2007; Pfeffer & Salancik, 1978). Board directors bring their knowledge and skills not only to monitor the firm but also to provide advice and counsel to the firm and engage in the firm's strategy formation (Zahra & Pearce, 1989). Overall, resource provision by board directors enhances the functioning of the firm, its performance and its survival (Daily, Dalton, & Cannella, 2003).

Recent efforts to fill the gap between what board directors actually do and what academics claim to be board functions have led to some kind of an extension of the resource-provisional function. This extension locates the board's role more in its strategy involvement (Boivie et al., 2021; Pugliese et al., 2009). This is something that goes beyond providing counsel to the top management team. Rather, board director characteristics are immediately connected to their ability to constructively contribute to the strategic decision making of a firm (Garg & Eisenhardt, 2017; Haynes & Hillman, 2010; Kor & Misangyi, 2008).

2.1.3. The endowments of board directors

When discussing the resource-provisional role of boards, it is necessary to understand what strategic resources directors can actually bring to the table. The endowments of directors are often referred to as *board capital*, which is the sum of a board director's human and social capital (Hillman & Dalziel, 2003).

In general, human capital is referred to as the knowledge, abilities and skills embodied in an individual or group as the outcomes of their education, training and experience (Becker, 1964; Coleman, 1988; Hillman & Dalziel, 2003). While human capital does not equate to the abilities of board directors, it comes as close as possible to indicating this capacity (Becker, 1964). One type of investment in human capital is education, which affects the cognition of board directors, while also implying a certain social status, friendship ties and specific social norms (Johnson et al., 2013). Another form consists of the past professional experiences of individuals in certain domains or industries, during certain events (e.g. acquisitions) and in certain roles (e.g. managers or board directors) that shape the individuals' mindsets, points of reference and cognitive frames. By going through these experiences, board directors gain knowledge and skills about how boards and firms function and how they can navigate the challenges they face (Huff, 1982; Tsoukas, 1996; Westphal & Fredrickson, 2001). These competences enhance the ability of directors to fulfil both their resource-provisional and monitoring roles (Hillman & Dalziel, 2003; Khanna, Jones, & Boivie, 2014). Therefore, scholars have so far typically provided evidence of the positive effects of industry experience on firm-level outcomes (Johnson et al., 2013).

Social capital stands for "the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p. 243). In performing their resource-provisional function, the social capital of directors is vital, both in terms of their ability to advise the firm and in relation to enhancing the legitimacy of the firm (Carpenter & Westphal, 2001; Hambrick & D'Aveni, 1992). The social ties of directors ease access to resources and facilitate information flows between the focal firm and external actors, thus minimizing the uncertainties that firms face (Hillman et al., 2009; Zald, 1969). The personal relationships and affiliations of board directors with others in the firm contribute differently to board processes

through their differing incentives, loyalty and trust (Johnson et al., 2013). Ties to other firms, particularly board interlocks,[1] are a type of social tie that is debated in terms of its influence on firm performance (Lamb & Roundy, 2016). Interlocking directors have access to board-level knowledge, practices, policies (Davis, 1991) and information specific to the firms they bridge; this knowledge would otherwise be unavailable to the focal firm (Beckman & Haunschild, 2002; Haunschild & Beckman, 1998; Lamb & Roundy, 2016; Zahra & Pearce, 1989). Furthermore, as directors are simultaneously serving in multiple boards, those resources, particularly knowledge and information, embedded in these relationships stand out by their timeliness (Carpenter & Westphal, 2001). Moreover, having interlocks also put the director in a position to coordinate actions.

The line between social capital and human capital is not always clear. Gaining human capital is often accompanied by establishing social ties and, in turn, extracting knowledge and learning skills through interactions.

Another endowment of a board director is the director's social standing, status and prestige, which are argued to be signalling mechanisms (Certo, 2003; Deutsch & Ross, 2003). However, as a director's social standing can be an outcome of whom they are connected to and how they relate to them, as well as what experiences they have had or where they obtained their degrees, it is challenging to tease out the pure effect of a director's social standing. There can also be reputational outcomes of a board director's membership in an *inner circle* or elite network whose members sit on the same boards and communicate in elite clubs (Lamb & Roundy, 2016; Mizruchi, 1996; Useem, 1984). This is where perceptions about directors and the firms they serve at can also be shaped (Certo, 2003; Higgins & Gulati, 2003). Research so far provides evidence that the presence of prestigious directors or the

---

[1] Board interlocks are the links between two firms, which are formed by having a common board member (Burt, 1980; Lamb & Roundy, 2016). An interlocking board director is an individual who is serving at two or more firms (Zona, Gomez-Meija, & WIthers, 2018).

departure of those who experience reputational costs enhances perceptions of the focal firm (Fich & Shivdasani, 2007).

From a resource-provisional perspective, it is mainly outside board directors who are in focus, as they do not have another (formalized) role within the firm. After all, the resources of inside directors are already accessible, irrespective of board directorship. Studies consider the presence of outside directors as a sign of cognitive variety within a board. Scholars have discussed both the potential benefits of cognitive variety, such as differing, fresh and new perspectives to problem solving (Fiegener, 2005; Rindova, 1999), and the potential detrimental effects, such as the hindrance of efficient knowledge utilization because of lack of cohesion within the board (Forbes & Milliken, 1999). Although outside directors are often central in board research, there are variations in how such directors are identified. In addition to having diverse ways of defining outside directors, the literature uses the terms *independent*, *external* and *outside* directors interchangeably (Li et al., 2020). We follow Chen et al. (2017) and refer to outside directors as those board directors who are not employed or engaged in the management of the focal new venture. In addition, we separate family members from outside board directors, following Vandenbroucke et al. (2016) and Pearce and Zahra (1991). This is because we believe that the aforementioned theoretical arguments on the resource-provisional function of outside directors do not apply to family members as board directors, as the dynamics and mechanisms within family boards can be different (Balachandran, Wennberg, & Uman, 2019). Moreover, the selection of family members to a board can be a matter of convenience, as drawing on the accessibility of family ties and the trust embedded in these relationships, founders may invite family members to the board irrespective of the resources they can provide (Engel, Kaandorp, & Elfring, 2017; Stam et al., 2014). In this dissertation, spouses, partners, children, siblings and parents of firm owners are identified as family member directors.

3. ALIGNMENT BETWEEN FIRMS AND THEIR BOARD DIRECTORS[2]

Often, strategic decisions are the outcomes of choices by different actors and can be viewed as a *two-sided matching process*. In particular, firms offer employment to certain individuals, strategic partnerships to various firms and entities, and their services or products to potential customers, as well as attempt to attract certain investors; however, whether or not these individuals and firms will accept these offers depends on the characteristics of both the focal firms and their counterparts (Rocha, van Praag, Folta, & Carneiro, 2019). In the domain of this thesis, an individual does or does not become a board director depending on whether the firm's strategic decision makers invite or appoint the individual to their firm and whether that individual accepts the invitation or appointment. Thus, director selection can be regarded as the outcome of a two-sided matching process (Withers et al., 2012). Here, we are again dealing with a logic similar to market logic: a market for board directors, where firms represent the demand for directors and directors supply the board with service. This market has unique characteristics in that firms can have many directors, and directors can serve in many firms. Thus, unlike the labour market, where there is many-to-one matching, in the market for board directors, we observe many-to-many matching.

As firms come in different shapes and sizes, their needs and preferences for board directors differ. Firms are not isolated and are often dependent on their environments and external actors. Subsequently, the specificities of the industry and the macro-environment can also define the needs of the firm. To meet the demands of the (changing) environment and alleviate their dependence, firms often incorporate changes in the size and composition of the board (Hillman et al., 2009). One of the primary reasons for firms to interlock with other firms is the need for resource-seeking activities to decrease the dependence of the focal firm

---

[2] In this thesis, I do not claim to have researched the two-sidedness of the processes due to my distance from the events observed and the complexity of such study. However, many of the interpretations and theory developments of the papers are directly or indirectly anchored in the space of alignment between firms and directors.

on external actors (Drees & Heugens, 2013; Lamb & Roundy, 2016). The governance of each firm thus necessitates a certain adaptation and alignment of board directors' roles to the needs of the firm. In the context of this dissertation, firm–director alignment occurs when board directors and firms are on the same page, in the sense that whatever one possesses or offers is in line with what the other misses or needs at a given point in time.

The recently suggested firm–director interdependence perspective (Jiang et al., 2021) underlines not only the need of firms for board directors but also the personal dependence of directors on firms to fulfil their needs and anticipations concerning board membership. For instance, directors may desire to elevate their prestige, remuneration and experience. Additionally, taking extra directorships and forming interlocks can be driven by directors' desire to advance their careers and be part of the elite board network (Hillman et al., 2009; Useem, 1984). The specific experiences of directors are often demanded, depending on what the firm is going through. Such competences can include their experience with acquisitions in a certain industry or with advising firms after initial public offerings (IPOs) (Kroll et al., 2007). The social capital of an individual, particularly by holding seats on other boards, positively affects their selection to a board (Carpenter & Westphal, 2001; Kim & Cannella, 2008). Moreover, the performance of the firm at which the director currently serves affects the director's likelihood of subsequent board appointments (Ferris, Jagannathan, & Pritchard, 2003); therefore, directors prefer to exit firms with poor performance (Arthaud-Day, Certo, Dalton, & Dalton, 2006). Thus, it is argued that board directors and firms select each other based on the types of dependencies they have with respect to each other, and in director selection and appointment, the needs of the firm should align with the incentives of the potential board director (Withers et al., 2012).

Strategic decisions are not random but entail anticipations of firm performance (Rocha et al., 2019); however, alignment is not always achieved. A mismatch between what firms need and

which directors they end up having can lead to failure in achieving what both parties need or expect. A vivid example of this is when a director leaves a firm that is in crisis (and thus most in need of the input of its director) because they may not want to be associated with a failed firm and experience reputation costs that diminish their social position in the market for corporate directors (Boivie, Graffin, & Pollock, 2012; Withers, Corley, & Hillman, 2012). Thus, a mismatch or misalignment between firms and their board directors can cause director exit or performance outcomes that are under par.

As has become clear, the characteristics of directors and firms, as well as the specificities of the environment in which they operate, shape the needs and dependences of both parties with regard to each other. Particular aspects informing the parties' mutual selection are their endowments, namely, their human (or for firms, intellectual) and social capital. In other words, the interplay between director characteristics and firm characteristics can lead to director-related and firm-related outcomes (Jiang et al., 2021).

4. NEW VENTURES AND BOARDS OF DIRECTORS

As mentioned previously, the focus of this dissertation is the alignment between board directors and firms and its outcomes and implications for new ventures. There are multiple reasons for investigating the alignment of boards in new ventures. New ventures fall prey to the liabilities of newness (Stinchombe, 1965). This is the result of resource constraints, a lack of established ties and a limited track record, which all affect the venture's legitimacy. New ventures have little power or influence in the external environment (Hillman et al., 2009). They thus face hurdles in reaching out to customers, distributors, suppliers and partners (Kor & Misangyi, 2008; Kor & Sundaramurthy, 2009; Stinchcombe, 1965; Zimmerman & Zeitz, 2002). This makes new ventures more dependent on and vulnerable to the market, competition and external actors in general (Romanelli, 1989). These challenges point to the urgent need for new ventures to mitigate their dependences in order to survive and grow.

4.1. Strategic human resources of new ventures

Research has argued and demonstrated that the initial endowments of new ventures and their subsequent actions are critical dimensions of organizational emergence that can essentially alleviate liabilities of newness and increase their chances of survival (Yang & Aldrich, 2017). The scarcity of a firm's building blocks (i.e. resources) is the most pronounced liability that new ventures experience (Clarysse, Knockaert, & Lockett, 2007; Stinchcombe, 1965). Therefore, the initial financial endowments of entrepreneurs, as well as their human and social capital, are widely researched and have been shown to determine the trajectory of a venture (Furlan & Grandinetti, 2016; Gimeno et al., 1997; Stam, Arzlanian, & Elfring, 2014). Furthermore, new ventures typically do not have established routines that can systematize and define the relations between and among entrepreneurs and workers regarding how to work (Stinchcombe, 1965). Routines can facilitate firm efficiency and, in turn, contribute to firm longevity. Routines help achieve cognitive efficiency, mitigate organizational complexity and foster role formalization, which together can help the firm achieve the desired outcomes (Hannan & Freeman, 1984; March, 1991). Another dimension of entrepreneurial activities is the establishment of organizational boundaries that infer internal coherence within the firm and a consistent image in the eyes of outsiders. Thus, new ventures can largely benefit from an initial stock of resources, the early establishment of routines, organizational boundaries and internal coherence (Yang & Aldrich, 2017).

However, after overcoming some of the initial challenges, the new venture still needs to deal with an array of old and new hurdles. Thus, in addition to what the founders initially bring to the table, there should be subsequent activities that are able to further shape the venture's trajectory (Bhave, 1994; Lichtenstein, Carter, Dooley, & Gartner, 2007; Yang & Aldrich, 2017). The venture needs to access additional resources, as its initial endowments may depreciate over time. To improve the chances of the new venture's survival and growth,

efforts should be made to reach out to alternative resources (Levinthal, 1991). Further routinization of the firm and habitual responses to daily operations can efficiently direct the resources, time and attention of entrepreneurs to hurdles of higher and more urgent priority, which in turn increases the longevity of the venture. Moreover, gaining legitimacy in the eyes of external actors and increasing the exposure of the venture to potential customers, suppliers and distributors offer another dimension for alleviating some of these liabilities. Thus, on top of the initial organizing conditions, the new venture's attempts to source additional resources, routinize and establish the venture's legitimacy can mitigate the liabilities of newness (Yang & Aldrich, 2017).

In light of these insights, it is not surprising that there is a long-standing interest in the strategic human resources and endowments of new ventures in relation to venture performance. Understandably, the human and social capital of entrepreneurs have received most attention (Bosma et al., 2004; Gimeno et al., 1997). These *soft* resources support the development of the new venture's competency, enable resource mobilization and establish legitimacy among stakeholders (Amason, Shrader, & Tompson, 2006; Gimeno et al., 1997; Stam et al., 2014). The roles of other strategic human resources, including those of board directors, are pushed more to the background, although we cannot ignore the fact that boards contribute to a firm's decision-making processes and can thus ultimately shape the venture's performance (Garg, 2013; Garg & Furr, 2017).

Yet there is no consensus among prior studies on how different board characteristics, such as board size (Boone et al., 2007; Eisenberg et al., 1998) and independence (Boone et al., 2007; Brunninge & Nordqvist, 2004), influence the performance of new ventures (Li et al., 2020). To illustrate these discrepancies, we might first point to Eisenberg et al. (1998), who found that the board size and profitability of small and medium-sized firms were negatively correlated. Others found that larger boards were associated with higher productivity (Cowling,

2003), lower agency problems (Boone et al., 2007) and higher corporate governance levels (Gordon et al., 2012). As for independence, Boone et al. (2007) found that board independence also helped mitigate agency problems, while Brunninge and Nordqvist (2004) did not find support for independent directors' positive effect on entrepreneurial activities, and Bertoni et al. (2014) showed that in young firms, board independence was negatively related to IPO valuation.

4.2. Board directors in new ventures

In my view, it is important to study boards in new ventures, as the roles of boards in new ventures can be different due to the differing challenges and critical needs that they face. While the majority of research addresses boards as monitoring bodies, in new ventures, due to their instability, the nature of monitoring by boards is chiefly related to establishing appropriate structures and processes, as well addressing the urge for frequent changes in strategic directions (Garg, 2013). As elaborated earlier, new ventures are typically in need of resources, social connections, legitimacy, well-functioning organizational design, and routines (Stinchcombe, 1965), and board directors can be sources of such resources and drivers of respective changes. Research shows that resource provision or value creation is the primary function that boards exercise in new or young ventures, while the dominating board function in mature firms is monitoring or value protection (Bertoni et al., 2014; Garg & Furr, 2017; Kroll et al., 2007; Neville, 2011). This is supported by the argument that new ventures suffer less from agency problems due to their incomplete separation of ownership and control (Audretsch & Lehmann, 2014) and thus have fewer respective needs for monitoring. Given that new ventures stand out for their lower levels of organizational complexity (Daily & Dalton, 1992; Daily et al., 2003; Eisenhardt & Schoonhoven, 1990; Forbes & Milliken, 1999) and, in turn, have fewer complications in terms of boards' abilities to influence firm outcomes (Johansson, Dahlander, & Wallin, 2017), I argue that board directors' influences and

contributions can have clearer and more vivid effects on new ventures. In particular, directors' human capital can serve as a major source of knowledge different from the firm's existing stock of knowledge (Zahra & Filatotchev, 2004), especially in terms of shaping capabilities.

Along these lines, researchers have argued that the skills and experiences of board directors typically complement those of top management teams (Clarysse et al., 2007), and this is when ventures become capable of alleviating their liabilities of newness (Kor & Misangyi, 2008). As firms are dependent on external providers of resources (Pfeffer & Salancik, 1978) and, in the earlier stages of their life, generally have fewer well-established relationships with other actors, the directors' social ties can serve as channels for attracting resources and customers that mitigate the vulnerabilities of the new venture (Kim & Cannella, 2008). Therefore, several studies have explored board directors' specific experiences, diversity and tenure to understand the effects of boards on, in particular, new ventures' patenting and launch of products (Vandenbroucke et al., 2016), as well as on post-entry growth in an emerging market (Chen et al., 2017).

Board directors are typically authoritative enough to engage their resources in, for example, shaping the firm's trajectory (Li et al., 2020). Depending on their human and social capital, board directors can enrich the initial endowments of a new venture, as well as initiating subsequent activities within the venture in terms of attracting resources, establishing routines and building legitimacy.

4.3. Alignment between directors and new ventures

However, alignment between ventures and their board directors does not automatically work. New ventures can have a hard time reaching out to board directors, as well as to other external actors, due to their liabilities of newness and smallness (Stinchombe, 1965). If we refer to the firm–director interdependence perspective (Jiang et al., 2021), new or young firms are hardly prestigious, and reputable directors seeking to avoid reputational costs may not find

themselves serving in these firms, even though resourceful and reputable directors may actually be wanted by young firms. For the same reason, young firms may be more likely to lose a board director. In general, the stage of the firm's life cycle influences the board's composition. The firm's complexity changes over time, as do their requirements in terms of the roles boards should perform upon the transition from one stage of organizational development to another. Along these lines, firms lacking established prestige seek prestigious directors, especially in the process of going public, where having a director on their board can signal the quality of the firm and help legitimize it. Therefore, firms are likely to invite board directors who can form board interlocks with prestigious firms, thus helping shape similar perceptions about the focal firm (Deutsch & Ross, 2003; Lamb & Roundy, 2016).

On the bright side, directors who seek to gain experience-based benefits and foster their career development or who are interested in developing new ventures will choose to serve on new venture boards (Garg, 2013). Once again, access to certain individuals, the decision to offer them a directorship and the decision of the board director to accept the position can depend on the characteristics of the venture, its strategic decision makers and the board directors. Thus, board directors are not randomly assigned to ventures; rather, they self-select themselves into ventures, as is discussed further in this section and in the papers.

5. OVERVIEW OF THE RESEARCH ARTICLES

I now briefly introduce the three articles of my dissertation. Furthermore, I elaborate how they relate to and jointly address the overarching research question of the dissertation.

5.1. Brief overview of the articles

Article 1: "Board Director Experience and New Venture Growth"[3]

---

[3] This article is co-authored with Bram Timmermans and Lars Frederiksen.

The objective of the first article of this dissertation is to unpack the role of the human capital[4] of board directors for new ventures. Research generally focuses on entrepreneurs' human and social capital to explain the performance outcomes of their new ventures. Meanwhile, there is relatively little knowledge on the extent to which the endowments of other strategic human resources (e.g. board directors) matter for a new venture's performance. Given that new ventures are typically in need of resources, we argue that experienced outside board directors can serve as one such source of resources. Therefore, the first paper explores the questions of to what extent and under what environmental specificities board directors' industry-specific and board experiences are related to the venture's growth.

We find that those new ventures that appoint outside board directors with industry experience demonstrate higher growth, especially in the case of operating in higher-uncertainty environments. The study contributes to both the corporate governance and entrepreneurship literature by enhancing our understanding of the influence that board directors' endowments can have on a new venture's growth. In particular, a distinctive aspect of this study is incorporating, both theoretically and empirically, the environmental characteristics of the ventures, suggesting and providing evidence that board directors' contributions to new ventures are contingent on environmental specificities.

Article 2: "To Interlock or Not to Interlock? The Effect of Board Interlocks on New Venture Growth"[5]

The second article investigates board interlocks in new ventures. This phenomenon in corporate governance triggered my attention because the relationship between board interlocks and firm performance is one of the most researched relationships in the board interlock literature. However, the findings are inconsistent, and there are reasons to believe

---

[4] The article acknowledges that the experiences of board directors are not merely related to their knowledge and skills but are intertwined with their social ties gained during their experiences.
[5] This is a single-authored paper.

that interlocks can have different influences on established and new ventures.While board interlocks are understudied in the entrepreneurial setting (Lamb & Roundy, 2016). These all made me reflect on and investigate the extent to which board interlocks affect new venture growth. Apart from addressing this important gap, the article takes steps towards mitigating endogeneity issues and unpacking interlock's treatment effect—as opposed to a selection effect—on new venture growth.

I find that compared with noninterlocking ventures, new ventures with an interlock outperform in terms of equity, assets and relative sales growth. Furthermore, I find support for the positive effect of the number of interlocks on equity growth; however, the effect on sales and asset growth is negative and significant. The first key contribution of this study is theorizing and investigating interlocks' role for new ventures given that interlocking directors can be particularly attractive as board members, although their effect has not been systematically studied. Second, enabled by Norwegian registry data, the study introduces an empirical strategy and a logic of instrumental variables that are applicable to the interlock–firm performance relationship in general, thus contributing to efforts to tease out the selection effect of interlocks from their treatment effect. Hence, the study contributes to the strategic entrepreneurship and corporate governance literature. From the strategic entrepreneurship literature perspective, board interlocks have been understudied. From the perspective of the corporate governance literature, the paper introduces the venture setting as a boundary for the interlock–firm relationship, an aspect that has previously been unexplored in depth (Lamb & Roundy, 2016).

Article 3: "The Odd One Out? A Portfolio Perspective on Board Director Exits"[6]

---

[6] This paper is co-authored with Bram Timmermans and Lasse Lien.

After looking into interlocks and how they can affect ventures, one aspect attracted my attention: the somewhat famous *busyness* hypothesis. This states that board directors sitting on multiple boards have limited time and attention for the firms they serve (Ferris et al., 2003). This argument led us to wonder whether these directors do not have time and attention for *all* their directorships or only for select firms. Particular questions that arise are whether, at some point, the director may need to exit some of their firms and which firms these would be.

Research typically looks at board director exit in relation to director-specific factors and board-level and firm-level drivers. In particular, most studies examine director exit in light of expected or past adverse events in the firm. When a board director holds multiple directorships, this adds a portfolio-level dimension to this discussion, of which we have limited insights. The third paper of my dissertation investigates and enriches insights into the extent to which dissimilarities across a director's portfolio are associated with the likelihood of director exit.

We find that diversity of director portfolio drives director exit. Moreover, the more dissimilar the firm is compared to the rest of the portfolio, the higher the probability that it will experience director exit. However, if the director has prior experience with more diverse portfolios, the positive relationship between dissimilarity and director exit diminishes. Our study contributes to the corporate governance literature by (1) generating predictions about and verifying a firm's relative characteristics in a portfolio as important determinants of director exit, (2) incorporating a broader spectrum of such characteristics and (3) identifying patterns in the director's prior portfolios to explain current directorship choices.

5.2. The articles in light of firm–director alignment

One part of the alignment story is which directors join which firms, while another is whether this helps achieve the desired outcomes for both parties. Whether the firm–director match

works is tapped by the three papers of this dissertation. In my papers, I look at firms getting an experienced director and firms getting a board interlock (and losing it), as well as examining the antecedents of director exit.

For reasons mentioned in the previous sections, this thesis focuses on a particular group of firms—new ventures—and their alignment with board directors in terms of the extent to which their endowments are associated with venture growth. In the first article, a particular kind of director endowment—human capital (experiences)—is examined, while the second paper focuses on board directors' social capital (board interlocks). The first paper theorizes and provides evidence on how board directors' endowments are aligned with firms' needs, specifically the needs of new ventures, and partially dictated by the environment in which they are operating. It examines whether the interplay of these characteristics leads to new venture growth. The skills, competences and reputation of board directors in new ventures may matter to different extents across different degrees of environmental uncertainty (e.g. industries) (Eisenhardt, 1989; Nielsen, 2015; Pfeffer, 1972). One way to respond and adapt to the environment and achieve the desired organizational outcomes is to align the board's resources with the needs of the firm (Aldrich & Yang, 2014; Hillman et al., 2009; Pfeffer, 1972). This leads to a simple argument; if board directors are able to contribute in alignment with the new venture needs that are *dictated* by the environment, the venture will be more likely to succeed. In a new venture setting, the effect of this alignment is expected to be more considerable due to the typically lower organizational complexity, which thus leads to fewer hindrances in terms of board functioning.

Stinchcombe (1965) underlines the scarcity of internal and external social ties as one of the main reasons for liabilities of newness. Social capital is also typically considered as complementing the effects of human capital on a venture's performance (Davidsson & Honig, 2003; Furlan & Grandinetti, 2016). Board interlocks are typically formed to leverage

environmental uncertainty (Lamb & Roundy, 2016). In my second paper, I theorize that the bundle of resources that interlocks embody can meet new ventures' multiple needs and vulnerabilities and ultimately contribute to venture growth.

As addressed in the third paper, another aspect is whether the firm (the new venture) will be able to retain the (interlocking) board director. At some point, this firm–director alignment can be interrupted, or the firm may find itself not aligned with other firms in the board director's portfolio. The reasons for this can be found in the firms' (relative) characteristics within the director's portfolio of firms. In the paper, we theorize and provide evidence that the relative characteristics of firms can be reasons for the focal firm or the director ceasing the board membership. The theorization proceeds with the incorporation of both board directors' and firms' perspectives on if and why they might find themselves misaligned with respectively, their firms and directors, leading ultimately to director exit.

6. DATA AND DESCRIPTIVE STATISTICS ON BOARDS IN NORWAY
6.1. Data description: Strengths and limitations

It is a challenge to study the impact of boards on new ventures. One reason for this difficulty is the lack of comprehensive data. Researchers rely on public records that typically capture only some board directors and firms and seldom include new ventures, as only a select number of which are public firms. Furthermore, it is challenging to acquire details on all firms, especially their directors, beyond their names.

To address these issues, the articles of this thesis rely on Norwegian registry data. The registry data provide detailed information on the population of Norwegian firms and residents, thereby granting high statistical power and a high level of detail to our studies. It is possible to merge different data registers through the anonymized unique person and firm identifiers. The registry allows for the tracking of firms and individuals over time, enabling longitudinal

research designs, notably panel models, which can partially address omitted variable bias and hence mitigate endogeneity. It is possible to retrieve detailed information on all firms in the Norwegian economy, including their financial indicators, date of establishment, industry and geographic location.

This information is the starting point in the identification of new ventures. One of the strengths of this registry data is its ability to link individuals to their respective firms and identify ownership, employment relations and board directorships. The longitudinal and universal nature of the dataset allows for the tracking of the career history of these individuals, including changes to ownership, employment and board involvement over time. Obviously, board directorship data are fundamental for our efforts to conduct the studies of this dissertation. Shareholder and ownership information allows us to identify the owners of newly founded ventures, thus coming closer to the identification of venture founders. Together with the employment register, as well as additional individual-level factors such as demographic information, educational background and family relations, this allows us to identify additional board director characteristics, making it possible to make a distinction between inside and outside directors.

The registry data also have limitations. For example, the registry only includes individuals who reside in Norway, and it is impossible to retrieve the characteristics of board directors who are not residents. Hence, some measures employing these characteristics can be incomplete. This can lead to the loss of some observations; however, such instances do not minimize the high statistical power. Another drawback is the inability to identify new ventures prior to 2005 and board directors prior to 2002. This left censoring has implications for estimating individuals' experiences. Moreover, while the registry data have high coverage and are very rich, enabling us to develop approaches to come closer to identifying founders and new ventures, we do not have additional evidence confirming that these are, respectively,

true founders and genuinely new ventures. Some limitations arise in studying the alignment between directors and firms. Despite its richness, the registry data do not provide all the possible variables that could be definitive in the alignment (or lack thereof) between firms and directors. Among other observable and unobservable factors, such factors can be directors' personality traits and intentions and firms' organizational cultures and loci of power within corporate governance bodies. The same applies to the possible outcomes. For instance, while we do operationalize firm performance with multiple measures, how the firms and the markets perceive a firm's performance and assign significance to different factors is not available through registry data.

As for the generalizability of the results outside the Norwegian setting, an impediment to this may be country-specific legislation that affects board involvement. This might include the legal requirement to have a board and the requirements set by governments regarding who should sit on the board. For example, since 2008, Norwegian listed companies have had to comply with a 40% quota of female directors, something that is not exercised by all countries. Therefore, the results may not be fully generalizable to countries without similar regulations or with additional regulations. Some countries also impose regulations on the representation of independent directors and stakeholders on boards (Larcker & Tayan, 2015). Such regulations can affect power differences within boards, including whose voice weighs more. These dynamics and mechanisms may define the extent to which the endowments of board directors can materialize in the firm and which directors are more likely to exit a board.

6.2. A look at boards in Norway

To produce the descriptive statistics, I relied on three datasets with the following structures: (1) firm–director–year observations representing 2,329,478 board seats, (2) firm–year observations representing 1,022,824 boards and (3) director–year observations representing 1,672,294 individuals across 2004–2014.

As shown in Table 1, based on the board director–year observations of 324,218 individuals acting as board directors within 2004–2014, the average age of board directors varied at around 47–50 years old. The factor of gender is of significance in characterizing boards in Norway, as publicly traded firms have been required by law to have 40% of their board seats occupied by women since 2008. Table 1 demonstrates that the proportion of female individuals acting as board directors increased by approximately 3% (almost 13,000) within 2004-2014. In 2014, female directors comprised 21.5% of all directors.

TABLE 1: The number and characteristics of individuals acting as board directors

Year	Number of board directors	Female directors	Proportion of female directors	Average age of directors
2004	133,950	24,780	0.185	47.737
2005	139,900	26,860	0.192	47.785
2006	135,741	27,012	0.199	48.067
2007	141,278	28,538	0.202	48.240
2008	157,611	32,152	0.204	48.281
2009	156,024	32,140	0.206	48.699
2010	150,903	31,387	0.208	49.219
2011	155,048	32,405	0.209	49.468
2012	165,681	34,958	0.211	49.407
2013	160,554	34,358	0.214	49.828
2014	175,604	37,754	0.215	49.681
	1,672,294	342,344		

Out of 2,329,478 board seats between 2004 and 2014, female board directors occupied 405,141 (i.e. 17.4%) of the seats. In 80.3% of these instances, women acted as inside directors; by contrast, this proportion was 69.5% for men. Additional statistics showed that in more than 53% of the cases, the women who joined boards were family members of the owners. This may point to the selection of board directors by *convenience*, particularly if we take into account the female director quotas imposed on publicly traded firms and the much lower number of women acting as board directors. This may suggest that, at some point, there

was a scarcity of female directors. According to Table 2, more than 30% of all firms had at least one female director, with older firms having women on boards more often than firms up to 10 years old. Regarding female representation on boards, on average, 16.6% of boards were comprised of women. On the one hand, it is surprising that more mature firms on average demonstrated a smaller proportion of women on their boards, although there were presumably more publicly traded firms among older firms, thus elevating the mean. Of course, the current statistics encompass both publicly traded and privately held firms. On the other hand, as mentioned earlier, women were mostly insider directors, specifically family member directors, while in older firms, family member directors were rarer.

Based on 1,022,824 firm–year observations from 2004–2014, the average board size was just over two directors, with younger firms having the smallest boards (Table 2). In addition, supplementary statistics (Table 3) demonstrated that larger firms (in terms of the number of employees) typically had bigger boards. More than 32% of firms had at least one outside director; among younger firms, this was more seldom. The closer look provided by Table 3 demonstrates a similar pattern: with firm size and age, the number of outside directors increases.

TABLE 2: Descriptive statistics of firm-year observations groups by age categories (2004-2014)

	New Ventures (158,430)		Firms up to 5 years-old (350,655)		Firms 6-10 years-old (229,209)		Firms over 11 years-old (442,960)		All firms (1,022,824)	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Board size	1.839	1.129	2.105	1.313	2.265	1.390	2.421	1.473	2.277	1.408
Firm has a female director	0.295	0.456	0.289	0.453	0.294	0.455	0.319	0.466	0.303	0.459
Female directors' prop in a board	0.198	0.345	0.177	0.320	0.162	0.294	0.159	0.274	0.166	0.295
Firm has an outside board director	0.154	0.361	0.296	0.457	0.329	0.470	0.336	0.472	0.321	0.467
Firm has an owner w/ industry experience	0.756	0.430	0.608	0.488	0.645	0.479	0.657	0.475	0.637	0.481
Firm has an outside director w/ industry exp	0.031	0.172	0.080	0.271	0.080	0.271	0.076	0.265	0.078	0.269
Firm has an outside director w/ directorial exp	0.151	0.358	0.288	0.453	0.324	0.468	0.331	0.470	0.315	0.464
Interlocking firm	0.113	0.317	0.225	0.417	0.257	0.437	0.247	0.431	0.242	0.428
Firm has a busy director	0.180	0.384	0.298	0.457	0.348	0.476	0.345	0.475	0.330	0.470

TABLE 3: Average board size and number of outside directors across firms grouped by their age and size

	Board size					Number of outside board directors				
	Up to 5 employees	5-9 employees	10-49 employees	50-249 employees	250 and more employees	Up to 5 employees	5-9 employees	10-49 employees	50-249 employees	250 and more employees
New Ventures	1.734	2.034	2.189	2.845	5.083	0.193	0.236	0.322	0.639	2.333
Firms up to 5 years-old	1.937	2.218	2.544	3.784	5.258	0.486	0.538	0.907	1.999	2.852
Firms 6-10 years-old	1.985	2.299	2.746	4.057	5.696	0.521	0.576	0.980	2.140	2.865
Firms over 11 years-old	1.972	2.306	2.893	4.365	5.727	0.455	0.529	0.982	2.088	2.743

As for certain board characteristics relevant to the articles of this thesis, more than 60% of firms had owners with prior experience in the industry of the firm (Table 2). Yet outside directors with such experience were rarer, especially in new ventures (they were found in 3.1% of new ventures, in comparison with an average of 7.8% for all ventures). A similar pattern was observed in the case of outside directors with prior directorial experience. They were part of the board in 31.5% of the cases, but the percentage for new ventures was only 15.7%. As for board interlocks, 24% of firms had at least one interlock formed by a board director who was an outsider in both firms. For new ventures, interlocks were more seldom, i.e. 11.3%. In the same table, the *busy* directors are those with three or more directorships— both as inside and as outside board directors in their firm. As we can observe, more often there tended to be busy directors in older firms (34.5%) as opposed to new ventures (18%).

7. METHODOLOGICAL CONSIDERATIONS
7.1. Endogeneity

Strategic decisions and choices are not random and are often a function of a firm's expected performance (Clougherty, Duso, & Muck, 2016; Rocha et al., 2019). Therefore, endogeneity is omnipresent in strategy–firm performance relationships. To avoid arriving at wrong conclusions, we should account for endogeneity when conducting analyses of such relationships. As argued earlier, those strategic decisions that involve different actors can often be viewed as a *two-sided matching process* (Rocha et al., 2019). Bringing this consideration to the domain of the current study in a simplified manner, we deal with a logic similar to market logic. The access to certain individuals, the decisions to offer them a directorship and the decisions of the board directors to accept this position can depend on the characteristics of the venture, its strategic decision makers and the board directors. Thus, it is a situation in which board directors are not randomly assigned to firms; rather, they self-select themselves into firms. This suggests that the board directors' presence in and of itself does not

necessarily shape the growth of a new venture, so we cannot rush to conclusions and attribute the observed outcomes to the boards' endowments. There may be other causes driving certain types of directors into certain types of new ventures, which could explain the focal firm's growth as well as the reverse causality issue.

7.2. Methodological choices

We have taken several steps to be able to come closer to claiming causality. In all three articles, independent and control variables are lagged by a year (*t-1*) to mitigate the endogeneity problems arising from the simultaneous determination of growth and other variables. This step is to comply with the requirement of temporal precedence for causal claims (Antonakis, Bendahan, Jacquart, & Lalive, 2010). In addition, the board directors' impact on ventures may materialize in firm outcomes in the following year(s) rather than immediately.

For the first and second articles of this dissertation, panel models are particularly suitable for addressing omitted variable bias because these models account for firm-specific, time-invariant, and observed and unobserved factors otherwise not modelled (Antonakis et al., 2010). In the first paper, we investigate the relationship between the experiences of directors and rely on panel regression techniques, using both random and fixed-effect model estimators. Even though the Hausman test demonstrates that random effects are inconsistent, the juxtaposition of random-effect and fixed-effect models provides some insights into the possible selection effects associated with appointing an outside board director. Overall, as the comparison of the random and fixed-effect models demonstrates, the presence of an external board director appears to be highly correlated with observed and unobserved firm characteristics that also seem to affect new ventures' growth.

In the second paper, which looks at the relationship between interlocks and new venture growth, I put more emphasis on endogeneity, making the mitigation of this issue one of the

primary objectives. A venture becomes interlocking and receives a certain number of interlocks when (1) it enrols a board director who is simultaneously holding another board position or (2) one of the venture's board directors takes a board position in another firm. In either case, an individual becomes a board director depending on their getting an offer and accepting it. In this study, fixed-effect panel models (verified by the Hausman test) are implemented because they allow firm-specific effects (the intercept) to be correlated with the explanatory variables (Wooldridge, 2016). To alleviate endogeneity, one other complexity should be accounted for: the strategic choices of other firms that may determine the choices of the focal firm. The second study approaches this problem by implementing an instrumental variable technique that accounts for the mechanisms present at individual (board director) and firm levels outside the focal firm (in the industry and region in which the venture operates within a given year) that can affect the choice of directors to accept a board position and/or the ability of ventures to access these directors. Hence, the study combines panel models and an instrumental variable approach to alleviate the endogeneity problems in the relationship of interest (H2). Concerning the treatment of getting at least one interlock (H1), we apply coarsened exact matching (CEM). Although CEM comes with limitations and does not strongly claim to remove endogeneity and perfectly recreate an experiment, it is a crucial step for conducting the analysis on a more balanced and comparable sample, thus enabling the observation of a cleaner effect by the treatment.

The third paper is the first step in comprehensively exploring director exit from a portfolio perspective by examining the proposed portfolio diversity and firm dissimilarity effect on the likelihood of director exit and how the latter is moderated by director's experience with diverse portfolios. Therefore, we employed a simple logistic regression to test the impact of not only the main independent variables and the moderators but also the control variables. Director exit can occur either based on mutual agreement between firms and their directors or

unilaterally by either. Therefore, in the model, there are individual-specific, board-specific and firm-specific as well as newly hypothesized portfolio-level variables. Some of these control variables were found to be very informative and introduce implications for all these parties. In the case of utilizing more complicated empirical techniques, such as panel models, these nuances would blur. Further studies, however, should consider applying these techniques to come closer to causal inferences.

8. FINDINGS AND IMPLICATIONS

In this thesis, I explore the overarching research question asking *how the interplay between the characteristics of firms and their board directors influences firm- and director-related outcomes.* The empirical papers that are part of this thesis address three dimensions of this question: (1) the human capital of board directors in new ventures in relation to venture growth, (2) the social capital of board directors in new ventures in relation to venture growth and (3) the relative characteristics of firms in director portfolios in relation to director exit.

The studies provide evidence that the mere presence or addition of an outside board director does not necessarily drive new venture growth. From the first article of this dissertation, which takes a closer look at the experiences of directors, we learn that appointing a board director with industry experience can drive some aspects of new ventures' growth (in this case, sales). The characteristics of directors become even more salient when actively considering the organizational environmental characteristics with which the new venture is confronted and how these shape or accentuate the needs of the new venture. In more capital-intensive and unstable contexts, the experience of directors can help alleviate the vulnerability of new ventures and beneficially affect their growth. Industry-specific human capital among board directors can help the entrepreneur navigate challenges, and they may use their social capital and reputation to acquire extra resources.

As for social capital, we have come to know that acquiring an (outside) board interlock provides an edge for new ventures in terms of equity, assets and sales growth compared to noninterlocking ventures (Article 2). However, the loss of an interlock does not systematically put the venture at a disadvantage. We observe that equity growth shows a tendency to increase, while asset and sales growth unexpectedly tends to decrease when the number of interlocks increases. Taking these patterns together, one of the reasons for this may be that interlocks help minimize the venture's dependence on loans and payables. Another possible explanation is that when the selection effect is mitigated, the negative effect manifests itself. Moreover, a higher number of interlocks may mean that ventures have *busy* directors, which, in turn, may imply that due to limited time, attention and resources, the director may not be able to contribute equally to all their firms.

However, a new venture may not be able to retain an interlocking (*busy*) director or may not want to keep one if it is an outlier in the director's portfolio of firms (Article 3). In general, firms that are dissimilar in terms of their age, industry and size (assets) are more likely to experience the exit of interlocking directors. In other words, if a firm's characteristics do not align with the other firms' characteristics in the same director's portfolio, the firm may experience the director's exit. Here again, the experience of board directors, particularly, with complex and diverse portfolio, plays a role. This experience may make the effect of the firms' industry dissimilarity a less decisive factor in terms of the director's exit. This may be due to directors' improved cognitive capacity for handling and navigating the different needs that different firms can have. Combined with the findings of the first paper, we can state that experience updates the cognitive schemata of board directors and helps them better manage and navigate various environments as well as a presumably diverse set of firms—without the need to quit them.

Linking these findings to the overarching research question, we can observe the need for the alignment and calibration of board directors' endowments with the specificities of the new venture's environment to facilitate the venture's growth. Moreover, if there is alignment between firm characteristics within a director's portfolio, the outcome of the director's exit is less probable.

8.1. Practical implications

Essentially, the implications of this thesis relate to the composition of boards in new ventures. As shown by the first two articles of this dissertation, board directors can be important in shaping the organizational outcomes of new ventures; therefore, instances of director exit are also vital to examine, as is shown in the third article. The generated insights can facilitate the effective establishment of alignment between firms' needs and the endowments of directors whom they invite to their boards. So far, we have observed that only a fraction of new ventures have boards, while even a smaller portion have directors with relevant human and social capital. The reasons for this surely stem from the inability of ventures to mobilize or retain a board; however, in addition, ventures may undermine boards or be unaware that they matter. The insights we offer are relevant for all who are engaged with building new ventures or who offer support services, including entrepreneurs, policy makers and facilitators of entrepreneurial activities. With respect to the latter, we specifically point to the need for incubators and accelerators to seek and screen for relevant skills, competences and connections among new ventures' boards of directors in order to extract the most out of these strategic entities. Furthermore, predicting which director will most likely exit a given firm can be especially valuable for firms that are vulnerable or needy, particularly in the case of new ventures, as it can help them take steps to retain the director or put extra consideration into the director selection phase in the first place. The practical implications may also relate to board

directors in terms of both calibrating their endowments in line with firms' needs and selecting and retaining the firms in their portfolios of directorships.

8.2. Overall contributions

This dissertation offers multiple contributions to strategic entrepreneurship and corporate governance research. It accentuates and embraces the specificities of new ventures and the differences in firms in general in relation to boards.

When researching new ventures' boards in relation to performance, studies have typically looked at their composition, employing somewhat one-dimensional criteria to disentangle the effects of different subgroups of directors. However, the heterogeneity within board members includes dimensions (experiences, social ties, etc.) that are able to indicate their capability to influence a new venture's outcomes (Li et al., 2020). Therefore, both theoretically and empirically, we cannot treat the boards of new ventures in the same way as those of established firms. In this thesis, I bring together and synthesize arguments from the entrepreneurship and corporate governance literature to explicitly delineate how boards can have a different role for new and young firms. In the first paper, we hypothesize and analyse an important moderator of board–venture growth relationships, namely, environmental uncertainty, which has not before been studied, particularly in the case of venture boards. However, given the vulnerabilities of new ventures, this factor can be critical in bringing ventures down, and it has been argued that boards are major boundary spanners for firms in general in terms of linking firms with their environments (Hillman et al., 2009).

Furthermore, from the strategic entrepreneurship literature perspective, board interlocks have been understudied. However, they are relevant to the study because interlocking directors can be perceived as productive and quality board members; hence, interlocking directors may be more in demand. In addition, interlocks are widespread among ventures getting venture capital (VC) funding, as venture capitalists may appoint board directors of their own. From

the perspective of the corporate governance literature, the second paper introduces the venture setting as a boundary for the interlock–firm relationship, an aspect previously unexplored in depth (Lamb & Roundy, 2016). Thus, the second paper brings the bundle of mechanisms behind interlocks to the domain of ventures.

The third paper contributes to the corporate governance literature by answering the following rarely asked question: *Which* firm will an interlocking director more likely exit? We hypothesize and show that part of the answer to this question lies in the relative characteristics of the firms in the director's portfolio. We theorize on and empirically consider a selection of (relative) characteristics of portfolio firms. These characteristics capture more aspects of firm dissimilarities than those captured in previous studies. The dominant tendency of the research is to take a one-sided perspective on director exit, as opposed to addressing the potential drivers of both firms and directors. This study does not differentiate between exits from firms in crisis and more benign exits, something that is commonly done in exit research, and it is thus more inclusive in terms of the contexts of the directors' exit. Overall, we can say that the contribution to corporate governance research has two aspects. First, the study enhances our understanding of the determinants of director exit, which, in turn, can be a determinant or a result of a firm's organizational outcomes. Second, the study's insights extend into the research stream on interlocking or *busy* directors. Regarding the latter, interlocking and *busy* directors' effect on firm performance has been widely debated. While such discussions have often been informative, insights into these directors' decisions to exit boards (or their removal) are largely absent.

The articles take steps to compensate for the shortcomings of research in several ways. From an empirical perspective, board directorship data are not easily obtainable. Therefore, Norwegian registry data have been critical in enabling the empirical strategies of all three articles. Corporate governance research on entrepreneurial firms mainly addresses the boards

of small firms (Li et al., 2020) rather than young ones, which are not necessarily the same. The first two articles of the thesis employ an empirical approach to arrive as closely as possible at genuinely new ventures. This approach involves nuances such as looking beyond firm registration dates, as this can include instances where firms went through a change that required a new registration (e.g. a merger, acquisition or international expansion). Subsequently, additional restrictions were applied, including eliminating firms where the firm identifier could be traced years prior to the registration year or where the startup was established after a large group of workers co-moved to it, as well as eliminating abnormally large ventures as of registration date and those with a large ownership by another firm. This was vital, as, otherwise, there would have been a mismatch between the empirics and our theorization, which has the underlying assumption of referring to new or young firms.

Both the first and second papers rely on both private and listed new ventures, and the analyses proceed with a longitudinal research design across many industries. Furthermore, in the second paper, the empirical contribution is related to an estimation strategy aimed at mitigating the endogeneity typical of board–firm performance relationships (Larcker, So, & Wang, 2013; Omer, Shelley, & Tice, 2014; Smith & Sarabi, 2020). This is an aspect that prior interlock research struggled to accomplish for several reasons, including data limitations. In addition, I introduce a logic of instrumental variables that is applicable to the interlock–firm performance relationship in general; to the best of my knowledge, this has not been conducted in research so far.

Empirically, the third paper offers nuances not previously considered by research. In particular, we put the firm characteristics of all portfolio firms on a continuum to arrive at more finely grained measures for the dissimilarity of firms within a director's portfolio.

9. REFERENCES

Amason, A. C., Shrader, R. C., & Tompson, G. H. (2006). Newness and novelty: Relating top management team composition to new venture performance. Journal of Business Venturing, 21(1), 125-148.

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. Leadership Quarterly, 21(6), 1086–1120.

Arthaud-Day, M. L., Certo, S. T., Dalton, C. M., & Dalton, D. R. (2006). A changing of the guard: Executive and director turnover following corporate financial restatements. Academy of Management Journal, 49(6), 1119-1136.

Audretsch, D. B., & Lehmann, E. E. (2014). Corporate governance and entrepreneurial firms. Foundations and Trends® in Entrepreneurship, 10(1–2), 1-160.

Becker, G. 1964. Human capital. New York: Columbia University Press.

Beckman, C. M., & Haunschild, P. R. (2002). Network learning: The effects of partners' heterogeneity of experience on corporate acquisitions. Administrative science quarterly, 47(1), 92-124.

Bertoni, F., Meoli, M., & Vismara, S. (2014). Board Independence, Ownership Structure and the Valuation of IPOs in Continental Europe. Corporate Governance: An International Review, 22(2), 116–131.

Bhave, M. P. (1994). A process model of entrepreneurial venture creation. Journal of Business Venturing, 9(3), 223–242.

Bjørnåli, E. S., & Gulbrandsen, M. (2010). Exploring board formation and evolution of board composition in academic spin-offs. *The Journal of Technology Transfer*, *35*(1), 92-112.

Boivie, S., Bednar, M. K., Aguilera, R. V, & Andrus, J. L. (2016). Are Boards Designed to Fail? The Implausibility of Effective Board Monitoring. Academy of Management Annals, 10(1), 319–407.

Boivie, S., Graffin, S. D., & Pollock, T. (2012). Time for me to fly: predicting director exit at large firms. Academy of Management Journal, 55(6), 1334–1359.

Boivie, S., Withers, M. C., Graffin, S. D., & Corley, K. G. (2021). Corporate directors ' implicit theories of the roles and duties of boards, (April 2020), 1662–1695.

Boone, A. L., Field, L. C., Karpoff, J. M., & Raheja, C. G. (2007). The determinants of corporate board size and composition: An empirical analysis. Journal of financial Economics, 85(1), 66-101.

Bosma, N., Van Praag, M., Thurik, R., & De Wit, G. (2004). The value of human and social capital investments for the business performance of startups. Small Business Economics, 23(3), 227-236.

Brunninge, O., & Nordqvist, M. (2004). Ownership structure, board composition and entrepreneurship: Evidence from family firms and venture-capital-backed firms. International Journal of Entrepreneurial Behaviour & Research, 10, 85–105.

Carpenter, M. A., & Westphal, J. D. (2001). The Strategic Context of External Network Ties: Examining the Impact of Director Appointments on Board Involvement in Strategic Decision Making. Academy of Management Journal, 44(4), 639–660.

Certo, S. T. (2003). Influencing initial public offering investors with prestige: Signaling with board structures. Academy of management review, 28(3), 432-446.

Chen, P. L., Kor, Y., Mahoney, J. T., & Tan, D. (2017). Pre-market entry experience and post-market entry learning of the board of directors: implications for post-entry performance. Strategic Entrepreneurship Journal, 11(4), 441-463.

Clarysse, B., Knockaert, M., & Lockett, A. (2007). Outside board members in high tech start-ups. Small Business Economics, 29(3), 243–259.

Clougherty, J. A., Duso, T., & Muck, J. (2016). Correcting for Self-selection Based Endogeneity in Management Research: Review, Recommendations and Simulations. Organizational Research Methods, 19(2), 286–347.

Coad, A., Nielsen, K., & Timmermans, B. (2017). My first employee: an empirical investigation. Small Business Economics, 48(1), 25–45.

Coleman, J. S. (1988). Social capital in the creation of human capital. American journal of sociology, 94, S95-S120.

Cowling, M. (2003). Productivity and corporate governance in smaller firms. *Small Business Economics*, *20*(4), 335-344.

Daily, C. M., Dalton, D. R., & Cannella, A. A. (2003). Corporate governance: Decades of dialogue and data. Academy of Management Review, 28(3), 371-382.

Dalton, D. R., Daily, C. M., Johnson, J. L., & Ellstrand, A. E. (1999). Number of directors and financial performance: A meta-analysis. Academy of Management journal, 42(6), 674-686.

Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. Journal of Business Venturing, 18(3), 301–331.

Davis, J. H., Schoorman, D. F., & Donaldson, L. (1997). Toward a Stewardship Theory of Management. Academy of Management Review, 22(1), 20–47.

Deutsch, Y., & Ross, T. (2003). You are Known by the Directors You Keep: Reputable Directors as a Signaling Mechanism for Young Firms. Management Science, 49(8), 1003–1017.

Drees, J. M., & Heugens, P. P. M. A. R. (2013). Synthesizing and Extending Resource Dependence Theory: A Meta-Analysis. Journal of Management, 39(6), 1666–1698.

Eisenberg, T., Sundgren, S., & Wells, M. T. (1998). Larger board size and decreasing firm value in small firms. Journal of financial economics, 48(1), 35-54.

Eisenhardt, K. M. (1989). Making Fast Strategic Decisions in High-Velocity Environments. Academy of Management Journal, 32(3), 543–576.

Engel, Y., Kaandorp, M., & Elfring, T. (2017). Toward a dynamic process model of entrepreneurial networking under uncertainty. Journal of Business Venturing, 32(1), 35-51.

Fama, E. F. (1980). Agency problems and the theory of the firm. Journal of political economy, 88(2), 288-307.

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. The journal of law and Economics, 26(2), 301-325.

Fern, M. J., Cardinal, L. B., & O'Neill, H. M. (2012). The genesis of strategy in new ventures: Escaping the constraints of founder and team knowledge. Strategic Management Journal, 33(4), 427-447.

Ferris, S. P., Jagannathan, M., & Pritchard, A. C. (2003). Too Busy to Mind the Business? Monitoring by Directors with Multiple Board Appointments. The Journal of Finance, 58(3), 1087–1111.

Fich, E. M., & Shivdasani, A. (2007). Financial fraud, director reputation, and shareholder wealth. Journal of financial Economics, 86(2), 306-336.

Forbes, D., & Milliken, F. J. (1999). Cognition and Corporate Governance: Understanding Boards of Directors as Strategic Decision-Making Groups. Academy of Management Review, 24(3), 489–505.

Furlan, A., & Grandinetti, R. (2016). Spinoffs and their endowments: beyond knowledge inheritance theory. Journal of Intellectual Capital, 17(3), 570–589.

Garg, S. (2013). Venture boards: Distinctive monitoring and implications for firm performance. Academy of Management Review, 38(1), 90–108.

Garg, S., & Eisenhardt, K. M. (2017). Unpacking the CEO-Board relationship: How strategy making happens in entrepreneurial firms. Academy of Management Journal, 60(5), 1828–1858.

Garg, S., & Furr, N. (2017). Venture Boards: Past Insights, Future Directions, and Transition to Public Firm Boards. Strategic Entrepreneurship Journal, 11(3), 326–343.

Gibson, K. (2000). The moral basis of stakeholder theory. Journal of business ethics, 26(3), 245-257.

Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the Fittest? Entrepreneurial Human Capital and the Persistence of Underperforming Firms. Administrative Science Quarterly, 42(4), 750–783.

Gordon, I. M., Hrazdil, K., & Shapiro, D. (2012). Corporate governance in publicly traded small firms: A study of Canadian venture exchange companies. *Business Horizons*, *55*(6), 583-591.

Hambrick, D. C., & D'Aveni, R. A. (1992). Top team deterioration as part of the downward spiral of large corporate bankruptcies. Management Science, 38(10), 1445-1466.

Hannan, M. T., & Freeman, J. (1984). Structural Inertia and Organizational Change. American Sociological Review, 49(2), 149–164.

Haunschild, P. R., & Beckman, C. M. (1998). When do interlocks matter?: Alternate sources of information and interlock influence. Administrative science quarterly, 815-844.

Haynes, K. T., & Hillman, A. J. (2010). The Effect of Firm Compensation Structures on the Mobility and Entrepreneurship of Extreme Performers. Strategic Management Journal, 31(11), 1145–1163.

Hashai, N., & Zahra, S. (2021). Founder team prior work experience: An asset or a liability for startup growth?. Strategic Entrepreneurship Journal.

Hedström, P., & Udehn, L. (2009). Analytical sociology and theories of the middle range. The Oxford handbook of analytical sociology, 25-47.

Higgins, M. C., & Gulati, R. (2003). Getting off to a good start: The effects of upper echelon affiliations on underwriter prestige. Organization science, 14(3), 244-263.

Hillman, A. J., Cannella, A. A., & Paetzold, R. L. (2000). The Resource Dependence Role of Corporate Directors: Strategic Adaptation of Board Composition in Response to Environmental Change. Journal of Management Studies, 37(2), 235–256.

Hillman, A. J., & Dalziel, T. (2003). Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Perspectives Source. The Academy of Management Review, 28(3), 383–396.

Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource dependence theory: A review. Journal of Management, 35(6), 1404–1427.

Huse, M. (2007). Boards, governance and value creation: The human side of corporate governance. Cambridge University Press.

Huff, A. S. (1982). Industry influences on strategy reformulation. Strategic Management Journal, 3(2), 119-131.

Jiang, H., Xia, J., Devers, C. E., & Shen, W. (2021). Who will board a sinking ship? A firm-director interdependence perspective of mutual selection between declining firms and director candidates. *Academy of Management Journal, 64*(3), 901-925.

Johansson, M., Dahlander, L., & Wallin, M. (2017). The Role of Boards and Board Ties for the Performance of Startups, (84426).

Johnson, S. G., Schnatterly, K., & Hill, A. D. (2013). Board Composition Beyond Independence: Social Capital, Human Capital, and Demographics. Journal of Management, 39(1), 232–262.

Khanna, P., Jones, C. D., & Boivie, S. (2014). Director Human Capital , Information Processing Demands , and Board Effectiveness. Journal of Management, 40(2), 557–585.

Kim, Y., & Cannella, A. A. (2008). Toward a social capital theory of director selection. Corporate Governance: An International Review, 16(4), 282–293.

Kor, Y. Y., & Misangyi, V. F. (2008). Outside directors' industry-specific experience and firms' liability of newness. Strategic Management Journal, 29(12), 1345–1355.

Kor, Y. Y., & Sundaramurthy, C. (2009). Experience-based human capital and social capital of outside directors. Journal of Management, 35(4), 981–1006.

Kroll, M., Walters, B. A., & Le, S. (2007). the Impact of Board Composition and Top Management Team Ownership Structure on Post-Ipo Performance in Young Entrepreneurial Firms. Academy of Management Journal, 50(5), 1198–1216.

Lamb, N. H., & Roundy, P. (2016). The "ties that bind" board interlocks research: a systematic review. Management Research Review, 39(11), 1516–1542.

Larcker, D., & Tayan, B. (2015). Corporate governance matters: A closer look at organizational choices and their consequences. Pearson education.

Larcker, D. F., So, E. C., & Wang, C. C. Y. (2013). Boardroom centrality and firm performance. Journal of Accounting and Economics, 55(2–3), 225–250.

Levinthal, D. A. . (1991). Random Walks and Organizational Mortality. Administrative Science Quarterly, 36(3), 397–420.

Li, H., Terjesen, S., & Umans, T. (2020). Corporate governance in entrepreneurial firms: a systematic review and research agenda. Small Business Economics, 54(1), 43-74.

Lichtenstein, B. B., Carter, N. M., Dooley, K. J., & Gartner, W. B. (2007). Complexity dynamics of nascent entrepreneurship. Journal of Business Venturing, 22(2), 236–261.

Mace, M. (1971). Directors. Myth and Reality. *Harvard Business School Press, Boston, MA*.

March, J. G. (1991). Exploration and Exploitation in Organizational Learning. Organization Science, 2(1), 71–87.

Mizruchi, M. S. (1996). What do interlocks do? An Analysis, Critique, and Assessment of Research on Interlocking Directorates. Annual Review of Sociology, 22(1), 271–298.

Nader, R. (1984). Reforming corporate governance. California Management Review, 26(4), 126-132.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational.pdf, 23(2), 242–266.

Neville, M. (2011). The role of boards in small and medium sized firms. Corporate Governance: The International Journal of Business in Society, 11(5), 527–540.

Nielsen, K. (2015). Human capital and new venture performance: the industry choice and performance of academic entrepreneurs. Journal of Technology Transfer, 40(3), 453–474.

Nordberg, D. (2007). Rebalancing the board's agenda. Journal of General Management, 33(2), 13-23.

Omer, T. C., Shelley, M. K., & Tice, F. M. (2014). Do well-connected directors affect firm value?. Journal of Applied Finance (Formerly Financial Practice and Education), 24(2), 17-32.

Pandey, Lien, Knudsen, & Timmermans (2020). Human capital accumulation in new ventures: The role of founders vs. early employees. Unpublished manuscript

Pearce, J. A., & Zahra, S. A. (1991). The relative power of CEOs and boards of directors: Associations with corporate performance. Strategic management journal, 12(2), 135-153.

Perham, J. (1983). Battle over board's role. Dun's Business month, 122(8), 53-58.

Pfeffer, J. (1972). Size and Composition of Corporate Boards of Directors: The Organization and its Environment. Administrative Science Quarterly, 17(2), 218–228.

Pfeffer, J., & Salancik, G. R. (1978). The external control of organizations: A resource dependence perspective. New York: Harper & Row.

Pugliese, A., Bezemer, P. J., Zattoni, A., Huse, M., Van Den Bosch, F. A. J., & Volberda, H. W. (2009). Boards of directors' contribution to strategy: A literature review and research agenda. Corporate Governance: An International Review, 17(3), 292–306.

Rocha, V., van Praag, M., Folta, T. B., & Carneiro, A. (2019). Endogeneity in Strategy-Performance Analysis: An Application to Initial Human Capital Strategy and New Venture Performance. Organizational Research Methods, 22(3), 740–764.

Romanelli, E. (1989). Environments and strategies of organization start-up: Effects on early survival. Administrative Science Quarterly, 369-387.

Smith, M., & Sarabi, Y. (2020). "What do interlocks do" revisited – a bibliometric analysis. Management Research Review. 44(4), 642-659.

Stam, W., Arzlanian, S., & Elfring, T. (2014). Social capital of entrepreneurs and small firm performance: A meta-analysis of contextual and methodological moderators. Journal of Business Venturing, 29(1), 152–173.

Stinchcombe, A.L. (1965) Social Structure and Organizations. In: March, J.P., Ed., Handbook of Organizations, Rand McNally, Chicago, 142-193.

Tsoukas, H. (1996). The firm as a distributed knowledge system: A constructionist approach. Strategic management journal, 17(S2), 11-25.

Useem, M. (1984). The inner circle: Large corporations and business politics in the US and UK. New York: Oxford University Press.

Vandenbroucke, E., Knockaert, M., & Ucbasaran, D. (2016). Outside Board Human Capital and Early Stage High-Tech Firm Performance. Entrepreneurship: Theory and Practice, 40(4), 759–779.

Volonté, C., & Gantenbein, P. (2016). Directors' human capital, firm strategy, and firm performance. Journal of Management & Governance, 20(1), 115-145.

Westphal, J. D., & Fredrickson, J. W. (2001). Who directs strategic change? Director experience, the selection of new CEOs, and change in corporate strategy. Strategic Management Journal, 22(12), 1113-1137.

Withers, M. C., Corley, K. G., & Hillman, A. J. (2012). Stay or Leave: Director Identities and Voluntary Exit from the Board During Organizational Crisis. Organization Science, 23(3), 835-850.

Withers, M. C., Hillman, A. J., & Cannella, A. A. (2012). A Multidisciplinary Review of the Director Selection Literature. Journal of Management, 38(1), 243–277.

Yang, T., & Aldrich, H. E. (2017). "The liability of newness" revisited: Theoretical restatement and empirical testing in emergent organizations. Social Science Research, 63, 36–53.

Zahra, S. A., & Filatotchev, I. (2004). Governance of the Entrepreneurial Threshold Firm: A Knowledge-based Perspective. Journal of Management Studies, 41(5), 885–897.

Zahra, S. A., & Pearce, J. A. (1989). Boards of Directors and Corporate Financial Performance: A Review and Integrative Model. Journal of Management, 15(2), 291–334.

Zald, M. N. . (1969). The Power and Functions of Boards of Directors: A Theoretical Synthesis. American Journal of Sociology, 75(1), 97–111.

Zimmerman, M. A., & Zeitz, G. J. (2002). Beyond Survival : Achieving New Venture Growth by Building Legitimacy. Academy of Management Review, 27(3), 414–431.

Zona, F., Gomez-Mejia, L. R., & Withers, M. C. (2018). Board Interlocks and Firm Performance: Toward a Combined Agency–Resource Dependence Perspective. Journal of Management, 44(2), 589–618.

ARTICLE 1

Board Director Experience and the Growth of New Ventures

Tatevik Harutyunyan

NHH Norwegian School of Economics

Department of Strategy and Management

Tatevik.Harutyunyan@nhh.no

Bram Timmermans

NHH Norwegian School of Economics

Department of Strategy and Management

Bram.Timmermans@nhh.no

Lars Frederiksen

Aarhus University

Department of Management

L.Frederiksen@mgmt.au.dk

ABSTRACT

Research on entrepreneurship generally focuses on entrepreneurs' human and social capital as the drivers of new venture performance. However, there is relatively little knowledge on the extent to which the endowments of other strategic human resources such as board directors influence new venture performance. We therefore investigated to what extent and under what environmental conditions the experience of board directors are related to a new venture's growth. Our analysis of Norwegian registry data on 13,204 new ventures showed that outside board directors' previous industry-related experience was positively associated with new ventures' sales growth. Furthermore, depending on the type and degree of environmental uncertainty, the saliency of the relationship between such experience and the performance of new ventures differed.

Keywords:

board of directors; industry experience; new venture; new venture growth; environmental uncertainty

1. INTRODUCTION

Interest in the strategic human resources of new ventures and their endowments in relation to new venture performance is long-standing. Entrepreneurs' human and social capital have been emphasized in the literature predominantly to alleviate the liabilities of newness faced by new ventures (Marvel, Davis, & Sproul, 2016; Unger, Rauch, Frese, & Rosenbusch, 2011). These "soft" resources support the development of new venture competencies, enable resource mobilization, and establish legitimacy among stakeholders (Amason, Shrader & Tompson, 2006; Bosma, Van Praag, Thurik, & De Wit, 2004; Gimeno, Folta, Cooper, & Woo, 1997; Stam, Arzlanian, & Elfring, 2014).

While the characteristics of entrepreneurs and new venture teams clearly play a central role in the performance of new ventures, they are not the only strategic human capital resources. Understandably, entrepreneurship scholars have started to investigate the role of the other individuals involved in new ventures, like early employees (Coad, Nielsen & Timmermans, 2017) and board directors (see Li, Terjesen, & Umans, 2020, for a review). In this study, we focused on the role of board directors as they contribute to new venture decision-making processes and may thus ultimately shape performance (Garg, 2013; Garg & Furr, 2017). There is no consensus among prior studies on how the different characteristics of boards, for instance, board size (Dalton, Daily, Johnson, & Ellstrand, 1999; Eisenberg, Sundgren, & Wells, 1998) and independence (Boone, Field, Karpoff, & Raheja, 2007; Brunninge & Nordqvist, 2004), influence the performance of new ventures (Li et al., 2020). Several studies have therefore examined board directors' specific work experience, diversity, and tenure to understand the effect of boards on, particularly, new ventures' patenting and launch of products (Vandenbroucke, Knockaert, & Ucbasaran, 2016), as well as their post-entry growth in emerging markets (Chen, Kor, Mahoney & Tan, 2017).

New ventures are typically in need of resources, social connections, legitimacy, a well-functioning organizational design, routines, and similar (Stinchcombe, 1965). Board directors can be sources of such resources as research suggests such resource provision to be the primary function that boards exercise in new ventures (Bertoni, Meoli, & Vismara, 2014; Garg & Furr, 2017; Kroll, Walters, & Le, 2007; Neville, 2011). Board directors are also typically authoritative enough to engage their resources to help shape the firm's trajectory. Given that new ventures stand out because of their lower levels of organizational complexity (Daily & Dalton, 1992), we believe that board directors' influence and contributions can have a clearer and more tangible effect on new venture growth. We therefore focused on the industry and directorial experiences of new ventures' board directors as an indication of their relevant skills, competences (Kor & Misangyi, 2008; Kor & Sundaramurthy, 2009), and social capital (Certo, 2003; Furlan & Grandinetti, 2016) in relation to new ventures' growth over time. Moreover, we tested the proviso that the skills, competencies, and legitimacy of board directors in new ventures may work differently across different degrees of environmental uncertainty (e.g., industries) (Eisenhardt, 1989; Martin, Gozubuyuk, & Becerra, 2013; Nielsen, 2015; Pfeffer, 1972).

To address the relationships of interest, we employed the data of the Norwegian registry. This is a longitudinal employer–employee matched dataset that includes the career histories of all residents in Norway, including board directors. Based on this register, we identified over 13,204 new ventures in the period 2005–2012 that were registered as limited corporations.

Despite the assumed strategic importance of boards, only 25% of new ventures involve board directors from outside the firm, and an even lower percentage utilize outside board directors with relevant industry and directorial experience. Those new ventures that appoint outside board directors with industry experience demonstrate higher growth, especially when operating in higher uncertainty environments. Further, depending on the type of

4

environmental uncertainty new ventures face, industry experience may carry a different weight for different aspects of new venture growth.

2. THEORY AND HYPOTHESES

2.1. The role of boards

Various theories suggest two different functions that a board of directors can offer a firm, irrespective of the firm's size, age and ownership (Li, Terjesen, & Umans, 2020; Lynall, Golden, & Hillman, 2003; Zald, 1969). The extant literature predominantly discusses the monitoring and mentoring role of boards in dealing with conflicting stakeholder interests (Davis, Schoorman, & Donaldson, 1997; Fama & Jensen, 1983; Zahra & Pearce, 1989).

Another class of explanations addresses the resource provision function of the board of directors (Pfeffer & Salancik, 1978). In this vein, the board of directors is an additional organizational body whose members are selected by the firm, who invest their human capital in the firm by providing advice and resources to the founding team, and whose interactions are decisive in the formation of the strategic direction of the firm (Zahra & Pearce, 1989). Furthermore, board members bring their social capital to the table, establish contacts with the external environment, and hence facilitate access to resources otherwise unavailable to the firm (Kim & Cannella, 2008; Li et al., 2020). Huse (2007), in particular, highlighted the board's role in the establishment and enhancement of a firm's reputation.

2.2 Resource provision by outside board directors

How boards complement a venture's top management team and alleviate the liability of newness is central to studies on the role of boards in new ventures (Certo, Covin, Daily & Dalton, 2001; Certo, 2003; Deutsch & Ross, 2003; Kim & Cannella, 2008). Given the challenges specific to new ventures, the resource provision function of these boards is more

significant than its monitoring function (Bertoni et al., 2014; Certo, Covin, Daily & Dalton, 2001; Garg & Furr, 2017; Kroll et al., 2007; Neville, 2011). Because of the instability of new ventures, monitoring by board directors may be significant in establishing appropriate routines and organizational structures and processes, as well as in constraining the urge to make frequent changes in strategic direction (Garg, 2013). Relying on resource dependence theory (Hillman & Dalziel, 2003; Pfeffer & Salancik, 1978) and cognitive perspectives on governance (Forbes & Milliken, 1999; Rindova, 1999) in particular, research has suggested that new ventures can gain access to various resources, establish relationships (Chen, Kor, Mahoney & Tan, 2017), develop capabilities, and formulate their strategic direction (Fiegener, 2005) via board directors' human and social capital.

From a resource provision perspective, interest turns to board directors who do not have another (formalized) role within the new venture (e.g., are not an owner, employee, or manager). After all, the resources of these individuals will have already been mobilized irrespective of their board directorship. The role of *outside directors* for a nascent firm has been discussed in the literature on entrepreneurship and boards. These studies considered the presence of outside directors as a sign of cognitive variety within a board. Scholars have further noted both the potential benefits of cognitive variety—the differing, fresh, and new perspectives to problem-solving (Fiegener, 2005; Rindova, 1999)—and the detrimental effects, including the hindering of efficient knowledge utilization, because of a lack of cohesion within a board (Forbes & Milliken, 1999).

Although outside directors are often central in board research, there are variations in how such directors are identified.[7] We followed Chen et al. (2017) and referred to outside directors as those board directors who were neither employed nor engaged in the management of the focal

---

[7] In addition to having diverse ways of defining outside directors, the literature uses the terms "independent," "external," and "outside" directors interchangeably (Li et al., 2020).

new venture. Furthermore, we separated family members from outside board directors in line with Vandenbroucke et al. (2016) and Pearce and Zahra (1991). We believe that the aforementioned theoretical arguments on the resource provision function of outside directors do not refer to family members as board directors since the dynamics and mechanisms within family boards can be different (Balachandran, Wennberg, & Uman, 2019). Moreover, the choice of family members for a board can be a matter of convenience as drawing on the accessibility of family ties and the trust embedded in these relationships, founders may invite them to the board regardless of the resources they can provide (Engel, Kaandorp, & Elfring, 2017; Stam et al., 2014).

Further, as Chen et al. (2017, p. 445) pointed out, "board-level learning from others occurs through appointing outside directors who transfer external market know-how and know-who embedded in other firms and industries." Consequently, the mobility of these individuals infers the mobility of their experience (Dokko & Rosenkopf, 2010). Thus, outside directors serve a resource provision function on the board. Their presence infers the flow of resources previously unavailable to the firm, and given the importance of the resource function of the boards of new ventures (Neville, 2011; Garg & Furr, 2017), our baseline hypothesis was:

> **Hypothesis (H1).** *The presence of an outside director to the board of a new venture is positively associated with the new venture's growth.*

2.3 Industry and directorial experience

Board directors carry out different functions in a venture. The monitoring function arguably requires different characteristics compared to the forward-looking strategic and resource provision functions that the board may fulfill. This may be the reason that, despite our baseline hypothesis, considerable ambiguity exists regarding the performance outcomes of outside directors on the boards of new ventures (Li et al., 2020). Thus, although we expect a

positive relationship between the presence or entry of an outside board director and venture growth, we theorized that heterogeneity in the experience of these directors drives some of the variance in the observed performance effects. This is in line with research indicating that the specific experience of outside board directors influences the various aspects of new ventures' performance differently (Vandenbroucke et al., 2016). Further, Chen et al. (2017) disentangled the effects of the intra- and extra-industry directorial and managerial experience of board directors on firm growth after their entry into an emerging market. Seconding this vein of research, the current study focuses on the relevant human capital outside directors bring, particularly same industry experience, and its impact on the growth of new ventures.

Research has underlined the importance of industry experience within young firms. For example, a founder's industry-specific experience may explain the outperformance of spin-off firms[8] (e.g., Dahl & Sorenson, 2013; Phillips, 2002) as it infers that the founder has relevant tacit knowledge gained during their years of previous employment as well as social ties built in the respective industry (Furlan & Grandinetti, 2016). These initial endowments of the new venture's founder are the outcomes of their work experience within the same industry as their new venture; thus, industry-specific experience is emphasized as a driver of performance superiority. The same mechanisms may be in place in the case of board directors in their capacity as strategic decision-makers.

One reason industry experience can matter is that actors have bounded rationality, and when facing issues and uncertainty, they turn to their prior experiences to interpret the current context and generate solutions (Johansson, Dahlander, & Wallin, 2017). If their prior experiences are within the *same* industry context, the contribution will be more relevant and valuable. This is because each industry domain has its specificities and dynamics that

---

[8] Spin-off firms are defined as firms established by former employees of incumbent firms in the same industry as their parent firm (e.g., Dahl & Sorenson, 2013).

necessitate respective responses and actions by new ventures in order for them to survive and grow. Hence, the presence of directors with industry experience can facilitate a new venture's navigation through the industry more efficiently as well as the relaxation of the venture's dependences on its external environment. Another reason for these benefits is that due to their possible connections within the industry, board directors with industry experience may be able to help by reaching out to respective customers, suppliers, employees, distributors, and other actors (Kor & Sundaramurthy, 2009). These possibilities will not necessarily be in place or sufficiently relevant in the case of directors with extra-industry experience.

A board director's experience in a different industry can ignite new collaborations and hence innovation and have beneficial outcomes for the venture in the case of a reputable board director (Deutsch & Ross, 2003). However, it may introduce cognitive distance as these board directors may be unaware of the focal industry challenges (Chen et al., 2017; Kor & Misangyi, 2008). They may therefore need time to learn the focal industry specificities by trial and error and thus potentially hinder the performance of new ventures given that the speed of action and appropriateness of responses are decisive for them. Thus, board directors with *industry experience* contribute more to the resource provision and strategy formulation functions of the board because they may introduce numerous relevant resources to the firm. As resources yield growth only when applicable to the environment of a firm (Penrose, 1959), these directors have the potential to foster a new venture's growth. We therefore hypothesize:

> **Hypothesis (H2).** *The presence of—or adding—an outside board director with similar industry experience as the new venture is positively associated with venture growth.*

In addition to industry experience, board directors may bring to the table their directorial experience (Chen et al., 2017). By directorial experience, we underscore the directors' prior experience as board directors irrespective of the industry they used to serve in. Such board directors may encounter a number of strategic and governance-related problems and become

9

engaged in solving them. In this way, they may become educated as board directors (Carpenter & Westphal, 2001; Kor & Sundaramurthy, 2009) and develop a certain way of thinking and frame of reference (Huff, 1982; Tsoukas, 1996; Westphal & Frederickson, 2001) that they can turn to when facing problems and uncertainty. As discussed by Chen et al. (2017), directorial experience infers intuitive responses to strategic and governance problems as well as the critical assessment of management proposals. This experience is thus relevant to the strategy formation and resource provision functions of the board. Accordingly, directorial experience refers to broad governance knowledge about how, for example, to manage and strategically plan aspects within a venture on a board level, such as establishing a useful organizational design, installing a corporate culture, and driving hiring decisions. In this way, board directors with directorial experience bring valuable knowledge about how to mitigate or reduce uncertainty within the boundaries of new ventures, which is a key element in managing these firms (Knight, 1921). We therefore argue that:

> **Hypothesis (H3).** *The presence of an outside board director with directorial experience is positively associated with a new venture's growth.*

2.4 Organizational environmental characteristics and board directors' experience

Similar to the claim that the choices and behaviors of individual entrepreneurs are affected by their contextual surroundings (Navis & Ozbek, 2017; Welter, 2011), we ask whether the competences and skills inferred by board directors' industry-related and directorial experience are equally important for all new ventures. It is very likely that they are not.

Firms do not operate in a vacuum, and new ventures in particular are highly dependent on the organizational environment in which they operate (Hillman, Withers, & Collins, 2009), mainly due to the liabilities of newness (Stinchombe, 1965) and their inherently uncertain nature (Foss, Klein, Kor, & Mahoney, 2008; McMullen & Shepherd, 2006). All new ventures

within an industry are exposed to environmental conditions that infer certain requirements to succeed in that industry; in some industries, ventures have to build reliable technology and secure intellectual property rights, while others may need to generate early cash flow and obtain a strong position in the market quickly. These requirements may make a new venture needy and vulnerable in specific ways in that particular organizational environment. These firms therefore need to respond and adapt to their environmental conditions (Buvik & Grønhaug, 2000; Martin et al., 2013).

Board directors are often pictured as linking the firm to its environment and leveraging its dependence on the external environment (Pfeffer & Salancik, 1978). One way to respond and adapt to the environment and to achieve the desired organizational outcomes is to align the board's resources with the needs of the firm (Aldrich & Yang, 2014; Hillman et al., 2009; Pfeffer, 1972). This leads to the simple argument that if board directors are able to contribute in accordance with a new venture's needs, which are "dictated" and conditioned by the environment, the venture will be more likely to succeed.

We therefore examined the organizational environment to identify hurdles that new ventures may need to overcome. More specifically, we took into consideration the instability of industry sales and the capital intensity of the industries in which the new ventures in our study operated. These environmental characteristics indicate the unpredictability of demand, competitive uncertainty, and dynamic changes in an industry (Kor, Mahoney, & Watson, 2008). Moreover, they may lead to firms' increased dependence on the external environment, which may reduce their control over their resources (Buvik & Grønhaug, 2000) and increase their need for resource commitment. This is especially salient in the case of new ventures.

Few studies have addressed the relationship between new venture founders' human capital and their performance outcomes across different types of industries with different levels of

uncertainty. The theorized mechanisms behind this relationship are the individuals' absorptive capacity and adaptability in uncertain and changing environments due to their industry-specific knowledge and respective networks (Nielsen, 2015). New ventures thus need to be able to adapt. The extra effect of dynamic technological changes in industry indicate the need of more inputs in terms of human capital to increase the speed of strategic decision-making (Buvik & Gronhaug, 2000; Nielsen, 2015; Sarasvathy, 2008; Unger, Rauch, Frese, & Rosenbusch, 2011).

Finally, research has suggested that in high-velocity environments, the availability of advice from experienced actors facilitates the speed of strategic decision-making, and the speedier the strategic decision-making, the greater the performance of the firm (Eisenhardt, 1989). In the context of new ventures, the need for speedy strategic decisions is more urgent as new ventures are more vulnerable due to their lack of resources, established connections, and legitimacy (Stinchombe, 1965). Analogous to these considerations, outside directors with industry and board experience as strategic decision-makers may facilitate better and faster governance through times of higher uncertainty and in high-velocity industries and therefore support the growth of new ventures. Accordingly, we hypothesized:

> **Hypothesis (H4).** *In high-uncertainty industries, the industry-specific and directorial experience of outside directors is positively associated with the growth of new ventures.*

3 DATA AND METHODS

3.1 Data

To test our hypotheses, we merged four data registers administered by Statistics Norway using their unique person and firm identifiers. In addition, we were able to track firms and

individuals over time. First, we used the firm register that contains detailed information on all firms in the Norwegian economy, including financial indicators, date of establishment, industry, and geographic location. This database formed the starting point for the identification of new ventures in our study. Second, we merged our dataset with the shareholder register; this database provides an overview of who owns how many shares in Norwegian public and private limited companies. Based on this database, we identified the owners of newly started ventures. Third, Statistics Norway administers a register detailing all the board directors of Norwegian organizations that are required to have a board. Fourth, for all individuals, including owners and board directors, it was possible to obtain detailed demographic information, including family relationships, from the personal register, with the only requirement being that these individuals had to reside in Norway. Finally, the employer–employee-linked register allowed us to identify who was employed by which company at a particular moment in time. We were subsequently able to track the careers of all the individuals in the register.

3.2 Sampling procedure

We used the Norwegian firm register to create a panel dataset of new ventures, which we followed over a period of up to five years from the date of founding. In the first step of our sample selection procedure, we identified new ventures established in the period 2005–2012. We confined our study to this period due to restrictions on the availability of data. The data on ownership are only available from 2005 onwards, hence the lower year restriction. Furthermore, board information was only available up to 2014. This restriction combined with the requirement that our panel include the two years following the registration of each new venture meant we could only include new registrations from 2013 onward.

Accurately identifying new ventures in the firm register was not a straightforward task. A common starting point when identifying new ventures is to ascertain when a new organization

number appeared in the firm registry. However, relying on this measure could also result in the inclusion of ventures that, upon closer inspection, may be established companies but underwent a change that required a new registration (e.g., mergers and acquisitions, international expansion, corporate spin-offs, and change of ownership). Subsequently, in addition to the registration date, we imposed several restrictions before we identified the newly registered venture as a genuine new venture.

First, we removed all instances where we could trace the firm identifier in the years prior to the registration. Second, we removed all instances where established corporations had a majority ownership in the founding year as this may have pointed to a corporate spin-out. While we contend that these are interesting new economic activities worth studying, we were interested in independent new ventures run by individual entrepreneurs or teams of entrepreneurs. Besides looking at ownership, we also identified the previous employment relationships of owners and employees associated with the new venture. When we observed a large group of workers co-moving to a newly registered venture, we removed these firms from our sample. Despite all these restrictions, we obtained a small set of newly registered ventures that were relatively large in the founding year. All the newly registered ventures with more than 50 employees in the founding year were therefore excluded.

The sample consisted of new ventures with different organizational forms. Since we were interested in studying the effect of boards, we limited our sample to include only new ventures that were registered as limited companies (AS in Norwegian) as these are legally required to install a board. Furthermore, we imposed industry restrictions and removed all new registrations that were active in public sector industries, including healthcare and education, and in industries that are considered heavily regulated (i.e., finance, agriculture, utility services, and real estate). We also excluded all new ventures that had missing industry information.

Finally, we imposed a minimal economic activity requirement to remove dormant firms and new registrations that were holding structures. The thresholds we imposed were the requirements that the new venture have at least one employee, or have paid at least 500,000 NOK in wages, or have a turnover of at least 500,000 NOK in the year of founding (*t*) or the following year (*t+1*). The motive for including the second year was to allow firms to reach this threshold within one calendar year. Since growth was our dependent variable, and we had set the second year as our baseline, we removed all observations where financial information was not available for *t+2*. This also meant that new registrations that had previously been operating were automatically removed from the sample.

3.2.1 Identification of the entrepreneurs

After we selected our sample of new ventures, we identified the entrepreneurs behind these firms. By relying on the register, we could only identify individuals with formalized links to the new ventures. Entrepreneurs may have formalized these relationships in different forms, but in our study, we proxied the entrepreneur role by identifying the owners of each new venture and identified these owners by relying on the Norwegian shareholder register. This register distinguishes between human and non-human legal entities that have an ownership share.

Some of these non-human owners were established firms with real activities. However, in many instances, these non-human legal entities were holding companies with little or no economic activities (i.e., no employees and no sales) and were often owned by one or a few individuals. In such cases, the owners of the holding companies were considered the ultimate owners of the new ventures and thus entrepreneurs.

An overall requirement for any owner, both human and non-human entities, was that they had at least a 10% ownership share. We identified these owners for all the years in our panel. All

new ventures where we could not identify at least one entrepreneur in the founding year were excluded from our sample. After we had identified all the owners, we merged this information with the individual and employer–employee-linked registers to identify their demographic characteristics and career histories.

3.2.2 Identification of the board directors

It is a legal requirement for all limited companies to have a board of directors, but who has a seat on the board is at the discretion of the owners and other stakeholders. In many instances, the board of directors consists of only the owners. To identify the board of directors of a new venture, we merged the firm identification number of the new venture with the firm identification number in the board membership dataset to identify all the individuals with a seat on the board for all the years in our panel. Similarly to our methodology for entrepreneurs, we removed all new ventures where we could not identify a board of directors. Where we identified a board directors, we merged this information with the individual and employer–employee-linked registers to identify the demographic characteristics and career (board) histories of these board directors.

3.2.3 Final Sample

Based on all the aforementioned sample restrictions and requirements, our final sample comprised 13,204 new ventures. Since we conducted our analysis across all years except the year of founding, we covered a total of 34,990 firm-year observations.

3.3 Variables
3.3.1 New venture growth

In our analysis, we investigated the relationships between the board director characteristics and the performance of the new ventures (i.e., their growth). To measure growth, we mainly focused on sales growth, which is a common measure of new venture performance (Delmar &

Shane, 2006). More specifically, we used absolute growth numbers instead of relative changes in growth. Using relative growth may appear less significant when it involves large numbers, while absolute growth is more informative in the case of early stage new ventures as it provides direct insights into how the sales of new ventures are affected.

3.3.2 Inside and outside board directors

We aimed to investigate the impact of outside board directors. By examining the individual's career history, it was possible to identify whether a board director was also an owner, manager, or employee of the new venture. If this was the case, the board member was considered an inside board director. Furthermore, while it is common practice to invite family members to take a seat on the board of a new venture, researchers have found a negative relationship between family board directors and new venture performance (Basly, 2007; Calabrò & Mussolino, 2013; Sciascia, Mazzola, Astrachan, & Pieper, 2013). Given their family ties, we also did not include board members that we identified as being parents, siblings, children, or spouses in our outside board director measure. Through exclusion, we considered all other board directors to be outside board directors. Here we followed Chen et al.'s (2017) definition of an outside director. After we had identified all the outside board directors, we created two measures. One was a dummy variable indicating whether the new venture had an outside board director in any given year (value of 1) or not (value of 0). The second dummy variable took a value of 1 when the new venture added a new outside board director, but otherwise 0 was allocated.

3.3.3 Experience of the board directors

In addition to identifying the presence of outside board directors, we also created two measures of outside board director experience to make a distinction between industry and board experience. For industry experience, we relied on the career histories of the board directors. We considered industry experience present among the outside board directors if at

least one outside board director had previous experience at a firm(s) with the same four-digit NACE industry code as the new venture. We applied the same logic as that for outside board members; in this case, we traced the board membership histories of the outside board directors. We did however put in place some restrictions here as we only considered board experience to exist if the individual had experience as a board member of a private company with at least five employees. We created a dummy variable to indicate whether there was board experience among the outside board directors.

3.3.4 Entrepreneur and new venture characteristics

Based on the ownership information, we created a measure to indicate the size of the founding team, which was proxied by the number of person-owners in the new venture. Because we had already identified family ties among owners, we create a dummy variable to denote family businesses. Since we were able to track the career histories of the entrepreneurs, we further identified whether one of the entrepreneurs had previous work experience in the same industry (i.e., at firms with the same four-digit industry code). When this was noted, the new venture was regarded as an entrepreneurial spin-off.

For all these new ventures, we created a series of year, industry, and regional variables. First, we created a dummy variable to indicate the year of founding. For industry, we controlled for the two-digit NACE industry code. As well as controlling for industry, we created measures to indicate industry characteristics with some form of environmental uncertainty. Studies have often created measures using principal component analysis on several industry-level characteristics (Dess & Beard, 1984; Nielsen, 2015). However, since our panel structure included multiple firm-year observations covering a period of eight years, we instead opted to focus on two four-digit industry-level characteristics. First, we measured the capital intensity of the industry by dividing the sum of the industry assets by the total industry turnover. Second, we followed Nielsen (2015) when creating a measure of sales instability. To do so,

we ran an OLS regression on sales for each four-digit industry; time (three years) was the only explanatory variable in addition to the constant term. Following this regression, we divided the standard deviation (instability indicator) by the mean value of the dependent variable to control for industry size. For each new venture, we identified the capital intensity and sales instability for the second year. We created a dummy variable by applying the value of 1 if the new venture was among the top and bottom quartile in their respective founding year.

3.4 Descriptive statistics

The total sample in our analysis consisted of 13,204 newly established ventures over the period 2005–2012. As Table 1 illustrates, the number of new ventures varied between 1,227 new ventures registered in 2005 to over 3,264 in 2012. We can explain this large increase in 2012 by a change in the capital requirements for registering a limited company, which decreased from 100,000 NOK to 30,000 NOK.[9]

TABLE 1: Number of new ventures and firm-year observations

Founding year	New ventures	Firm-year observations
2005	1,227	3,601
2006	1,406	3,953
2007	1,437	4,089
2008	1,263	3,653
2009	1,333	3,812
2010	1,448	4,162
2011	1,826	5,323
2012	3,264	6,397
Total	13,204	34,990

In Table 2, we present the descriptive statistics for these start-ups as well as for the entrepreneurial team and new venture characteristics. Half the new ventures in our sample had

---

[9] We are confident that this was the main driver behind the increase as this growth in the number of new ventures was only observed among limited companies and not among new ventures that were registered as sole proprietorships. Because of this lower capital requirement, we expected less-endowed entrepreneurs to be able to register new businesses. This was confirmed as the average level of performance of these new ventures was lower, and a lower share of new ventures had one outside board director.

at least two owners in the founding year. With an overall average of 1.79 owners per start-up, the team-based new ventures had on average 2.58 owners. In our sample, 39.1% of the ventures were identified as being entrepreneurial spin-offs, while 21.5% of the firms were owned by family members. This means that around 41% of all the team-based new ventures involved family ownership. An unreported analysis[10] demonstrated that most new ventures were active in the retail (16.8%), architectural and engineering (11.2%), and wholesale (10.97%) sectors.

In terms of board membership, over the years we observed the start-ups, 25.5% of the new ventures had at least one outside board director. In many cases, this involved a director with board experience (14%), while just over 5% of the outside board directorships included a director with industry experience. Involving an outside board director thus did not appear to be that widespread among the new ventures, but those that did have an outside director tended to involve individuals with some experience that may have been relevant and thus helped the business grow.

Over 25% had at least one outside board director. Furthermore, 14% of the new ventures in our sample had a board member with directorial experience, but only 5% had a board member with industry experience. The majority of the new ventures had an outside board director in the year of founding, but 7.5% of the new ventures in our sample added an outside board director in the years that followed. In many cases, this was a board director with directorial experience (4.9%), while only 1.7% added a new outside board director with industry experience.

---

[10] Available upon request.

TABLE 2: Time-invariant new venture characteristics

Variable	Obs	Mean	Std.dev
Spinoff	13,204	0.391	0.488
Family Firm	13,204	0.215	0.411
Founding Team	13,204	0.502	0.500
Have an external board director	13,204	0.255	0.436
Have an external board director w/ board experience	13,204	0.140	0.347
Have an external board director w/ industry experience	13,204	0.053	0.224
Added an external board director	13,204	0.075	0.264
Added an external board director w/board experience	13,204	0.049	0.215
Added an external board director w/industry experience	13,204	0.017	0.129
Capital intensity	11,625	1.491	2.445
Sales instability	11,625	0.030	0.041

In Table 3, we report the descriptive statistics of the main time-variant variables from our regression with a distinction between overall, between, and within variations. On average, sales growth increased by 529,000 NOK, and the variation in growth was slightly higher between firms than within firms. The same could not be said for the annual sales levels as the variations were, unsurprisingly, much larger than those between firms.

The same pattern was true for the human capital stock of the firms as the between-firm variations in the number of owners, the number of employees, and the presence of an outside board director was larger than the within-firm variations.

Adding board directors did not vary considerably within and between firms, which indicated that if the firms added board directors during a given period, this was only once during that period and was seldom a repeated event (at least not within the relatively short time period we observed these new ventures).

TABLE 3: Time-variant characteristics based on overall, within, and between variations

Variable		Mean	Std. Dev
Sales growth	overall	529.368	4191.008
	between		3012.289
	within		2990.535
Sales level	overall	4360.891	10001.130
	between		9302.764
	within		2886.260
# of owners	overall	1.780	1.029
	between		0.981
	within		0.284
# employees	overall	2.869	5.740
	between		5.228
	within		2.246
External board of directors	overall	0.147	0.354
	between		0.333
	within		0.110
external board of directors w/ experience	overall	0.090	0.286
	between		0.267
	within		0.092
External board of directors w/industry experience	overall	0.032	0.176
	between		0.162
	within		0.060
Added external board director	overall	0.032	0.175
	between		0.121
	within		0.128
Added external board director w/ board experience	overall	0.020	0.140
	between		0.094
	within		0.104
Added external board director w/ industry experience experience	overall	0.007	0.082
	between		0.054
	within		0.062
N		34,990	
n		13,204	
T		2.650	

4 RESULTS

To test our hypotheses, we relied on panel regression techniques for which we used both random and fixed effects model estimators. In Table 4, we present the results of our first set of panel regression models. We ran our fixed effects model in Models 1–3, while Models 4–6 showed the results of our fixed effects estimation. Common to our panel models was the issue of heteroscedasticity, which required us to conduct our regressions using robust standard errors. As a consequence, the standard errors were significantly larger than in the non-robust

specification, which caused some measures to not be (strongly) statistically significant despite the fact that the regression coefficients were relatively high.

Even though the Hausman test demonstrated that the random effects were inconsistent, the juxtaposition of the random and fixed effects models provided some insights into the possible selection effects associated with appointing an outside board director. Models 1 and 2 showed a possible relationship between having an outside board director and sales growth. In Model 1, having a board member was associated with an increase in sales of 261,800 NOK. In contrast, this effect in Model 2 was mainly attributed to adding a board member, with a sales growth of 529,100 NOK, and a significantly weaker effect of 151,800 NOK if the new venture already had an outside board director on the board. However, in our fixed effects panel estimation, many of the board level effects disappeared. It seemed as if having an outside board director was heavily correlated with other (unobserved) firm characteristics, so we could not state with certainty that the presence of an outside board director led to higher sales levels. Consequently, we were not able to confirm our first hypothesis. In Models 3 and 6, we included more detailed board director experience characteristics. First, the random effects model demonstrated a positive relationship between having an outside board director with experience and sales growth. Despite this positive effect and similar to our previous analysis, this effect was no longer significant when we moved to our more consistent fixed effects estimator. Adding an outside board director with industry experience was related to positive sales growth in both our random and fixed effects models. If we used our fixed effects estimator as the point of departure, adding such a board director would be associated with sales growth of just over 1,000,000 NOK in the following year. Based on this analysis, we refuted Hypothesis 3 as there was not undeniable statistical evidence that board experience contributes to performance, but our analysis of industry experience and growth clearly supported Hypothesis 2.

TABLE 4: Panel regression of board experience and sales growth (full sample)

	Random effect panel regression			Fixed effect panel regression		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Sales level	0.0599*	0.0600*	0.0595*	-0.629***	-0.629***	-0.629***
	(0.02)	(0.02)	(0.02)	(0.09)	(0.09)	(0.09)
Number of owners	139.5**	138.6**	139.5**	128.0	126.9	129.9
	(46.03)	(46.16)	(46.05)	(85.52)	(85.59)	(85.35)
Spinoff	110.5+	110.8+	108.8+	omitted	omitted	omitted
	(61.08)	(61.06)	(59.95)			
Family firm	-222.9***	-223.8***	-224.0***	omitted	omitted	omitted
	(60.96)	(61.20)	(61.05)			
Number of employees	-18.23	-18.58	-18.98	-28.45	-28.52	-28.34
	(19.86)	(19.83)	(19.78)	(39.59)	(39.58)	(39.55)
Outside board	261.8**			89.94		
	(86.63)			(168.43)		
Outside board (*t-1*)		151.8+	-7.812		102.3	49.40
		(87.20)	(74.63)		(115.07)	(130.99)
Added outside board director		529.1*	-33.84		79.04	-206.8
		(249.28)	(270.86)		(205.30)	(334.75)
Outside board director /w board experience (*t-1*)			420.1*			120.7
			(163.49)			(247.80)
Outside board director /w industry experience (*t-1*)			-341.2			19.94
			(223.34)			(317.96)
Added outside board director w/ board experience			291.0			131.7
			(396.81)			(393.38)
Added outside board director w/ industry experience experience			1746.6*			1058.7*
			(718.79)			(504.23)
Constant	-1315.2***	854.3**	866.2**	2331.4***	2304.5***	2296.8***
	(392.71)	(330.81)	(327.51)	(227.15)	(225.24)	(224.45)
Firm fixed effect	no	no	no	yes	yes	yes
Year controls	yes	yes	yes	yes	yes	yes
Industry controls (2-digit)	yes	yes	yes	yes (included in firm fixed effect)		
Founding year control	yes	yes	yes	yes (included in firm fixed effect)		
Observations	34,990	34,990	34,990	34,990	34,990	34,990
Clusters	13,204	13,204	13,204	13,204	13,204	13,204
Rho	0.234	0.233	0.233	0.876	0.876	0.875
R-squared within	0.058	0.056	0.044	0.372	0.372	0.372
R-squared between	0.237	0.239	0.235	0.284	0.284	0.283
R-squared overall	0.0709	0.0714	0.0721	0.0672	0.0672	0.0669

Robust Standard errors in parentheses

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

One question that arose was whether prospective outside board directors are able to select better performing new ventures. To have a closer look at this issue, we created three subsamples: (i) one that included those new ventures with sales levels in the top 25% in the second year of their respective cohort; (ii) a subsample that included those new ventures with sales levels in the bottom 25% in the second year of their respective cohort; and (iii) a

subsample that included those with sales levels in the top 10% of their respective cohort. The analyses for these cohorts are presented in Models 7, 8, and 9 of Table 5, respectively.

Outside board directors (with industry experience) appeared not to be associated with the growth difference across any of these groups. We only observed positive sales growth associated with outside board directors among the highest growth firms. Nevertheless, the fact that we also observed positive sales growth among the high-growth new ventures indicates differences in growth associated with outside board directors with industry experience, which strengthened our confidence in our previous findings and subsequently our second hypothesis.

TABLE 5: Fixed effects panel regression of board experience and sales growth (high- and low-performance subsamples)

	Fixed effect panel regression		
	Model 7	**Model 8**	**Model 9**
	Top 25%	*Bottom 25%*	*Top 10%*
	performers (y2)	*performers (y2)*	*performers (y2)*
Sales level	-0.635***	-0.606***	-0.656***
	(0.10)	(0.12)	(0.10)
Number of owners	343.0	0.484	553.4
	(211.43)	(77.09)	(415.50)
Number of employees	-50.83	85.83	-69.00
	(45.74)	(67.23)	(52.80)
Outside board (*t-1*)	-81.70	170.6+	-363.1
	(566.56)	(87.54)	(1404.39)
Added outside board director	-1178.5	-124.7	-3196.5
	(1074.56)	(189.25)	(2352.24)
Outside board director /w board experience (*t-1*)	-251.8	227.3	-781.0
	(799.94)	(171.44)	(1846.84)
Outside board director /w industry experience (*t-1*)	-33.02	-32.02	-37.90
	(776.53)	(227.27)	(1523.52)
Added outside board director w/ board experience	441.4	439.7	1740.2
	(1135.74)	(319.19)	(2276.38)
Added outside board director w/ industry experience experience	2745.4*	75.44	5336.9*
	(1209.60)	(411.82)	(2092.77)
Constant	6731.2***	57.19	12499.3***
	(794.30)	(162.87)	(1743.82)
Firm fixed effect	yes	yes	yes
Year controls	yes	yes	yes
Industry controls (2-digit)	yes (included in firm fixed effect)		
Founding year control	yes (included in firm fixed effect)		
Observations	9,183	7,047	3,663
Clusters	3,460	2,667	1,380
Rho	0.873	0.618	0.878
R-squared within	0.391	0.224	0.431
R-squared between	0.284	0.172	0.288
R-squared overall	0.062	0.003	0.054

Robust Standard errors in parentheses

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

In Table 6, we took our fixed effects models presented in Table 4 as a point of departure but created subsamples of different levels of environmental uncertainty. First, we made a distinction between the two subsamples generated based on the capital intensity of the industry in which the firm operated. For this purpose, we created a subsample of new ventures

that were established in the 25% most (Model 10) and least (Model 11) capital-intensive industries.

From our analysis, we observed that new ventures that operated in high capital-intensive industries had lower baseline sales levels compared to the new ventures operating in low capital-intensive industries. This may point to some differences in the speed with which the new ventures in these industries were able to build their customer bases. Regardless, we observed that industry experience among the outside board directors appeared to contribute to the growth in sales in both subsamples. In high capital-intensive industries (Model 10), we observed this to be the case for the new ventures that had added outside board directors with industry experience as they saw an increase in sales of 1,500,000 NOK, while those that had added an outside board director experienced an increase of 1,700,000 NOK. Admittedly, the latter was only significant at the 6% level, and even though the precision of the estimates was uncertain, the effect size remained considerable.

A much clearer picture emerged when we separated the new ventures that operated in industries with high levels of instability in sales (Model 12) and compared their growth with that of the new ventures that operated in more stable sales environments (Model 13). The new ventures that added an outside board director with industry experience witnessed a significant growth in sales, which was nearly 4,500,000 NOK larger. In the new ventures with more sales stability, we found no significant relationship between the presence of an outside board director with industry experience and sales growth although there appeared to be a weaker positive effect with having an outside board director. Overall, the impact of an outside board director and, more specifically, an outside board director with industry experience appeared to differ depending on the industry environment. We thus found support for our fourth hypothesis.

TABLE 6: Fixed effects panel regression of board experience and sales growth (industry uncertainty subsample)

	Fixed effect panel regression			
	Model 10 *High capital intensive industries*	**Model 11** *low capital intensive industries*	**Model 12** *High sales instability*	**Model 13** *low sales instability*
Sales level	-0.720***	-0.620***	-0.599***	-0.591***
	(0.12)	(0.14)	(0.11)	(0.09)
Number of owners	-22.25	255.8	-131.3	115.9
	(226.68)	(191.61)	(259.72)	(129.60)
Number of employees	-72.59	-23.84	-38.38	42.55
	(142.52)	(60.63)	(58.50)	(48.20)
Outside board (*t-1*)	245.3	-475.5	-125.5	475.5+
	(286.33)	(441.25)	(297.69)	(272.73)
Added outside board director	-724.3	402.1	-1158.5	301.4
	(1069.08)	(497.63)	(712.28)	(723.89)
Outside board director /w board experience (*t-1*)	-31.14	445.0	501.9	-759.1
	(396.51)	(788.39)	(440.35)	(733.33)
Outside board director /w industry experience (*t-1*)	1511.7*	559.7	-301.7	641.3
	(685.15)	(816.38)	(869.41)	(643.47)
Added outside board director w/ board experience	144.2	-382.3	838.5	-703.0
	(988.95)	(1057.01)	(1028.57)	(987.05)
Added outside board director w/ industry experience experience	1748.5+	3080.6+	4466.5*	-194.3
	(921.80)	(1779.69)	(1829.39)	(904.82)
Constant	1874.3***	3628.8***	2957.4***	1933.2***
	(535.14)	(667.97)	(486.74)	(380.29)
Firm fixed effect	yes	yes	yes	yes
Year controls	yes	yes	yes	yes
Industry controls (2-digit)	yes (included in firm fixed effect)			
Founding year control	yes (included in firm fixed effect)			
Observations	7,953	7,585	7,614	8,607
Clusters	3,005	2,916	2,902	3,325
Rho	0.809	0.915	0.883	0.835
R-squared within	0.350	0.452	0.406	0.277
R-squared between	0.158	0.311	0.433	0.172
R-squared overall	0.014	0.097	0.113	0.043

Robust Standard errors in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

5 DISCUSSION AND CONCLUSION

This study provides new insights into the role board directors play on new venture growth and, in particular, how the experience of outside board directors relates to new venture growth across different types of industries. While there has been longstanding interest in

understanding how boards function in firms, recent research has explored the role of boards in the setting of new ventures. Nevertheless, such investigations present some challenges. First, identifying new ventures can be difficult, and many studies have relied on survey-based research using small samples. Second, given the challenges in identifying start-ups, the majority of studies have focused on *small* rather than *new* ventures (Li et al., 2020). While most new ventures are small, not all small ventures are new, which restricts the identification of the board directors of new ventures. Second, board directorship data are not easily obtainable. By relying on Norwegian registry data, we were able to identify genuinely new ventures as well as the board directors of these ventures. In the setting of new ventures, the importance of the board directors is mainly assumed due to their resource provision function as they are carriers of the relevant human and social capital. In addition, they act as strategic decision-makers, which points to their potential ability to affect the survival and growth of new ventures.

In this paper, we estimated the extent to which outside board directors can influence new venture growth. First, highlighted by research on boards comprising incumbents (Stiles, 2001), the relatively low number of new ventures in our study with outside board members, especially with industry and board experience, demonstrated that outside boards are seldom used strategically. Nevertheless, from a resource provision perspective, we expected that outside board directors would stand out since these individuals provide access to resources that would otherwise not be available to start-ups. Accordingly, we argued that the presence or addition of outside board directors would be positively related to new ventures' growth.

Overall, as the comparison of the random and fixed effects models demonstrated, the presence of an outside board director appears to be highly correlated with observed and unobserved firm characteristics, which also seem to affect new venture growth. Thus, there seems to be a selection and/or confounding effect in which firms that will perform better in the future are

also more likely to appoint an outside board director. This does not mean that the presence of an outside board director does not matter; it merely indicates that it is difficult to separate the effect of having an outside board director with other features that seem to affect new venture growth. Although we were careful not to draw strong conclusions, we found evidence of the existence of a possible selection and confounding effect. It may also be a factor explaining why previous studies have remained inconclusive regarding the impact of outside boards on performance, despite strong arguments on the positive effects of outside board members. Future research should therefore investigate ways to effectively deal with these issues when addressing the role of (outside) boards and new venture performance.

Although we could not confirm our first hypothesis, we continued to explore whether making a distinction between different types of board director experience would have a significant effect. Theoretically, we reasoned that similar industry experience as well as board experience among board directors would drive the growth of new ventures. The underlying mechanisms are that through such experience, board directors bring both (access to) relevant skills and resources, as well as enhance legitimacy in establishing relationships with suppliers, customers, possible venture capitalists, and other resource providers.

Indeed, based on our empirical analysis, we found support for some of these arguments; industry experience among outside board directors appeared to be positively associated with growth despite the fact that such experience was relatively rare in our sample. Again, our analysis demonstrates that some of the relationships could be attributed to the characteristics of the firm (e.g., spin-offs were more likely to appoint board members with industry experience), but there remained a strong significant relationship when we controlled for observed and unobserved fixed effects. Thus, rather than having outside board directors as such, one should take into account the type of experience of these board directors. This

positive effect was especially visible among the firms that demonstrated relatively high sales levels at an early stage.

Finally, the environmental context and more specifically the uncertainty in this environment also played a role in how the outside board directors contributed to new venture growth. In industries characterized by low capital intensity and low volatility, the entrepreneurs appeared more capable of maneuvering on their own. However, in more capital-intensive and unstable environments, the experience of board directors was seen to help alleviate the vulnerability of the new ventures and beneficially affect their growth. These findings point to the relevance and need for certain types of experience among board directors depending on the type of uncertainty new ventures face. Furthermore, the relationships manifest differently in different industries than can be explained by industry-specific characteristics and requirements.

In general, in contrast to capital-intensive industries, the low capital-intensive industries in our study were characterized by less resource commitment, investment in physical assets, and less dependence on input resources. Traditionally, such differences have tended to separate services from manufacturing industries (Brouthers, Brouthers, & Werner, 2003). In capital-intensive industries, access to finance is critical to securing such resource commitments, and this can be obtained via external parties or by securing internal sources of funding, for example, by generating sales. In our empirical analysis, new ventures in high capital-intensive industries generated lower sales, but the presence of industry experience among the outside board directors was associated with higher sales. This does not mean that new ventures in low capital-intensive industries may benefit from such board directors; rather, these industries may build much more on generating sales early when competition for market share is critical. Additionally, in these industries, we observed that industry experience among outside board directors may play a role. Similar positive associations between the experience of outside board directors and sales growth have also been observed in industries characterized by high

sales instability. "In addition, the presence of outside board directors was shown to be positively associated with higher levels of growth in our study. Thus, overall, directors' industry-specific human capital and their social capital and reputation can help entrepreneurs navigate industry specificities to obtain those resources.

Notwithstanding these theoretical contributions, the insights we offer in this paper are relevant to all who are engaged in building new ventures and who offer support services, for example, entrepreneurs, policy-makers, and facilitators of entrepreneurial activities. Among the latter, we refer specifically to incubators and accelerators to seek and screen for relevant skills, competences, and connections for the boards of directors of new ventures in order to extract the most out of these strategic alliances. Aside from being relevant in the appointment of board directors, our findings may also be pertinent when setting up other related functions, like mentorship programs.

Our study was not without limitations. First, with regard to the empirical set-up, we cannot make strong claims of causality. We may expect selection effects to occur in cases where "high-quality" entrepreneurs who are most likely to succeed are able to mobilize a board with particular kinds of characteristics. Indeed, we observed the presence of confounding factors linked to firms' specific characteristics but were not able to separate this effect. Second, we only investigated the presence of outside board directors in the first years after the founding of the new ventures; however, depending on the stage of the lifecycle a new venture is in, the entrepreneur (or any of the firm's stakeholders) may invite relevant board directors at a later stage in the process beyond the time scope of our study.

REFERENCES

Aldrich, H. E., & Yang, T. (2014). How do entrepreneurs know what to do? Learning and organizing in new ventures. *Journal of Evolutionary Economics*, *24*(1), 59-82.

Amason, A. C., Shrader, R. C., & Tompson, G. H. (2006). Newness and novelty: Relating top management team composition to new venture performance. *Journal of Business Venturing*, 21(1), 125-148.

Balachandran, C., Wennberg, K., & Uman, T. (2019). National culture diversity in new venture boards: The role of founders' relational demography. *Strategic Entrepreneurship Journal*, *13*(3), 410-434.

Basly, S. (2007). The internationalization of family SME: An organizational learning and knowledge development perspective. *Baltic Journal of Management*, 2(2), 154-180.

Bertoni, F., Meoli, M., & Vismara, S. (2014). Board independence, ownership structure and the valuation of IPOs in continental Europe. *Corporate Governance: An International Review*, *22*(2), 116-131.

Boone, A. L., Field, L. C., Karpoff, J. M., & Raheja, C. G. (2007). The determinants of corporate board size and composition: An empirical analysis. *Journal of financial Economics*, *85*(1), 66-101.

Bosma, N., Van Praag, M., Thurik, R., & De Wit, G. (2004). The value of human and social capital investments for the business performance of startups. *Small Business Economics*, *23*(3), 227-236.

Brouthers, K. D., Brouthers, L. E., & Werner, S. (2003). Transaction cost-enhanced entry mode choices and firm performance. *Strategic Management Journal*, *24*(12), 1239-1248.

Brunninge, O., & Nordqvist, M. (2004). Ownership structure, board composition and entrepreneurship: Evidence from family firms and venture-capital-backed firms. *International Journal of Entrepreneurial Behaviour & Research*, *10*, 85–105.

Buvik, A., & Grønhaug, K. (2000). Inter-firm dependence, environmental uncertainty and vertical co-ordination in industrial buyer–seller relationships. *Omega*, *28*(4), 445-454.

Calabrò, & Mussolino, D. (2013). How do boards of directors contribute to family SME export intensity? The role of formal and informal governance mechanisms. *Journal of Management & Governance*, *17*(2), 363-403.

Carpenter, M. A., & Westphal, J. D. (2001). The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making. *Academy of Management journal*, *44*(4), 639-660.

Certo, S.T., Covin, J.G., Daily, C.M., & Dalton, D.R. (2001). Wealth and the effects of founder management among IPO-stage new ventures. *Strategic Management Journal*, 22(6-7), 641-658.

Certo, S. T. (2003). Influencing initial public offering investors with prestige: Signaling with board structures. *Academy of management review*, 28(3), 432-446.

Chen, P. L., Kor, Y., Mahoney, J. T., & Tan, D. (2017). Pre-Market Entry Experience and Post-Market Entry Learning of the Board of Directors: Implications for Post-Entry Performance. *Strategic Entrepreneurship Journal*, 11(4), 441–463.

Coad, A., Nielsen, K., & Timmermans, B. (2017). My first employee: an empirical investigation. *Small Business Economics*, *48*(1), 25-45.

Dahl, M. S., & Sorenson, O. (2013). The who, why, and how of spinoffs. Industrial and Corporate Change, 23(3), 661–688.

Daily, C. M., & Dalton, D. R. (1992). The relationship between governance structure and corporate performance in entrepreneurial firms. *Journal of Business Venturing*, *7*(5), 375-386.

Dalton, D. R., Daily, C. M., Johnson, J. L., & Ellstrand, A. E. (1999). Number of directors

and financial performance: A meta-analysis. *Academy of Management journal*, *42*(6), 674-686.

Davis, J. H., Schoorman, D. F., & Donaldson, L. (1997). Toward a Stewardship Theory of Management. *Academy of Management Review* , 22(1), 20-47.

Delmar, F., & Shane, S. (2006). Does experience matter? The effect of founding team experience on the survival and sales of newly founded ventures. *Strategic Organization*, *4*(3), 215-247.

Dess, G. G., & Beard, D. W. (1984). Dimensions of organizational task environments. *Administrative science quarterly*, 52-73.

Deutsch, Y., & Ross, T. (2003). You are Known by the Directors You Keep: Reputable Directors as a Signaling Mechanism for Young Firms. *Management Science*, 49(8), 1003–1017.

Dokko, G., & Rosenkopf, L. (2010). Social capital for hire? Mobility of technical professionals and firm influence in wireless standards committees. *Organization Science*, *21*(3), 677-695.

Engel, Y., Kaandorp, M., & Elfring, T. (2017). Toward a dynamic process model of entrepreneurial networking under uncertainty. Journal of Business Venturing, 32(1), 35–51.

Eisenberg, T., Sundgren, S., & Wells, M. T. (1998). Larger board size and decreasing firm value in small firms. *Journal of financial economics*, *48*(1), 35-54.

Eisenhardt, K. M. (1989). Making fast strategic decisions in high-velocity environments. *Academy of Management journal*, *32*(3), 543-576.

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The journal of law and Economics*, *26*(2), 301-325.

Fiegener, M. (2005). Determinants of board participation in the strategic decisions of small corporations. *Entrepreneurship Theory and Practice*, *29*(5), 627-650.

Forbes, P., & Milliken, J. (1999). Cognition and corporate governance: Understanding boards of directors as strategic decision-making groups. *Academy of management review*, *24*(3), 489-505.

Foss, N. J., Klein, P. G., Kor, Y. Y., & Mahoney, J. T. (2008). Entrepreneurship, subjectivism, and the resource-based view: toward a new synthesis. *Strategic Entrepreneurship Journal*, *2*, 73–94.

Furlan, A., & Grandinetti, R. (2016). Spinoffs and their endowments: beyond knowledge inheritance theory. *Journal of Intellectual Capital*, 17(3), 570–589.

Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative science quarterly*, 750-783.

Garg, S. (2013). Venture boards: Distinctive monitoring and implications for firm performance. *Academy of Management Review*, 38(1), 90–108.

Garg, S., & Furr, N. (2017). Venture boards: past insights, future directions, and transition to public firm boards. *Strategic Entrepreneurship Journal*, *11*(3), 326-343.

Hillman, A. J., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management review*, *28*(3), 383-396.

Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource dependence theory: A review.*Journal of Management*, *35*(6), 1404–1427.

Huff, A. S. (1982). Industry influences on strategy reformulation. *Strategic Management Journal*, *3*(2), 119-131.

Huse, M. (2007). Boards, governance and value creation. boards, governance and value creation: The human side of corporate governance. *Cambridge: Cambridge University*

Press.

Johansson, M., Dahlander, L., & Wallin, M. (2017). *The Role of Boards and Board Connections for the Performance of Entrepreneurial Firms.* Unpublished manuscript.

Kim, Y., & Cannella, A. A. (2008). Toward a social capital theory of director selection. *Corporate Governance: An International Review*, 16(4), 282–293.

Knight, F. H. (1921). Risk, uncertainty and profit. *New York: Hart, Schaffner and Marx*.

Kor, Y. Y., Mahoney, J. T., & Watson, S. (2008). The effects of demand, competitive, and technological uncertainty on board monitoring and institutional ownership of IPO firms. *Journal of Management & Governance*, *12*(3), 239-259.

Kor, Y. Y, & Misangyi, V. (2008). Outside directors' industry-specific experience and firms' liability of newness. *Strategic Management Journal*, *29*(12), 1345–1355.

Kor, Y. Y., & Sundaramurthy, C. (2009). Experience-based human capital and social capital of outside directors. Journal of Management, 35(4), 981–1006.

Kroll, M., Walters, B. A., & Le, S. A. (2007). The impact of board composition and top management team ownership structure on post-IPO performance in young entrepreneurial firms. *Academy of management Journal*, *50*(5), 1198-1216.

Li, H., Terjesen, S., & Umans, T. (2020). Corporate governance in entrepreneurial firms: A systematic review and research agenda. *Small Business Economics*, *54*(1), 43-74.Lynall, M. D., Golden, B. R., & Hillman, A. J. (2003). Board composition from adolescence to maturity: A multitheoretic view. *Academy of Management Review*, *28*(3), 416-431.

Lynall, M. D., Golden, B. R., & Hillman, A. J. (2003). Board composition from adolescence to maturity: A multitheoretic view. *Academy of management review*, *28*(3), 416-431.

Marvel, M. R., Davis, J. L., & Sproul, C. R. (2016). Human capital and entrepreneurship research: A critical review and future directions. *Entrepreneurship Theory and Practice*, *40*(3), 599-626.

Martin, G., Gözübüyük, R., & Becerra, M. (2015). Interlocks and firm performance: The role of uncertainty in the directorate interlock-performance relationship. *Strategic Management Journal*, *36*(2), 235-253.

McMullen, J. S., & Shepherd, D. A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, *31*(1), 132–152.

Navis, C. and Ozbek, O.V., 2017. Why context matters: Overconfidence, narcissism, and the role of objective uncertainty in entrepreneurship. *Academy of Management Review*, *42*(1), pp.148-153.

Neville, M. (2011). The role of boards in small and medium sized firms. *Corporate Governance: The International Journal of Business in Society*, 11(5), 527–540.

Nielsen, K. (2015). Human capital and new venture performance: the industry choice and performance of academic entrepreneurs. *Journal of Technology Transfer*, *40*(3), 453–474.

Pearce, J. A., & Zahra, S. A. (1991). The relative power of CEOs and boards of directors: Associations with corporate performance. *Strategic management journal*, *12*(2), 135-153.

Penrose, E. (1959). The theory of the growth of the firm. *John Wiley & Sons, New York*.

Pfeffer, J. (1972). Size and composition of corporate boards of directors: The organization and its environment. *Administrative science quarterly*, 218-228.

Pfeffer, J., & Salancik, G. R. (1978). The External Control of Organizations: A Resource Dependence Perspective. *New York, NY: Harper & Row Publishers*.

Phillips, D. J. (2002). A genealogical approach to organizational life chances: The parent-progeny transfer among Silicon Valley law firms, 1946–1996. *Administrative Science Quarterly*, *47*(3), 474-506.

Rindova, P. (1999). What corporate boards have to do with strategy: A cognitive

perspective. *Journal of management studies*, *36*(7), 953-975.

Sarasvathy, S. D. (2008). Effectuation - Elements of entrepreneurial expertise. *Cheltenham: Edward Elgar Publishing*.

Sciascia, S., Mazzola, P., Astrachan, H., & Pieper, M. (2013). Family involvement in the board of directors: Effects on sales internationalization. *Journal of Small Business Management*, *51*(1), 83-99.

Stam, W., Arzlanian, S., & Elfring, T. (2014). Social capital of entrepreneurs and small firm performance: A meta-analysis of contextual and methodological moderators. Journal of Business Venturing, 29(1), 152–173.

Stiles, P. (2001). The impact of the board on strategy: An empirical examination. *Journal of management studies*, *38*(5), 627-650.

Stinchcombe, A. L. (1965). Organizations and social structure. *Handbook of organizations*, *44*(2), 142-193.

Tsoukas, H. (1996). The firm as a distributed knowledge system: a constructionist approach. *Strategic management journal*, *17*(S2), 11-25.

Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of business venturing*, *26*(3), 341-358.

Vandenbroucke, E., Knockaert, M., & Ucbasaran, D. (2016). Outside Board Human Capital and Early Stage High-Tech Firm Performance. *Entrepreneurship: Theory and Practice*, 40(4), 759–779.

Welter, F., 2011. Contextualizing entrepreneurship—conceptual challenges and ways forward. *Entrepreneurship theory and Practice*, *35*(1), pp.165-184.

Westphal, J. D., & Fredrickson, J. W. (2001). Who directs strategic change? Director experience, the selection of new CEOs, and change in corporate strategy. *Strategic Management Journal*, *22*(12), 1113-1137.

Zahra, S. A., & Pearce, J. A. (1989). Boards of directors and corporate financial performance: A review and integrative model. *Journal of management*, *15*(2), 291-334.

Zald, M. N. (1969). The power and functions of boards of directors: A theoretical synthesis. American journal of Sociology, 75(1), 97-111.

ARTICLE 2

To Interlock or Not to Interlock? The Effect of Board Interlocks on

New Venture Growth

Tatevik Harutyunyan

NHH Norwegian School of Economics

Department of Strategy and Management

Tatevik.Harutyunyan@nhh.no

ABSTRACT

Research increasingly addresses different aspects of the role of boards in new ventures. However, instances when firms are linked by having common board directors— that is, board interlocks—are understudied in the entrepreneurial setting. Moreover, the findings on one of the most researched relationships in the board interlock literature—the relationship between board interlocks and firm performance—are inconsistent. The study investigates *the extent to which board interlocks affect new venture growth*. Evidence from Norwegian registry data show that interlocking ventures significantly outperform noninterlocking ventures in terms of equity, asset, and sales growth. After estimating 2SLS for panel models that address endogeneity, the results demonstrate the number of interlocks have a positive and significant relationship with equity growth.

Keywords:

Board interlocks; new ventures; growth; endogeneity; board of directors

1. INTRODUCTION

There is growing attention toward the different aspects of the role boards play in new ventures (Li, Terjesen, & Umans, 2020). Research suggests that the primary function of boards in new ventures is provision of resources (Garg & Furr, 2017; Kroll, Walters, & Le, 2007; Neville, 2011). Board directors bring to the table their knowledge, skills, social ties and reputation (Li et al, 2020). This is particularly beneficial for new ventures that suffer less from agency problems (Audretsch & Lehmann, 2014) and are more in need for resources, legitimacy and connections to reach out to suppliers, distributors, customers and other external actors (Kor & Misangyi, 2008; Kor & Sundaramurthy, 2009; Stinchcombe, 1965; Zimmerman & Zeitz, 2002).

While this research stream has increased our understanding of the impact of board directors on new ventures performance, there are still important gaps to be addressed. One such gap is related to situations where board members of a new venture are also the board members of other firms – so called board interlocks[11] (Mizruchi, 1996). Interlocks enable firms to obtain critical resources and information (Davis & Cobb, 2010; Pfeffer, 1983) and facilitate the economic exchanges between interlocking firms due to interlocking directors' social capital (Granovetter, 1985; Horton, Millo, & Serafeim, 2012), among other factors. The general literature on board interlocks is well-established, but it also reveals some contradictory findings (Lamb & Roundy, 2016). Some studies found support for the positive relationship between interlocks and firm performance (Cai & Sevilir, 2012; Haniffa & Hudaib, 2006; Harris & Shimizu, 2004; Pérez-Calero, Villegas, & Barroso, 2016), while others have failed to find support (Fich & White, 2005) and even observed a negative association (Croci & Grassi, 2014; Fligstein & Brantley, 1992; Santos, da Silveira, & Barros, 2012).

---

[11] Hereafter, the terms 'board interlocks' and 'interlocks' are used interchangeably.

One potential reason for the contradictory findings is that many studies group established- and new ventures together. This is problematic if the effects of board interlocks differ across the two. Because of new ventures' typically lower organizational complexity (Daily & Dalton, 1992), liabilities of newness, smallness (Stinchcombe, 1965), and higher urgency for them to address their numerous needs, there are good theoretical reasons for why new ventures can benefit more from interlocks (Martin, Gozubuyuk, & Becerra, 2013).

Another potential reason for contradictory findings is endogeneity (Lamb & Roundy, 2016; Larcker, So, & Wang, 2013; Mizruchi, 1996; Omer, Shelley, & Tice, 2014). Interlocking board directors are not randomly assigned to boards/firms, and certain firms can attract certain board members. This suggests that board directors' presence in and of itself does not necessarily shape the growth of a new venture, and one cannot attribute the observed outcomes to board interlocks because there can be other factors driving these directors into certain types of new ventures, factors that also shape the new venture's growth trajectory.

The purpose of this paper is to address these gaps in the literature by studying *the extent to which board interlocks affect new venture growth*. Norwegian registry data are critical in my effort to mitigate endogeneity and to unpack the interlocks' treatment effect on new venture growth as opposed to the selection effect. The dataset is longitudinal and covers the entire population of Norwegian firms and residents; using this dataset enables the identification of new ventures and board directors and the implementation of various models and empirical approaches, particularly panel models, matching methods, and the construction of valid instrumental variables.

I find that compared with noninterlocking ventures, new ventures with an interlock are superior in terms of equity, assets, and relative sales growth. Furthermore, I also find support for the positive effect of the number of interlocks on equity growth; however, the effect on sales and asset growth is negative and significant. The first key contribution of this study is

theorizing and investigating interlocks' role for new ventures given that interlocking directors can be particularly attractive as board members, while their impact has not been systematically studied hitherto. Second, the study introduces an empirical strategy and a logic of instrumental variables that is applicable to the interlock–firm performance relationship in general, and thus contributes to the efforts to tease out the selection effect of interlocks from their treatment effect.

2. THEORY AND HYPOTHESES

Board Interlocks in New Venture Setting

New ventures are subject to the liabilities of newness, often lacking critical resources, established ties, and a track record and its corresponding legitimacy; they have little power and influence in the external environment (Hillman, Withers, & Collins, 2009). Thereby, new ventures face hurdles when it comes to reaching out to customers, distributors, suppliers, and partners (Kor & Misangyi, 2008; Kor & Sundaramurthy, 2009; Stinchcombe, 1965; Zimmerman & Zeitz, 2002). These make new ventures more dependent on and vulnerable to the market, competition (Romanelli, 1989), and external actors in general. These challenges point to the urgency for new ventures to mitigate their dependences to survive and grow.

Drawing on resource dependence theory, research shows that boards and board interlocks can relieve firms' dependences on the external environment (Boyd, 1990; Hillman et al., 2009; Lamb & Roundy, 2016; Pfeffer, 1972). In this regard, research underlines the resource provision role of board members, which is particularly relevant for new ventures (Garg & Furr, 2017; Kroll, Walters, & Le, 2007; Neville, 2011). Directors advise the top management team and get involved in the strategic decision-making of the firm that makes directors' competences and skills especially significant. Moreover, they bring to the table their social ties and the resources embedded in their networks, including their reputation (Kor & Sundaramurthy, 2009; Li et al., 2020), enabling further resource mobilization and growth for

the firm. On top of the discussed roles that board directors play, the role of *interlocking directors* has additional layers. A board interlock is the link between two firms that is formed by having a common board member (Burt, 1980; Lamb & Roundy, 2016; Mizruchi, 1996), and in this case, an interlocking board director is an individual who is serving at two or more firms (Zona, Gomez-Meija, & Withers, 2018).

Interlocking directors have access to board-level knowledge, practices, policies (Davis, 1991), and information specific to the firms they bridge; this knowledge would otherwise be unavailable to the focal firm (Beckman & Haunschild, 2002; Haunschild & Beckman, 1998; Lamb & Roundy, 2016; Zahra & Pearce, 1989). Furthermore, simultaneously serving at multiple boards makes the resources, particularly knowledge and information, embedded in these relationships stand out because of their *timeliness* (Carpenter & Westphal, 2001). Moreover, board directors as strategic decision-makers are influential enough (Adler & Kwon, 2002; Garg, 2013) to bring into action these resources. Board directors' *simultaneous* and *formal* involvement in multiple firms put them in a position also to coordinate actions.

Further, board directors form an "inner circle" or elite network whose members sit on the same boards and who can communicate in their elite clubs (Lamb & Roundy, 2016; Useem, 1984). Thus, there can be *reputational* outcomes for the directors as a result of the membership in these circles (Mizruchi, 1996). Together with interlocking directors' individual reputations, the reputation of the firms they serve can shape the perceptions of external actors about the focal firm (Certo, 2003; Higgins & Gulati, 2003). Hence, this can affect the firm's legitimacy, which, in turn, can influence the firm's ability to mobilize resources (Zimmerman & Zeitz, 2002), build its own social ties, and reach out to suppliers and customers, among other benefits. This becomes a vital aspect for new ventures that are striving to establish their legitimacy.

The discussed mechanisms infer performance outcomes for the interlocking firms. Naturally, the investigation of the relationship between board interlocks and firm performance has received considerable attention (Lamb & Roundy, 2016). The argued mechanisms for this relationship are the interlocking firms' enhanced ability to obtain critical resources and information (Davis & Cobb, 2010; Pfeffer, 1983) and the feasibility of facilitating the economic exchanges between them (Granovetter, 1985; Horton et al., 2012). Although one of the most researched relationships in the interlock literature is the relationship between board interlocks and firm performance, the findings do not align (Lamb & Roundy, 2016). This, together with the fact that board interlocks are understudied in the entrepreneurial setting (Lamb & Roundy, 2016), triggered my interest to investigate *the extent to which board interlocks affect new venture growth.*

I posit that because of the theorized mechanisms behind them, board interlocks can potentially address new ventures' vulnerabilities and needs. Further, because new ventures have the urgency to address their numerous needs, they have multiple reasons to and, therefore, are likely to utilize the potential that board interlocks have to alleviate their above-mentioned liabilities. Hence, new ventures can derive much from interlocks and, consequently, have more notable growth outcomes (Martin et al., 2013) than ventures with no interlocks. Moreover, I propose that in a new venture setting, because of ventures' typically lower organizational complexity (Daily & Dalton, 1992; Daily et al., 2002; Eisenhardt & Schoonhoven, 1990; Forbes & Milliken, 1999) and, hence, less hindrance for board functioning and influence, the role of board interlocks for the new venture growth can be more considerable. Combined, I posit there are multiple reasons to believe that:

> *Hypothesis 1 (H1):* The growth of new ventures with interlocking boards is
>
> significantly higher than that of new ventures without interlocking boards.

Furthermore, the more board interlocks a new venture has, the more likely it is that it can more quickly reach out to external actors and a variety of resources (Kor & Sundaramurthy, 2009) and realize those interlocks' potential more thoroughly. Higher number of board interlocks would also come with more flexibility (Martin et al., 2013) than what the new venture would have otherwise. However, new ventures can reach a saturation level when every additional interlock does not provide anything new that was otherwise not available for the firm. In addition, there be instances when board directors are overboarded with multiple board positions, which can imply a scarcity of time and attention (Harris & Shimizu, 2004). Therefore, I argue the following:

Hypothesis 2 (H2): The number of new ventures' board interlocks positively affects new venture growth but with diminishing marginal effect.

3. DATA AND METHODS

3.1. Data

For testing the proposed hypotheses, I employ Norwegian registry data. The dataset is composed of different registers. To test the hypotheses, I rely on a merger of several of them based on the unique person and firm identifiers that are identical throughout the registers. The dataset is a longitudinal employee–employer matched dataset with the possibility of identifying new ventures and board directors. This enables a longitudinal study, including panel models that can partially address omitted variable bias, hence mitigating endogeneity. The registry data, furthermore, include the entire population of Norwegian firms, and because of the large number of observations, it is possible to conduct, in particular, coarsened exact matching and afford "losing" observations in order to achieve increased methodological rigor. Moreover, because data on all firms are available, it is possible to aggregate and arrive at industry- or region-level variables that serve as instrumental variables in the estimation of

Two-stage least squares (2SLS) regressions. Overall, the Norwegian registry dataset is critical in my attempt to mitigate endogeneity and unpack the treatment effect as opposed to the selection effect of interlocks.

3.2. Sample

The final sample comprises new ventures that are one to five years old identified within the period of 2005–2014, the youngest being those that had just finished their first full year of operations. Whether the firm is a new venture is identified by the date of their registration. However, because I am interested in independent and genuinely new ventures, their identification comes with multiple considerations. Particularly, another firm(s) should not be a majority owner(s) in the firm. With the same purpose in mind, those ventures formed by many former coworkers that co-moved from the former employer were left out together with firms whose identifiers appear in the years preceding their registration date. Moreover, I removed new ventures with more than 50 employees in the registration year, as well as those with any sales and salary payments within the two years prior to their registration date because they may have started their activities much earlier than indicated by their formal registration.

To ensure that board structure or composition is not regulated by external actors and that the sample is aligned with the theorization presented earlier, I eliminated firms from some heavily regulated industries (agriculture, real estate, utilities, and financial intermediaries), from the public sector (education, healthcare, and public administration), and from the community services industry.

Thus, the final dataset that serves as the basis of the statistical analysis comprises the population of new ventures that (a) are limited companies (AS), (b) are active and have either at least 1 mln Norwegian crowns from sales, at least one employee, or pay more than NOK 1 mln wages in a given year, (c) have individuals as (jointly) majority owners, (d) have at least one outside board director or owner-director (23,010 observations comprising the sample for

H1), and (e) have at least one common outside director or an owner-director with another firm (forming an interlock), for whom the common director is an outsider/owner-director. This results in the sample relevant for H2 (10,011 observations).

In the current study, outsiders are defined as those board members who are neither employed nor engaged in the management of the focal new venture (Chen, Kor, Mahoney, & Tan, 2017) and are not the family members of the owners (Pearce & Zahra, 1991; Vandenbroucke, Knockaert, & Ucbasaran, 2016). Accordingly, I eliminated focal firm's employees, top managers, and owners' family members (spouse/partner, children, siblings, and parents) from the sample of board directors. However, person-owners[12] were not excluded for multiple reasons. First, within each boardroom, the voice of an owner-director weighs more heavily than purely "outsider" voices (Fiegener, 2005); therefore, they are the influential ones who are able to make the interlocking effect happen. Second, including person-owners is a step to compensate the shortcomings of the sample of outsiders, as well as to balance it better, as the sample of outsiders is not necessarily comprised of merely outsiders; it could involve the representatives of corporate owners, as well as those whose shares are not yet reflected in the shareholders' dataset even though they may already be registered as board directors or vice versa.

3.3. Variables

The dependent variable of interest is the new venture's growth. For new ventures, the typical performance measures are *sales* and the *number of employees* (Delmar, Davidsson, & Gartner, 2003) and the respective growth rates. The conceptual development of the present study has implications for the size of the new venture in terms of *assets* and *equity*. Therefore, in addition to the above-mentioned measures, both the absolute and relative growth measures of

---

[12] In the identification of ultimate owners, I regard a corporate owner as a person-owner when it is a nonactive firm that registers sales for less than NOK 1 mln in a year and either pays salaries of less than NOK 1 mln in a year or do not have any employees.

assets and equity are also constructed. The dependent variables have undergone a cube-root transformation. The outcomes of interest are growth measures, which can be positive, negative, and zero. As opposed to a log transformation, a cube-root transformation preserves zeros as zeros and the signs of the original data in addition to serving the same function— modifying dependent variables' distribution shape and mitigating skewness (Cox, 2011).

The independent variable for testing H1 is a dummy variable indicating whether the focal firm has at least one board interlock or not. The identification of interlocking firms (i.e., those with board interlocks) is based on the construction of firm dyads that have a common outside/owner-director. The construction of dyads also enables an assessment of the number of board interlocks a firm has (H2). Independent and control variables are *lagged* by a year (*t-1*) to mitigate the endogeneity problems arising from the simultaneous determination of growth and other variables. This is a step to comply with the requirement of temporal precedence for causal claims (Antonakis, Bendahan, Jacquart, & Lalive, 2010). In addition, the board interlocks' effect may materialize in the venture outcomes in the following year(s) rather than immediately.

I incorporated a set of control variables, such as owner-, top manager-, and board director-specific human capital characteristics, all of which are significant factors in affecting firm performance (e.g., Gimeno, Folta, Cooper, & Woo, 1997; Lynall, Golden, & Hillman, 2003). Particularly, I estimated the number of owners, top managers and board directors within a focal firm who have experience in the same industry (NACE four-digit codes) within the last three years. Furthermore, to measure the education level of strategic human resources, dummy variables were constructed, where the value of one indicates the presence of owners, top managers, and board directors with graduate degree and zero—the absence thereof. Moreover, a control variable indicating the number of board directors with previous experience as a board member has been included in the model.

Another control variable is *ownership concentration* because ownership is often related to value creation and is discussed in relation to owners' incentives, control, and competences (Foss, Klein, Lien, Zellweger, & Zenger, 2020). Majority owners' intentions weigh more heavily; hence, they can deploy the capital in a specific manner and with a specific strategy that can considerably affect the value creation (Foss et al., 2020) and the venture's growth. In addition, these owners can be more decisive in inviting board directors and creating interlocks. To account for the *autoregressive* effects of growth outcomes, the model includes variables such as the level of assets, sales, equity, and number of employees in year *t-1* because they have the potential to facilitate the growth rate in year *t*. Additionally, the model also includes *year* dummies for unobserved year-specific effects, as well as *industry dummies.* The data span from 2004 until 2014; therefore, there are firms with NACE industry codes in line with NACE Rev. 1.1 and Rev. 2. Based on the correspondence between the divisions in Rev. 1.1 and Rev. 2, I converted these industry codes into intermediate NACE aggregation codes (A*38), which aggregates the 88 NACE Rev. 2 divisions into 38 categories (Statistical Office of the European Communities, 2006).

3.4. Descriptive Statistics

According to Table 1, from 2005–2014, the population of all firms with at least one outside director and/or owner-director is 216,454 firms. On average, around 11% [13] of the sample are new ventures, totaling 23,010. Furthermore, Table 1 demonstrates that less than half of these new ventures have at least one interlock, totaling 10,011. Meanwhile, around 60% of all firms are interlocking. Among all interlocking firms in the sample, 7.7% are new ventures, once more pointing that new ventures form interlocks more rarely.

---

[13] In the case of samples from 2005–2008, not all one to five years old firms are included because of left-censoring of the data. Therefore, there are fewer new ventures in the sample up to 2009.

TABLE 1: The frequency of interlocking firms in the samples of all firms and all new ventures

	All firms		New ventures	
	Interlocking firms	Noninterlocking firms	Interlocking new ventures	Noninterlocking new ventures
2005	9,213	6,151	174	240
2006	8,993	6,361	326	480
2007	8,787	6,001	416	649
2008	14,038	9,170	1,208	1,498
2009	14,481	9,189	1,460	1,704
2010	14,193	9,311	1,305	1,575
2011	14,596	9,700	1,233	1,615
2012	14,872	9,741	1,269	1,511
2013	14,470	10,000	1,152	1,552
2014	16,047	11,140	1,468	2,175
Subtotal	**129,690**	**86,764**	**10,011**	**12,999**
Total	**216,454**		**23,010**	

Figure 1 shows that a board comprised of three members is the most common among all new ventures. Although noninterlocking ventures tend to have mostly two or three board members, interlocking ones mostly have three to four board directors. On average, interlocking new ventures have larger boards—3.24—than noninterlocking ones—2.68.
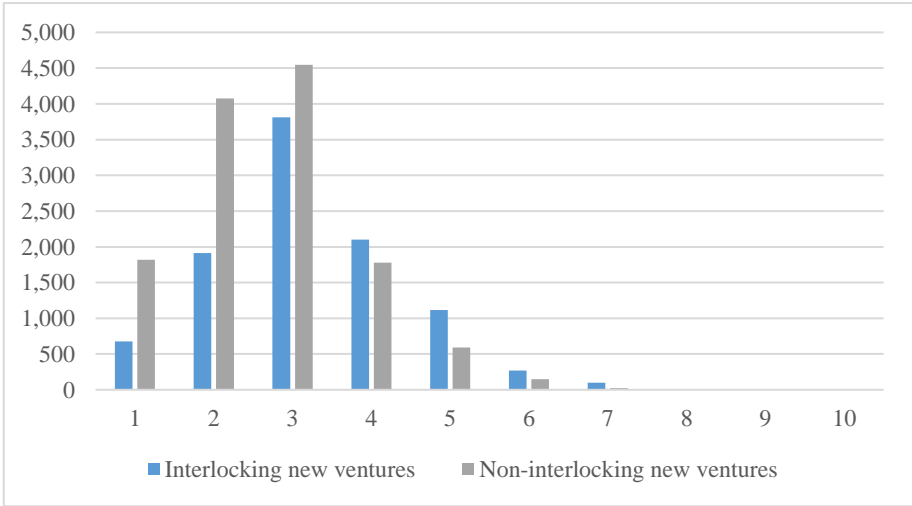
FIGURE 1: The distribution of board sizes in interlocking and non-interlocking new ventures

When it comes to the number of interlocks per new venture, one interlock per interlocking venture is the most common, accounting for 35 % of the cases. And 80% of interlocking ventures have five or less interlocks. This points at a right-skewed distribution with a long tail regarding the number of interlocks per venture.

Table 3 juxtaposes the descriptive statistics of interlocking and noninterlocking new ventures. On average, growth in sales and equity in interlocking new ventures is higher than in noninterlocking ones. The same refers to growth in the number of employees and assets in absolute terms. Meanwhile, in relative terms, the latter growth indicators show less of a growth, which may be because of higher base levels of number of employees (variable (16), Table 2) and assets (variable (17), Table 2) in interlocking firms as opposed to noninterlocking ones.

As shown in Table 2, compared with noninterlocking ventures, a higher proportion of interlocking ventures have a top management team (TMT) member, board director, and/or an owner with a graduate degree. Further, on average, interlocking ventures have more owners, board directors, and TMT members with industry experience, as well as board directors with previous directorial experience compared with noninterlocking new ventures.

TABLE 2: Descriptive statistics of interlocking and non-interlocking new ventures

	Non-interlocking new ventures (12,999 firms)				Interlocking new ventures (10,011 firms)			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
(1) Sales growth in t (abs)	782.28	7,082.56	-269,440.00	386,191.00	1,427.83	15,366.72	-487,482.00	650,572.60
(2) Sales growth in t (rel)	0.56	12.72	-133.33	1,234.20	0.90	43.31	-714.00	4,202.00
(3) Equity growth in t (abs)	17.75	250.31	-6,306.00	10,000.00	77.22	11,163.40	-732,009.00	832,854.00
(4) Equity growth in t (rel)	0.11	1.15	-2.00	55.61	1.06	83.29	-1.00	8,328.54
(5) Employment growth in t (abs)	0.81	4.39	-83.00	150.00	1.08	8.52	-162.00	475.00
(6) Employment growth in t (rel)	0.28	1.30	-1.00	75.00	0.26	2.20	-1.00	167.00
(7) Asset growth in t (abs)	389.53	3,986.27	-120,310.00	125,462.00	778.72	47,877.94	-2,230,297.00	1,929,652.00
(8) Asset growth in t (rel)	0.38	6.48	-2.96	672.67	0.28	1.75	-3.74	106.74
(9) Number of interlocks in t-1					3.96	4.91	1.00	76.00
(10) Venture has TMT w/ grad. degree in t-1	0.09	0.28	0.00	1.00	0.11	0.32	0.00	1.00
(11) Venture has an owner w/ grad. degree in t-1	0.18	0.39	0.00	1.00	0.24	0.43	0.00	1.00
(12) Venture has a board dir w/ grad. degree in t-1	0.15	0.36	0.00	1.00	0.30	0.46	0.00	1.00
(13) Ownership concentration in t-1	0.53	0.29	0.00	1.00	0.49	0.30	0.00	1.00
(14) Sales in t-1	6,239.06	12,744.67	-154.00	550,611.00	12,911.91	44,012.73	-149.00	2,978,309.00
(15) Equity in t-1	303.38	2,000.98	0.00	110,000.00	1,351.91	13,842.03	19.00	832,954.00
(16) Employment in t-1	4.04	7.96	0.00	312.00	6.72	15.53	0.00	804.00
(17) Assets in t-1	3,831.98	33,073.51	-134.00	3,171,631.00	21,684.46	221,690.10	-335.00	7,197,197.00
(18) Numb. board dir w/ directorial exp. in t-1	2.59	1.11	0.00	9.00	3.16	1.22	1.00	10.00
(19) Numb. owners w/ industry exp.in t-1	1.36	2.72	0.00	216.00	1.63	2.87	0.00	119.00
(20) Numb. TMT w/ industry exp.in t-1	0.63	0.49	0.00	2.00	0.67	0.48	0.00	2.00
(21) Numb. board dir. w/ industry exp.in t-1	0.12	0.35	0.00	3.00	0.18	0.49	0.00	5.00

Table 3 provides grounds to compare the descriptive statistics for the sample of new ventures after implementing coarsened exact matching (CEM). The two groups of ventures include ventures that have an interlock for the first time and those that do not have any interlock until year t+1 (t being the treatment year). It can be observed that typically, ventures with an interlock manifest higher growth. The only exceptions are the relative growth in sales being lower in interlocking ventures and relative growth in employment, on average, being the same for both groups. In terms of the education of TMT members, board directors, and owners, a similar structure is observed as in the general sample of new ventures because of the elimination of extreme values and arriving at a more balanced sample after matching.

TABLE 3: Descriptive statistics of matched sample after CEM

	The new venture has *not* gotten an interlock 3,760 control ventures				The new venture has gotten an interlock 1,319 treated ventures			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
(1) Sales growth in *t* (abs)	556.44	4,523.24	-76045.00	55,118.00	1,146.63	10,934.45	-103,331.00	237,420.00
(2) Sales growth in *t* (rel)	0.76	20.64	-15.25	1,234.20	0.28	1.74	-1.02	39.56
(3) Equity growth in *t* (abs)	9.00	213.01	-6306.00	6,395.00	54.32	606.52	-2,281.00	13,697.00
(4) Equity growth in *t* (rel)	0.08	1.22	-0.96	55.61	0.15	1.28	-0.93	32.33
(5) Employment growth in *t* (abs)	0.66	4.14	-79.00	121.00	1.25	13.86	-24.00	475.00
(6) Employment growth in *t* (rel)	0.21	0.89	-1.00	30.00	0.21	0.78	-1.00	9.31
(7) Asset growth in *t* (abs)	306.28	2,575.50	-79,403.00	40,833.00	1,244.57	12,010.53	-142,941.00	287,514.00
(8) Asset growth in *t* (rel)	0.25	2.22	-2.96	76.40	0.29	1.26	-0.96	24.70
(9) Number of interlocks in *t-1*					3.14	4.26	1.00	68.00
(10) Venture has TMT w/ grad. degree in *t-1*	0.10	0.30	0.00	1.00	0.12	0.33	0.00	1.00
(11) Venture has an owner w/ grad. degree in *t-1*	0.18	0.39	0.00	1.00	0.25	0.43	0.00	1.00
(12) Venture has a board dir w/ grad. degree in *t-1*	0.15	0.36	0.00	1.00	0.27	0.45	0.00	1.00
(13) Ownership concentration in *t-1*	0.54	0.28	0.00	1.00	0.49	0.30	0.03	1.00
(14) Sales in *t-1*	6,665.31	10,803.19	-154.00	202,532.00	12,210.87	23,611.16	0.00	463,980.00
(15) Equity in *t-1*	233.71	482.78	30.00	12,741.00	1,266.28	12,741.98	30.00	336,810.00
(16) Employment in *t-1*	4.42	7.94	0.00	188.00	6.89	11.68	0.00	202.00
(17) Assets in *t-1*	3,104.59	5,650.05	-134.00	119,421.00	11,533.48	66,065.06	6.00	1,517,718.00
(18) Numb. board dir w/ directorial exp. in *t-1*	2.63	1.08	0.00	7.00	3.03	1.22	1.00	9.00
(19) Numb. owners w/ industry exp.in *t-1*	1.54	1.62	0.00	29.00	1.76	2.37	0.00	42.00
(20) Numb. TMT w/ industry exp.in *t-1*	0.76	0.43	0.00	2.00	0.71	0.46	0.00	2.00
(21) Numb. board dir. w/ industry exp.in *t-1*	0.06	0.26	0.00	3.00	0.12	0.40	0.00	4.00

4. ESTIMATION STRATEGY

Many strategic decisions and choices are not random and are a function of a firm's expected performance (Clougherty, Duso, & Muck, 2016; Rocha, van Praag, Folta, & Carneiro, 2019). Therefore, endogeneity is omnipresent in the strategy–firm performance relationships. To avoid arriving at wrong conclusions, one should account for endogeneity when conducting analyses of such relationships.

Often, strategic decisions are an outcome of the choices by different actors and can be viewed as a "two-sided matching process" (Rocha et al., 2019). Bringing the consideration to the domain of the current study in a simplified manner, we deal with a logic similar to market logic. A venture becomes interlocking and receives a certain number of interlocks when (i) it enrolls a board director who is simultaneously holding another board position or (ii) one of the venture's board directors takes a board position in another firm. In either case, whether an individual becomes a board director depends on whether a firm's strategic decision makers invite the individual to their firm and whether that individual accepts the invitation or vice

16

versa. The access to certain individuals, the decisions to offer them a directorship, and the decisions for the board directors to accept this position can depend on the characteristics of the venture, its strategic decision makers, and the board directors. Thus, it is a situation where board directors are not randomly assigned to the ventures; rather, they self-select themselves into ventures. This suggests that board directors' presence in and of itself does not necessarily shape the growth of a new venture, so one cannot automatically attribute the observed outcomes to the impact of board interlocks. There can be other causes driving certain types of directors into certain types of new ventures, and this can also explain the focal new venture's growth, as well as the reverse causality issue. Therefore, for the current study, panel models are particularly suitable for addressing omitted variable bias because these models account for firm-specific, time-invariant, observed and unobserved factors otherwise not modeled (Antonakis et al., 2010). In this case, fixed effect panel models are implemented because they allow firm-specific effects (the intercept) to be correlated with the explanatory variables (Wooldridge, 2016), confirmed by the Hausman test.

To mitigate endogeneity, one other complexity should be accounted for: the strategic choices of other firms that may be influencing the choices of the focal venture. The current study approaches the problem by implementing an instrumental variable technique that accounts for the mechanisms present on individual (board director) and firm levels outside of the focal venture—in the industry and region the venture operates in within a given year—that can affect the director's choice of accepting a board position and/or venture's ability to access these directors (see section 4.2). Hence, the present study combines panel models and an instrumental variable approach to alleviate the endogeneity problems in the relationship of interest (H2). Concerning the 'treatment' of getting at least one interlock (H1), CEM is implemented. Although CEM comes with limitations and does not strongly claim to remove endogeneity and perfectly recreate an experiment, it is a crucial step to conduct the analysis

on a more balanced and comparable sample and observe the cleaner effect of the treatment. CEM can, therefore, markedly improve the methodological rigor and brings us closer to the causal effects of getting an interlock.

4.1. Coarsened Exact Matching

The goal of using matching techniques is to reduce the bias in the estimation of the treatment effect. To achieve this, particularly through CEM, the key is to match a group of observations that have received the treatment (treatment group) to one that has not received it (control group) based on coarsened pretreatment covariates. The goal is to find a better balance, that is, achieve more similarity, between the two groups by also leaving out observations without a match (Blackwell, Iacus, King, & Porro, 2009; Stuart, 2010). Reducing the covariate imbalance between the treated and untreated observations minimizes the respective covariates' impact on the causal inference. The procedure is an effort to approximate the nonexperimental design to a gold standard randomized experiment (Antonakis et al., 2010; Stuart, 2010).

In the present study, the treatment group comprises new ventures that did not have an interlock before and, in a given year, get at least one interlock (first-time interlockers). Here, the interlocks are formed by an owner-/outside board director who is also an owner/outside director on the corresponding board. The control group includes ventures that have never had such interlock and still do not have one in year $t-1$ (the treatment year), as well as year t when growth is estimated. This is because if a (control) venture gets an interlock in year t, it can affect their same year's growth, making the control and treatment observations incomparable.

By applying CEM, I intend to juxtapose ventures that have similar growth trajectories and see if the trajectory changes for the venture that received the interlock as opposed to the firm that did not. Therefore, the observations are matched based on how promising the new ventures are (possible predictors of growth) and the additional characteristics that can indicate if the

venture will receive an interlock or not (Blackwell et al., 2009; Stuart, 2010). As factors that can determine a venture's growth trajectory, I chose the presence of strategic human resources with industry experience and/or prior directorial experience. In addition, strategic human resources with these experiences have established social ties and reputations through which they can invite board directors. In the case of board directors with prior directorial experience, apart from their established ties and reputation, they have a better chance of landing another board position, thus becoming interlocking. One other matching variable is the level of equity, which can indicate whether the venture has managed to receive extra investment on top of the minimum equity requirement. This variable points to the venture's growth intention or ambition, as well as its ability to attract investors who can either become board directors or appoint such. In either case, this increases the chance of having an interlocking board director. Further, some matching criteria are in place to ensure the comparability of ventures within each strata. Thus, the following characteristics of focal ventures in the year before the treatment (*t-2*) serve as matching criteria (1) year; (2) firm age; (3) NACE industry codes (A*38); the presence of (3a) person-owners, (3b) TMT members, and (3c) board directors with prior working experience in the same industry; (4) the presence of board directors with prior experience as a board member, (5) minimum equity requirement. Each level of the matching variables is in separate strata. Only equity is coarsened, for which I considered the minimum requirement for limited companies in Norway.

Table 4 provides the details on the sample characteristics in terms of imbalance between the control and treatment groups before and after applying CEM. After CEM, the imbalance between the treatment and control ventures significantly dropped. After matching, our analysis sample consists of 5,079 ventures, of which 1,319 are the treated ventures and 3,760 are the control ventures. Overall, the purpose was to reach a much better balance often coming at the expense of sample size. This points to large variations in the characteristics of

firms that received an interlock for the first time and those that had never gotten any board interlock before.

TABLE 4: Sample imbalance before and after Coarsened Exact Matching

4.2. Instrumental Variables: Theoretical Considerations and Measurement

What predicts the presence and number of board interlocks and—only through them—affects the growth of new ventures? This is the question that instrumental variables (IV) should answer in the current study (Antonakis et al., 2010). To achieve this, I first rest on a number of theoretical considerations regarding the characteristics of a given industry-region in which the focal venture operates. On the one hand, I consider that the directors in a certain industry and region at a given time can be more inclined to take multiple directorships (supply side).

Before matching							
Multivariate L1 distance	0.59						
Matching criteria (pre-treatment, year *t-2*)	**Univariate imbalance**	**mean**	**min**	**25%**	**50%**	**75%**	**max**
Year	0.12	-0.37	0.00	-1.00	-1.00	-1.00	0.00
Firm age	0.20	0.35	1.00	0.00	0.00	0.00	0.00
Industry	0.15	0.13	0.00	0.00	2.00	0.00	0.00
Equity	0.09	831.09	30.00	0.00	11.00	190.00	130000.00
Industry experience of the owners	0.04	-0.04	0.00	0.00	0.00	0.00	0.00
Industry experience of TMT	0.01	-0.01	0.00	0.00	0.00	0.00	0.00
Industry experience of board dir	0.03	0.03	0.00	0.00	0.00	0.00	0.00
Directorial experience of board dir	0.05	0.05	0.00	0.00	0.00	0.00	0.00
After matching							
Number of strata	3691						
Number of matched strata	750						
	Control	Treated					
All	8728	1767					
Matched	3760	1319					
Unmatched	4968	448					
Multivariate L1 distance	0.10						
Matching criteria (pre-treatment, year *t-2*)	**Univariate imbalance**	**mean**	**min**	**25%**	**50%**	**75%**	**max**
Year	2.90E-15	-4.10E-11	0	0	0	0	0
Firm age	5.80E-15	3.00E-14	0	0	0	0	0
Industry	3.50E-15	-5.00E-14	0	0	0	0	0
Equity	0.05	724.18	0	0	0	100	2.20E+05
Industry experience of the owners	3.40E-15	5.30E-15	0	0	0	0	0
Industry experience of TMT	3.50E-15	1.70E-15	0	0	0	0	0
Industry experience of board dir	1.90E-15	-5.60E-16	0	0	0	0	0
Directorial experience of board dir	0	0	0	0	0	0	0

On the other hand, the firms in a certain industry-region-year can be more prone to form more interlocks (demand side). Regarding the question of why firms, particularly new ventures, can have these tendencies, I suggest multiple arguments that partially lean on the mechanisms of organizational isomorphism. For instance, education, socialization, and professional networks suggest certain cognitive and normative frames and facilitate the diffusion of certain routines and institutional practices (Beckert, 2016; DiMaggio & Powell, 1983). One can argue that within the industry-region at a certain time, it is more likely that the founders, managers, and/or board directors of new ventures have similar education, possibly from the same university, and that they are part of a certain social circle. Moreover, firms in general are more visible to each other, especially given that information on boards is publicly available. In addition, even on the individual level, isomorphic mechanisms can be in place because board directors are part of "elite networks" and normally communicate more closely (Lamb & Roundy, 2016; Useem, 1984); not to mention, they may have better knowledge of firms that may interest them, or board directors may offer each other board seats in different firms. An additional incentive for directors to accept more directorships and eventually, to converge their behaviors, can be that holding multiple directorships is perceived as a signal of high-quality directors (Fich & White, 2005).

Among the firms, mimetic processes and the adoption of institutional templates can be in place; these are driven by the firms' need to navigate uncertainty and to establish legitimacy (Beckert, 2016; DiMaggio & Powell, 1983). This is especially relevant for new ventures, which typically lack legitimacy (Stinchcombe, 1965). Another mechanism for organizational isomorphism is the presence of a common legal environment. The (outside) board sizes of the firms in a specific industry-region can be larger because of, for instance, a legal requirement of having an outsider. Moreover, it can be so because boards can be particularly important

within a given industry-region. As a result, there can be a higher demand for outside board directors. In case of a limited "pool" of individuals acting as outside directors or of individuals actively investing in ventures and serving as board directors, there can be a shortage of such directors leading to each individual taking several board seats. In combination with the legal requirement to have an outsider at a board, this infers a higher probability of getting an interlocking director at the focal board.

Taken together, isomorphic mechanisms and/or potential imbalance between the demand and supply of outside/owner-board directors can explain how probable it is for the focal new venture to have interlocking practices similar to other firms. Thus, the logic is that if board interlocks are important in a focal industry-region, interlocks can be treated as a characteristic of an industry/region rather than a sign of, for instance, a focal firm's outperformance.

With these arguments in mind, a number of IVs can be considered. However, after estimating 2SLS regressions with several relevant IVs, inspecting their compliance with the assumptions for valid instruments, and conducting weak instrument tests (Wooldridge, 2016), in order to test H2, I incorporated only the strongest of the instruments. The chosen instrument is the *proportion of individuals acting as interlocking outside/owner-directors out of all outside/owner-directors within a given industry, region, and year*. The variable points at outside/owner-directors' inclination to serve on more than one board. I argue that the instrument fulfills the monotonicity condition that is required by a qualified instrument. That is, the higher the proportion of interlocking directors, the higher is the likelihood that a firm in the same industry, region, and within the given year will have more interlocks. Interlocking directors can facilitate an increase of interlocks in the given setting because working in the same inner circles, board directors offer each other board seats in the firms they also serve at.

Many interlocking directors in the specific industry-region means that whoever firms invite to join their board or whoever is willing to join the firm is more likely to be interlocking. Even if the already interlocking directors reject invitations to take more board seats, instead of them, noninterlocking directors may be offered and may accept additional seats.

As for the measurement of the IVs, I used NACE three-digit industry codes, where within each group, the industries are more related to each other than in the case of two-digit industry codes; here, the industry definition is not as narrow as four-digit industry codes. For regions, I used 90 labor market and trade regions (economic regions) of Norway (Statistics Norway, 2001). Further, the IVs are measured for the same year when the independent variables are observed because it shows the state and tendencies of the firms within the industry-region-year as the focal venture's tendencies are observed (the simultaneity of the tendencies). The extreme cases, when the focal firm is the only one in that industry, year and within that region, are eliminated to ensure that the instrument and independent variable are not mechanically correlated.

5. RESULTS

Table 5a and 5b report the results of the first set of analyses testing H1—whether interlocking new ventures grow at a larger pace than noninterlocking ones. I ran the analyses on the sample of all new ventures and its two subsamples, one of which comprises new ventures that received a board interlock for the first time and their respective control ventures. The other one is the latter subsample after implementing CEM. The estimations of the models on all samples (including the CEM subsample) indicate that interlocking ventures and those that received an interlock outperform the noninterlocking ones in terms of growth in equity and assets (see Table 5a–5b, Models 4–9). One interesting observation is that the ventures that

23

received an interlock for the first time have significantly higher absolute growth in sales that is not observed in the comparison of interlocking ventures and noninterlocking ones (see Table 5a, Model 10). Although one can observe significant differences, the coefficients are not readily interpretable in terms of effect sizes because the dependent variables are cube-rooted (see Appendix 1 for details). After estimating the effect on the respective growth measures, one can see that, surprisingly, on average, equity is shown to grow by only around NOK 7 more for treated ventures in absolute terms and by 0.002% more in relative terms. Asset growth is higher by NOK 1,728 and 0.106% a year, with sales growth being higher by NOK 1,033. Therefore, I found support for H1 in the case of equity and asset growth, as well as absolute growth in sales.

TABLE 5A: Effect of getting a board interlock on new venture absolute growth

	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)
	Employment growth (abs, cbrt)	Employment growth (abs, cbrt)	Employment growth (abs, cbrt)	Equity growth (abs, cbrt)	Equity growth (abs, cbrt)	Equity growth (abs, cbrt)	Asset growth (abs, cbrt)	Asset growth (abs, cbrt)	Asset growth (abs, cbrt)	Sales growth (abs, cbrt)	Sales growth (abs, cbrt)	Sales growth (abs, cbrt)
Explanatory variables (t-1)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Interlocking venture	0.004			0.202***			0.404***			0.194		
	(0.013)			(0.036)			(0.150)			(0.165)		
Venture became interlocking		0.025	0.043		0.243***	0.191**		0.923***	1.200***		0.757**	1.011**
		(0.027)	(0.038)		(0.058)	(0.079)		(0.293)	(0.387)		(0.346)	(0.451)
TMT w/ grad. degree	-0.010	0.039	0.056	0.099	0.035	0.095	0.547	0.291	1.241	0.366	0.651	0.976
	(0.026)	(0.037)	(0.075)	(0.087)	(0.092)	(0.188)	(0.346)	(0.428)	(0.808)	(0.347)	(0.476)	(0.864)
Owners w/ grad degree	-0.010	-0.039	-0.018	0.112	0.010	0.024	-0.108	-0.460	-0.368	-0.161	-0.428	-0.074
	(0.022)	(0.033)	(0.066)	(0.072)	(0.077)	(0.158)	(0.286)	(0.375)	(0.676)	(0.292)	(0.416)	(0.726)
Board directors w/ graduate degree	0.010	0.041	0.004	0.116**	0.033	-0.005	0.215	0.194	0.415	-0.101	-0.070	-0.709
	(0.018)	(0.028)	(0.048)	(0.050)	(0.059)	(0.115)	(0.215)	(0.303)	(0.536)	(0.236)	(0.353)	(0.590)
Nmb board directors w/ board experience	0.024***	0.013	0.006	0.076***	0.039**	0.039	0.270***	0.109	0.164	0.199**	0.182	0.412*
	(0.006)	(0.009)	(0.017)	(0.021)	(0.019)	(0.035)	(0.074)	(0.094)	(0.180)	(0.078)	(0.111)	(0.215)
Nmb owners w/ industry experience	0.002	0.005	0.003	0.025**	0.044**	0.014	0.108**	0.110	0.272	0.023	-0.006	0.147
	(0.004)	(0.004)	(0.014)	(0.012)	(0.019)	(0.040)	(0.054)	(0.077)	(0.193)	(0.038)	(0.073)	(0.239)
Nmb TMT members w/ industry experience	0.023	0.006	0.047	-0.155***	-0.097**	-0.245**	-0.066	0.191	0.257	0.269	0.631**	0.303
	(0.014)	(0.020)	(0.044)	(0.037)	(0.043)	(0.116)	(0.166)	(0.215)	(0.447)	(0.175)	(0.251)	(0.536)
Nmb board directors w/ industry experience	0.005	-0.012	-0.077	-0.023	0.008	-0.016	-0.052	-0.381	-0.713	0.427**	-0.424	-0.533
	(0.016)	(0.024)	(0.052)	(0.042)	(0.042)	(0.078)	(0.191)	(0.256)	(0.569)	(0.209)	(0.320)	(0.672)
Ownership structure	-0.041*	-0.016	0.120**	-0.264***	-0.014	0.106	0.062	0.348	1.526**	-1.142***	-1.249***	-0.117
	(0.023)	(0.032)	(0.061)	(0.075)	(0.075)	(0.156)	(0.280)	(0.350)	(0.645)	(0.297)	(0.423)	(0.775)
Assets (cbrt)	-0.001	-0.000	-0.005	0.020*	0.002	-0.002	-0.049	-0.059	-0.034	0.088***	0.161***	0.194***
	(0.001)	(0.002)	(0.004)	(0.011)	(0.007)	(0.011)	(0.050)	(0.050)	(0.079)	(0.020)	(0.034)	(0.049)
Equity (cbrt)	-0.006***	-0.001	0.000	-0.035	0.025	0.037	0.026	0.042	0.090	-0.081*	-0.142**	-0.127
	(0.002)	(0.004)	(0.007)	(0.037)	(0.021)	(0.028)	(0.070)	(0.088)	(0.137)	(0.042)	(0.068)	(0.095)
Employment (cbrt)	-0.113***	-0.115***	-0.074	0.146***	0.077**	0.109	0.869***	0.542***	0.518	1.162***	1.263***	1.451***
	(0.014)	(0.023)	(0.051)	(0.045)	(0.038)	(0.071)	(0.150)	(0.207)	(0.349)	(0.161)	(0.260)	(0.465)
Sales (cbrt)	0.016***	0.020***	0.022***	-0.021***	-0.010	0.000	0.037	0.097***	0.061	-0.067***	-0.086***	-0.174***
	(0.001)	(0.002)	(0.003)	(0.005)	(0.006)	(0.010)	(0.030)	(0.034)	(0.053)	(0.021)	(0.031)	(0.050)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.184	-1.009***	-0.570	0.628	-0.277	-0.514	1.736	-3.804***	2.472	5.685	-9.865***	2.483
	(563.739)	(0.081)	(0.428)	(.)	(0.216)	(0.344)	(.)	(0.904)	(9.212)	(.)	(1.051)	(6.738)
Observations	23,009	10,494	5,079	23,009	10,494	5,079	23,009	10,494	5,079	23,009	10,494	5,079
R-squared	0.072	0.078	0.073	0.026	0.024	0.027	0.020	0.021	0.043	0.031	0.031	0.053

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 5B: Effect of getting a board interlock on new venture relative growth

	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)	All interlocking new ventures	All new that got an interlock	All new that got an interlock (CEM)
	Employment growth (rel, cbrt)	Employment growth (rel, cbrt)	Employment growth (rel, cbrt)	Equity growth (rel, cbrt)	Equity growth (rel, cbrt)	Equity growth (rel, cbrt)	Asset growth (rel, cbrt)	Asset growth (rel, cbrt)	Asset growth (rel, cbrt)	Sales growth (rel, cbrt)	Sales growth (rel, cbrt)	Sales growth (rel, cbrt)
Explanatory variables (*t-1*)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Interlocking venture	-0.004			**0.025*****			**0.018***			0.012		
	(0.008)			(0.004)			(0.010)			(0.010)		
Venture became interlocking		0.008	0.021		**0.034*****	**0.028****		**0.068*****	**0.102*****		0.030	0.040
		(0.015)	(0.020)		(0.008)	(0.012)		(0.019)	(0.026)		(0.019)	(0.026)
TMT w/ grad. degree	-0.004	0.027	0.055	0.005	0.003	0.008	0.010	-0.003	0.058	-0.007	0.003	0.021
	(0.015)	(0.022)	(0.040)	(0.010)	(0.013)	(0.028)	(0.020)	(0.031)	(0.058)	(0.022)	(0.033)	(0.066)
Owners w/ grad degree	-0.012	-0.028	-0.038	0.022***	0.004	0.014	-0.014	-0.021	0.008	0.012	-0.005	0.022
	(0.012)	(0.019)	(0.033)	(0.008)	(0.011)	(0.027)	(0.016)	(0.026)	(0.050)	(0.018)	(0.027)	(0.050)
Board directors w/ graduate degree	0.005	0.019	0.008	0.017**	0.007	-0.005	0.021	0.009	-0.015	-0.007	-0.009	-0.045
	(0.010)	(0.016)	(0.026)	(0.007)	(0.008)	(0.018)	(0.013)	(0.022)	(0.039)	(0.014)	(0.022)	(0.041)
Nmb board directors w/ board experience	0.014***	0.012**	0.009	0.009***	0.005*	0.006	0.011**	0.006	0.008	0.015***	0.016**	0.031**
	(0.003)	(0.005)	(0.009)	(0.002)	(0.003)	(0.005)	(0.004)	(0.007)	(0.013)	(0.005)	(0.007)	(0.013)
Nmb owners w/ industry experience	-0.000	0.002	0.005	0.001	0.002	-0.003	0.002	0.005	0.012	0.002	0.003	0.015*
	(0.002)	(0.002)	(0.006)	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.008)	(0.002)	(0.003)	(0.009)
Nmb TMT members w/ industry experience	0.019**	0.014	0.046*	-0.020***	-0.011*	-0.033*	-0.007	0.007	0.032	-0.013	0.024	-0.018
	(0.008)	(0.012)	(0.024)	(0.005)	(0.006)	(0.017)	(0.011)	(0.017)	(0.032)	(0.011)	(0.017)	(0.035)
Nmb board directors w/ industry experience	0.007	-0.005	-0.030	-0.001	0.002	-0.007	-0.001	-0.016	-0.028	0.016	-0.021	-0.011
	(0.009)	(0.014)	(0.033)	(0.005)	(0.006)	(0.012)	(0.011)	(0.018)	(0.041)	(0.011)	(0.018)	(0.040)
Ownership structure	-0.023*	-0.004	0.078**	-0.037***	-0.016	0.009	0.002	0.027	0.115**	-0.069***	-0.054**	0.046
	(0.013)	(0.020)	(0.036)	(0.008)	(0.010)	(0.024)	(0.017)	(0.027)	(0.047)	(0.018)	(0.027)	(0.052)
Assets (cbrt)	-0.001**	-0.001	-0.004**	0.004**	0.001	0.000	-0.007***	-0.015***	-0.012***	0.006***	0.011***	0.015***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.004)
Equity (cbrt)	-0.004***	-0.001	-0.001	-0.008***	-0.002	-0.001	0.001	0.004	0.009	-0.004*	-0.006*	-0.006
	(0.001)	(0.002)	(0.003)	(0.003)	(0.001)	(0.002)	(0.001)	(0.003)	(0.005)	(0.002)	(0.003)	(0.005)
Employment (cbrt)	-0.111***	-0.130***	-0.107***	0.015**	0.014***	0.015*	0.025***	0.021*	0.013	0.057***	0.070***	0.064***
	(0.005)	(0.009)	(0.018)	(0.006)	(0.005)	(0.009)	(0.007)	(0.012)	(0.021)	(0.007)	(0.012)	(0.021)
Sales (cbrt)	0.009***	0.012***	0.013***	-0.003***	-0.002***	0.000	0.002***	0.007***	0.006**	-0.013***	-0.015***	-0.019***
	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.219	-0.712***	-0.117	0.067	-0.023	-0.021	0.347	-0.372***	0.367	0.524	-1.104***	0.308
	(.)	(0.047)	(0.164)	(.)	(0.026)	(0.039)	(.)	(0.063)	(0.469)	(.)	(0.061)	(0.248)
Observations	23,009	10,494	5,079	23,009	10,494	5,079	23,009	10,494	5,079	23,009	10,494	5,079
R-squared	0.083	0.086	0.078	0.028	0.018	0.021	0.016	0.017	0.038	0.029	0.025	0.048

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

26

In an unreported estimation of the models, no significant differences was observed between the growth of ventures that ceased to be interlocking and of those retained their interlocks (after CEM). That is, the loss of an interlock does not systematically put the venture at a disadvantage.

In H2, I argue that the number of interlocks positively affects new venture growth but with a diminishing marginal effect. To test H2, in Tables 6–9, I juxtapose the results of two different estimation approaches and models. Models 1–4 of Tables 6–9 present the results of the analysis of the most basic estimation approach of this study: Ordinary Least Squares (OLS) regression. Models 5–8 of these tables contain the findings from the most advanced estimation approach and analysis of the present study: 2SLS regression with fixed effect panel models.[14] The purpose is to compare the results of estimating models with omnipresent endogeneity to the results after executing estimation techniques and models that mitigate endogeneity.

Models 1–2 and 5–6 test linear relationships, whereas in Models 3–4 and 7–8, the focal independent variable—the number of interlocks—is in its logarithmic functional form because the hypothesized relationship is nonlinear. The coefficients of the linear and logarithmic independent variables estimated by OLS have the same sign and significance for each growth measure (DV). The exception is when the number of interlocks turns significant ($p<0.1$) for equity growth in Model 8 (Table 7) from being nonsignificant in Model 6. Neither of the models with different functional forms of the independent variable outperforms the other in terms of explanatory power.[15] As shown in Table 6, the number of interlocks has a

---

[14] Note that the unreported results of 2SLS analysis of Models 1–4, as well as the basic panel models, can be provided upon request.
[15] In the second-stage regressions, the R-squared cannot be interpreted (Wooldridge, 2016). Therefore, the comparison applies only to the results of the OLS regression and panel models (the latter is unreported in the paper).

weakly significant negative effect ($p<0.1$) on relative employment growth (Models 2 and 4) that disappears after taking into consideration the endogeneity in Models 5–8[16]. Furthermore, as Table 7 demonstrates, the number of interlocks is in a strong positive relationship with the absolute growth in equity ($p<0.05$, Models 5 and 7). The effect sizes are larger than in the case of the OLS coefficients but with lower significance.[17] In terms of functional form, there is a confirmation of diminishing marginal effects from Models 7 and 8 as opposed to Model 6 in the case of relative growth.

Meanwhile, unlike employment growth, in the case of asset and sales growth, nonsignificant effects (Models 1–4) turn to a negative and significant effect on asset growth ($p<0.05$, Models 5–8, Table 8) and relative sales growth ($p<0.1$, Models 6 and 8, Table 9) after running panel models with a 2SLS regression. One possible explanation can be that a positive selection effect reveals itself and neutralizes the negative effect of the number of interlocks in Models 1–4, and when the selection effect is mitigated, the negative effect manifests. To conclude, I found support for H2 only in the case of equity growth.

---

[16] It is noteworthy that the instrumental variables turn weak in the case of employment growth and absolute sales growth models failing to meet the requirement of the endogeneity test. Therefore, the parameter estimates are more consistent in the panel models (unreported) than after 2SLS with panel models. The latter models do not demonstrate results that are different (sign and significance) from the ones reported in Tables 6 and 9 (Models 5 and 7).

[17] See the effect size calculations on equity in Figures 2 and 3, assets in Figures 4 and 5, and sales in Figure 6 (Appendix 2).

TABLE 6: Effect of number of interlocks on new venture's employment growth

Explanatory variables (*t-1*)	Results of OLS regressions				Results of second-stage regressions of panel models			
	Employment growth (abs, cbrt)	Employment growth (rel, cbrt)	Employment growth (abs, cbrt)	Employment growth (rel, cbrt)	Employment growth (abs, cbrt)	Employment growth (rel, cbrt)	Employment growth (abs, cbrt)	Employment growth (rel, cbrt)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Number of interlocks	-0.002	-0.002*			-0.052	-0.028		
	(0.002)	(0.001)			(0.107)	(0.054)		
Number of interlocks (log)			-0.016	-0.012*			-0.286	-0.119
			(0.012)	(0.007)			(0.407)	(0.210)
TMT w/ grad. degree	-0.038	-0.020	-0.038	-0.020	0.072	0.033	0.074	0.031
	(0.039)	(0.021)	(0.039)	(0.021)	(0.191)	(0.098)	(0.187)	(0.096)
Owners w/ grad degree	0.018	0.012	0.018	0.012	-0.029	-0.039	-0.010	-0.029
	(0.033)	(0.018)	(0.033)	(0.018)	(0.110)	(0.058)	(0.107)	(0.057)
Board directors w/ grad degree	-0.009	-0.007	-0.007	-0.007	0.041	0.006	0.042	-0.004
	(0.025)	(0.014)	(0.025)	(0.014)	(0.214)	(0.111)	(0.166)	(0.087)
Nmb board directors w/ board experience	0.035***	0.020***	0.036***	0.020***	0.051	0.012	0.052	0.007
	(0.010)	(0.005)	(0.010)	(0.005)	(0.084)	(0.043)	(0.063)	(0.032)
Nmb owners w/ industry experience	0.005	0.000	0.005	0.001	-0.019	-0.008	-0.019	-0.007
	(0.006)	(0.002)	(0.005)	(0.002)	(0.017)	(0.008)	(0.017)	(0.008)
Nmb TMT members w/ industry experience	0.056**	0.041***	0.056**	0.041***	0.102*	0.055*	0.110*	0.059*
	(0.024)	(0.013)	(0.024)	(0.013)	(0.060)	(0.031)	(0.062)	(0.032)
Nmb board directors w/ industry experience	0.018	0.018	0.019	0.018	0.082	0.046	0.077	0.042
	(0.021)	(0.012)	(0.021)	(0.012)	(0.063)	(0.033)	(0.051)	(0.027)
Ownership structure	0.004	-0.006	0.004	-0.007	0.083	0.074	0.089	0.077
	(0.037)	(0.020)	(0.037)	(0.020)	(0.105)	(0.054)	(0.106)	(0.054)
Assets (cbrt)	-0.000	-0.001	-0.000	-0.001	0.012	0.009*	0.011	0.008*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)	(0.005)	(0.008)	(0.004)
Equity (cbrt)	-0.006**	-0.003**	-0.006**	-0.003**	0.001	0.000	0.001	0.000
	(0.003)	(0.001)	(0.003)	(0.001)	(0.008)	(0.004)	(0.008)	(0.004)
Employment (cbrt)	-0.090***	-0.094***	-0.090***	-0.094***	-1.498***	-0.893***	-1.494***	-0.893***
	(0.021)	(0.008)	(0.021)	(0.008)	(0.099)	(0.052)	(0.098)	(0.052)
Sales (cbrt)	0.013***	0.006***	0.013***	0.006***	-0.001	0.002	-0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.003)	(0.005)	(0.003)
Constant	-0.191***	-0.040*	-0.197***	-0.043*				
	(0.045)	(0.023)	(0.045)	(0.023)				
Industry dummies	Yes	Yes	Yes	Yes				
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,011	10,011	10,011	10,011	6,937	6,937	6,937	6,937
Number of distinct ventures					2,354	2,354	2,354	2,354
R-squared	0.068	0.076	0.068	0.076				

*** p<0.01, ** p<0.05, * p<0.1

TABLE 7: Effect of number of interlocks on new venture's equity growth

	Results of OLS regressions				Results of second-stage regressions of panel models			
	Equity growth (abs, cbrt)	Equity growth (rel, cbrt)	Equity growth (abs, cbrt)	Equity growth (rel, cbrt)	Equity growth (abs, cbrt)	Equity growth (rel, cbrt)	Equity growth (abs, cbrt)	Equity growth (rel, cbrt)
Explanatory variables (*t-1*)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Number of interlocks	0.024***	0.002**			0.471**	0.049		
	(0.009)	(0.001)			(0.237)	(0.030)		
Number of interlocks (log)			0.191***	0.021***			1.931**	0.194*
			(0.041)	(0.005)			(0.876)	(0.111)
TMT w/ grad. degree	0.297*	0.021	0.304**	0.022	0.319	0.020	0.368	0.026
	(0.152)	(0.016)	(0.152)	(0.016)	(0.670)	(0.069)	(0.649)	(0.066)
Owners w/ grad degree	0.074	0.028**	0.071	0.027**	0.203	0.066	0.043	0.050
	(0.129)	(0.012)	(0.129)	(0.012)	(0.429)	(0.056)	(0.427)	(0.056)
Board directors w/ grad degree	0.177**	0.028***	0.155**	0.025**	-0.303	-0.031	-0.103	-0.008
	(0.076)	(0.010)	(0.076)	(0.010)	(0.519)	(0.063)	(0.409)	(0.048)
Nmb board directors w/ board experience	0.103***	0.013***	0.094**	0.012***	-0.292	-0.039	-0.208	-0.029
	(0.037)	(0.005)	(0.037)	(0.005)	(0.206)	(0.025)	(0.156)	(0.019)
Nmb owners w/ industry experience	0.064***	0.003*	0.064***	0.003*	0.117	0.002	0.112	0.001
	(0.022)	(0.002)	(0.022)	(0.002)	(0.079)	(0.007)	(0.080)	(0.007)
Nmb TMT members w/ industry experience	-0.289***	-0.036***	-0.290***	-0.036***	-0.325*	-0.020	-0.382*	-0.026
	(0.070)	(0.008)	(0.070)	(0.008)	(0.190)	(0.021)	(0.195)	(0.022)
Nmb board directors w/ industry experience	-0.071	-0.007	-0.081	-0.008	-0.369**	-0.034	-0.291**	-0.026
	(0.064)	(0.008)	(0.064)	(0.008)	(0.173)	(0.022)	(0.148)	(0.019)
Ownership structure	-0.273*	-0.037***	-0.276**	-0.037***	0.386	0.077*	0.329	0.071*
	(0.141)	(0.014)	(0.140)	(0.014)	(0.331)	(0.041)	(0.318)	(0.040)
Assets (cbrt)	0.022	0.005*	0.021	0.005*	-0.036	0.003	-0.026	0.004
	(0.014)	(0.002)	(0.014)	(0.002)	(0.061)	(0.009)	(0.060)	(0.009)
Equity (cbrt)	-0.056	-0.010**	-0.057	-0.010***	-1.563***	-0.167**	-1.561***	-0.166**
	(0.050)	(0.004)	(0.050)	(0.004)	(0.325)	(0.076)	(0.328)	(0.076)
Employment (cbrt)	0.201**	0.015	0.198**	0.015	0.357*	0.028	0.349*	0.027
	(0.083)	(0.011)	(0.082)	(0.011)	(0.210)	(0.020)	(0.201)	(0.019)
Sales (cbrt)	-0.029***	-0.003***	-0.029***	-0.003***	0.007	0.001	0.003	0.000
	(0.008)	(0.001)	(0.008)	(0.001)	(0.026)	(0.003)	(0.024)	(0.003)
Constant	0.225	0.036*	0.286	0.044**				
	(0.213)	(0.020)	(0.212)	(0.020)				
Industry dummies	Yes	Yes	Yes	Yes				
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,011	10,011	10,011	10,011	6,937	6,937	6,937	6,937
					2,354	2,354	2,354	2,354
R-squared	0.036	0.039	0.038	0.040				

*** p<0.01, ** p<0.05, * p<0.1

TABLE 8: Effect of number of interlocks on new venture's asset growth

Explanatory variables (*t-1*)	Results of OLS regressions				Results of second-stage regressions of panel models			
	Asset growth (abs, cbrt)	Asset growth (rel, cbrt)	Asset growth (abs, cbrt)	Asset growth (rel, cbrt)	Asset growth (abs, cbrt)	Asset growth (rel, cbrt)	Asset growth (abs, cbrt)	Asset growth (rel, cbrt)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Number of interlocks	0.010	0.001			-2.807**	-0.194**		
	(0.037)	(0.001)			(1.253)	(0.079)		
Number of interlocks (log)			0.158	0.003			-10.496**	-0.710**
			(0.161)	(0.008)			(4.423)	(0.278)
TMT w/ grad. degree	1.291**	0.041	1.297**	0.041	4.700	0.193	4.299	0.164
	(0.571)	(0.027)	(0.571)	(0.027)	(2.988)	(0.166)	(2.711)	(0.129)
Owners w/ grad degree	0.252	0.002	0.249	0.002	0.870	-0.010	1.809	0.055
	(0.455)	(0.022)	(0.455)	(0.022)	(1.499)	(0.090)	(1.379)	(0.077)
Board directors w/ grad degree	0.189	0.012	0.161	0.011	4.189	0.269	2.664	0.159
	(0.316)	(0.017)	(0.317)	(0.017)	(2.791)	(0.177)	(2.010)	(0.121)
Nmb board directors w/ board experience	0.485***	0.017***	0.471***	0.017***	2.862***	0.159**	2.226***	0.113**
	(0.129)	(0.006)	(0.128)	(0.006)	(1.083)	(0.065)	(0.783)	(0.045)
Nmb owners w/ industry experience	0.222***	0.003	0.222***	0.003	0.666***	0.025*	0.695***	0.027**
	(0.079)	(0.003)	(0.079)	(0.003)	(0.248)	(0.014)	(0.228)	(0.012)
Nmb TMT members w/ industry experience	-0.318	-0.011	-0.317	-0.011	-0.702	-0.002	-0.383	0.019
	(0.291)	(0.016)	(0.291)	(0.016)	(0.761)	(0.046)	(0.701)	(0.041)
Nmb board directors w/ industry experience	0.004	0.007	-0.010	0.007	0.824	0.074	0.306	0.037
	(0.278)	(0.014)	(0.278)	(0.014)	(0.860)	(0.054)	(0.640)	(0.039)
Ownership structure	0.598	0.009	0.588	0.009	2.053	0.050	2.394*	0.073
	(0.498)	(0.025)	(0.499)	(0.025)	(1.560)	(0.091)	(1.425)	(0.082)
Assets (cbrt)	-0.034	-0.004***	-0.035	-0.004***	-2.326***	-0.109***	-2.390***	-0.114***
	(0.063)	(0.001)	(0.063)	(0.001)	(0.226)	(0.016)	(0.208)	(0.015)
Equity (cbrt)	0.025	0.001	0.024	0.001	0.075	0.007	0.053	0.006
	(0.092)	(0.002)	(0.092)	(0.002)	(0.246)	(0.016)	(0.211)	(0.013)
Employment (cbrt)	1.340***	0.039***	1.337***	0.039***	2.316**	0.013	2.315**	0.012
	(0.256)	(0.010)	(0.256)	(0.010)	(1.036)	(0.053)	(0.968)	(0.045)
Sales (cbrt)	-0.016	-0.001	-0.016	-0.001	-0.023	-0.002	0.003	-0.000
	(0.040)	(0.001)	(0.040)	(0.001)	(0.132)	(0.007)	(0.129)	(0.006)
Constant	2.386***	0.545***	2.463***	0.545***				
	(0.632)	(0.029)	(0.637)	(0.030)				
Industry dummies	Yes	Yes	Yes	Yes				
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,011	10,011	10,011	10,011	6,937	6,937	6,937	6,937
Number of distinct ventures					2,354	2,354	2,354	2,354
R-squared	0.031	0.023	0.031	0.023				

*** p<0.01, ** p<0.05, * p<0.1

TABLE 9: Effect of number of interlocks on new venture's sales growth

	Results of OLS regressions				Results of second-stage regressions of panel models			
	Sales growth (abs, cbrt)	Sales growth (rel, cbrt)	Sales growth (abs, cbrt)	Sales growth (rel, cbrt)	Sales growth (abs, cbrt)	Sales growth (rel, cbrt)	Sales growth (abs, cbrt)	Sales growth (rel, cbrt)
Explanatory variables (*t-1*)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Number of interlocks	0.021	-0.000			-1.361	-0.124*		
	(0.036)	(0.002)			(1.245)	(0.070)		
Number of interlocks (log)			0.044	-0.003			-5.129	-0.471*
			(0.167)	(0.009)			(4.578)	(0.252)
TMT w/ grad. degree	0.832	-0.001	0.835	-0.001	-0.537	0.044	-0.728	0.027
	(0.532)	(0.032)	(0.532)	(0.032)	(2.581)	(0.133)	(2.458)	(0.113)
Owners w/ grad degree	-0.398	0.021	-0.397	0.021	-0.521	-0.016	-0.065	0.026
	(0.437)	(0.025)	(0.437)	(0.025)	(1.319)	(0.075)	(1.253)	(0.067)
Board directors w/ grad degree	-0.230	-0.020	-0.220	-0.020	0.642	0.089	-0.086	0.023
	(0.334)	(0.018)	(0.334)	(0.018)	(2.591)	(0.153)	(1.978)	(0.113)
Nmb board directors w/ board experience	0.311**	0.021***	0.319**	0.021***	1.269	0.099*	0.965	0.072*
	(0.127)	(0.007)	(0.126)	(0.007)	(1.014)	(0.058)	(0.749)	(0.041)
Nmb owners w/ industry experience	0.038	0.003	0.037	0.003	0.262	0.009	0.276	0.010
	(0.068)	(0.003)	(0.068)	(0.003)	(0.231)	(0.013)	(0.220)	(0.011)
Nmb TMT members w/ industry experience	0.435	-0.008	0.433	-0.008	0.550	-0.009	0.705	0.005
	(0.293)	(0.018)	(0.293)	(0.018)	(0.707)	(0.041)	(0.699)	(0.039)
Nmb board directors w/ industry experience	0.831***	0.041***	0.835***	0.041***	1.235	0.081*	0.986	0.058
	(0.290)	(0.014)	(0.290)	(0.014)	(0.801)	(0.047)	(0.659)	(0.037)
Ownership structure	-0.705	-0.051*	-0.694	-0.051*	-1.360	-0.023	-1.195	-0.008
	(0.497)	(0.028)	(0.497)	(0.028)	(1.417)	(0.078)	(1.378)	(0.073)
Assets (cbrt)	0.077***	0.004***	0.078***	0.004***	0.468***	0.032***	0.437***	0.029***
	(0.024)	(0.001)	(0.024)	(0.001)	(0.128)	(0.008)	(0.119)	(0.008)
Equity (cbrt)	-0.126**	-0.005**	-0.124**	-0.005**	0.127	0.005	0.117	0.005
	(0.052)	(0.002)	(0.052)	(0.002)	(0.273)	(0.010)	(0.258)	(0.008)
Employment (cbrt)	1.315***	0.063***	1.315***	0.063***	0.946	0.048	0.948	0.048
	(0.258)	(0.011)	(0.258)	(0.011)	(0.908)	(0.049)	(0.887)	(0.046)
Sales (cbrt)	-0.070**	-0.012***	-0.070**	-0.012***	-1.993***	-0.103***	-1.980***	-0.102***
	(0.031)	(0.001)	(0.031)	(0.001)	(0.133)	(0.008)	(0.132)	(0.007)
Constant	-14.189***	-0.910***	-14.214***	-0.911***				
	(0.627)	(0.031)	(0.634)	(0.031)				
Industry dummies	Yes	Yes	Yes	Yes				
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,011	10,011	10,011	10,011	6,937	6,937	6,937	6,937
Number of distinct ventures					2,354	2,354	2,354	2,354
R-squared	0.037	0.038	0.037	0.038				

*** p<0.01, ** p<0.05, * p<0.1

6. DISCUSSION

In the current study, I have investigated *the extent to which board interlocks affect new venture growth*. Boards are shown to predominantly manifest their resource provision function in new venture settings (Garg & Furr, 2017). Additionally, because board interlocks are often pictured as ways of alleviating a firm's dependence on the external environment (Hillman et al., 2009), their effect is expected to be more considerable because of the higher uncertainties and liabilities that new ventures face (Stinchcombe, 1965). Given ventures' lower organizational complexity (Daily & Dalton, 1992), I argue that interlocks' effect is notable on their growth outcomes. New ventures and their growth outcomes are highly heterogeneous and volatile, partially because of them experiencing different life stages—some of them not yet having any products to sell, others not having an established set of customers, and so forth. Hence, the systematic effect on these ventures should be inspected separately from established firms, both theoretically and empirically.

As descriptive statistics demonstrate, interlocking ventures have bigger boards, as well as more top managers, board directors, and owners with high levels of human capital. These features indicate that interlocking ventures are better equipped for growth. Once again, this nourishes the argument that receiving an interlock can be a symptom of the venture characteristics that are also responsible for growth. This emphasizes the necessity to disentangle the selection effect of interlocks from their treatment effect.

After implementing CEM and estimating OLS regressions, the results suggest that acquiring interlocks provides an edge for new ventures in terms of equity, assets, and sales growth. The ventures that received an interlock for the first time have significantly higher absolute growth in sales compared with ventures that have never received an interlock—something I did not

find in the outcomes of the comparison between the general population of interlocking ventures and noninterlocking ones. A supplementary analysis demonstrates that those ventures that became noninterlocking do not experience a systematic disadvantage in terms of growth compared with interlocking ventures that retain their interlocks. These observations lead to the idea that the advantage of getting an interlock is there for the immediate effect, and that their loss does not remove the benefits brought to the venture. It can also be so that the previously interlocking director stops serving at other boards, therefore his/her knowledge, social connections and reputation are still available to the focal venture.

However, what is particularly surprising is the high statistical significance and low economic significance—effect size—of getting an interlock. One explanation of this observation can be that interlocking directors cannot necessarily bring certain benefits that non-interlocking board directors can actually do. Such can be the undivided attention of noninterlocking directors, their deeper immersion into the venture's challenges, and potentially more efforts to establish themselves as board directors.

As for the number of interlocks, the efforts to untangle the selection effect from the treatment effect resulted in interesting evidence. Once the estimation includes firm-specific time-invariant factors and after utilizing instruments, the magnitude of the effect is amplified when it comes to equity growth. The exact opposite is observed in the case of asset and sales growth, where no significant effect turns to a negative effect after alleviating the endogeneity. The latter can be explained by the positive selection effect being *removed* from the systematic effect. Taken together, when the number of interlocks increases, equity growth shows a tendency to increase, while asset and sales growth, unexpectedly, tend to decrease. For one thing, these patterns together can indicate that interlocks may help minimize the venture's dependence on loans and payables.

I propose that similar to the reasons for why interlocks are formed (Mizruchi, 1996), the effect that they have on firm performance can stem from several classes of explanations—dyad level, firm level, and individual level—and research should account for these to offer an interpretation of the results. On the dyad and firm levels, there can be factors, such as the characteristics, intentions, power, and resourcefulness, of the firms in the interlock (Zona et al., 2018). On the individual level, the interlocking directors' incentives, characteristics, career prospects, and power can be in play (Mizruchi, 1996). Because there is evidence of the negative effect that the number of interlocks have on venture growth (asset and sales), a question that arises is *when* the dark side of interlocks reveals itself in the case of new ventures. One possible explanation can be that the alter-firm is extracting value from the new venture by exercising power over a dependent entity (Feldman, 2016). On the director-level and firm-level, a negative reputation of a director can have a detrimental effect on the venture (Croci & Grassi, 2014); however, is this a rule or more of an exception in the case of new ventures?

I consider that one particularly important question to ask and answer is whether the number of interlocks comes from many interlocking directors or a few who hold several board seats each. In other words, are we observing that the ventures are dependent on "busy" directors who are pictured as controversial in their effect on firm performance (Lamb & Roundy, 2016)? Aspects that are more benign can also be relevant; if the board director has several directorships, it is likely that not *all* of their firms can get the theorized bundle of resources. This feeds not only the findings of reduced growth accompanied by increasing number of interlocks, but also the observed small effect size of getting an interlock. After all, there is more to interlocks than just their number, and a look behind this number and into who those interlocking board directors are can have the potential to provide richer answers.

The present paper contributes to strategic entrepreneurship and corporate governance literature. From the strategic entrepreneurship literature perspective, board interlocks were understudied. However, they are relevant to study because interlocking directors can be perceived as productive and quality board members; hence, they may be more in demand. In addition, interlocks are widespread among ventures getting venture capital (VC) funding and that also appoint board directors of their own. Considerations of interlocking directors can help entrepreneurs be conscious about the composition of their boards when inviting board directors. From the perspective of the corporate governance literature, the paper introduces venture setting as a boundary for the interlock–firm relationship—aspect which so far lacks thorough exploration (Lamb & Roundy, 2016).

The current paper's theorization proceeded by bringing the bundle of mechanisms behind interlocks to the domain of ventures, synthesizing and adapting specific traits of interlocks (on top of more general board functions) to new ventures' specificities. Empirically, the present study overcomes the constraints present in the research on the interlock–firm performance relationship. So far, research has normally conducted analyses on small samples of up to a couple of hundred observations (Boyd, 1990; Blanco-Alcántara et al., 2018; Hamdan, 2018; Haniffa & Hudaib, 2006; Kor & Sundaramurthy, 2009; Non & Franses, 2007; Pérez-Calero et al., 2016; Sewpersadh, 2020; Zona et al., 2018) comprised of mainly listed firms (Boyd, 1990; Blanco-Alcántara et al., 2018; Croci & Grassi, 2014; Hamdan, 2018; Haniffa & Hudaib, 2006; Kor & Sundaramurthy, 2009; Martin et al., 2013; Omer et al, 2014; Pérez-Calero et al., 2016; Santos et al., 2012; Zona et al., 2018) in specific industries (Kor & Sundaramurthy, 2009; Martin et al., 2013; Song et al., 2021; Zona et al., 2018), presumably because of data availability. Enabled by Norwegian registry data, the current study relies on the *population* of new ventures—both private and listed entities—and the analyses proceed with a longitudinal

research design across many industries. In addition, the empirical contribution is related to an estimation strategy aimed at mitigating the endogeneity typical of board–firm performance relationships (Larcker et al., 2013; Omer et al., 2014; Smith & Sarabi, 2020). Here, I introduce a logic of instrumental variables that is applicable to the interlock–firm performance relationship in general; to the best of my knowledge, this has not been presented so far.[18]

The current study is not without its limitations. In terms of empirics, the testing of H1 proceeded without a 2SLS estimation because the respective set of instrumental variables and their combinations turned out to be weak—they did not comply with the required endogeneity test—so 2SLS estimates were not consistent (Wooldridge, 2016). Further, the current research empirically looks at an interlock as a bundle of mechanisms and at their combined effect; thus, it does not tap into the specific mechanisms behind interlocks. The paper, however, conceptually discusses the mechanisms for future research to address. Furthermore, it would be fruitful to explore under which conditions interlocks are more salient—moderators, as we observe small effect size of getting an interlock, hence there are large differences of how different types of ventures and different types of interlocking directors align leading to respective outcomes. Another potential limitation of this study and prospect for future research can be reconsidering growth measures. The current ones tap into only part of the processes within a venture and are imperfect observables to study. Therefore, future research should address the possibility of having a set of more suitable performance indicators that more thoroughly capture venture performance.

---

[18] Upon request, I can provide my summary of the empirical strategies in interlock research for handling endogeneity.

REFERENCES

Adler, P. S., & Kwon, S. (2002). Social capital: Prospects for a new concept. *Academy of Management Review*, *27*(1), 17–40.

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *Leadership Quarterly*, *21*(6), 1086–1120.

Audretsch, D. B., & Lehmann, E. E. (2014). Corporate governance and entrepreneurial firms. *Foundations and Trends® in Entrepreneurship*, *10*(1–2), 1-160.

Beckert, J. (2010). Institutional isomorphism revisited: Convergence and divergence in institutional change. *Sociological Theory*, *28*(2), 150–166.

Beckman, C. M., & Haunschild, P. R. (2002). Network learning: The effects of partners' heterogeneity of experience on corporate acquisitions. *Administrative Science Quarterly*, *47*(1), 92–124.

Blackwell, M., Iacus, S., King, G., & Porro, G. (2009). Cem: Coarsened exact matching in Stata. *Stata Journal*, *9*(4), 524–546.

Blanco-Alcántara, D., Díez-Esteban, J. M., & Romero-Merino, M. E. (2018). Board networks as a source of intellectual capital for companies. *Management Decision*, *57*(10), 2653–2671.

Boyd, B. (1990). Corporate linkages and organizational environment : A test of the resource dependence model. *Strategic Management Journal*, *11*(6), 419–430.

Burt, R. S. (1980). Cooptive corporate actor networks: A reconsideration of interlocking directorates involving American manufacturing. *Administrative Science Quarterly*, 557–582.

Cai, Y., & Sevilir, M. (2012). Board connections and M&A transactions. *Journal of Financial Economics*, *103*(2), 327–349.

Carpenter, M. A., & Westphal, J. D. (2001). The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making. *Academy of Management Journal*, *44*(4), 639–660.

Certo, S. T. (2003). Influencing initial public offering investors with prestige: Signaling with board structures. *Academy of Management Review, 28*(3), 432–446.

Chen, P. L., Kor, Y., Mahoney, J. T., & Tan, D. (2017). Pre-market entry experience and post-market entry learning of the board of directors: Implications for post-entry performance. *Strategic Entrepreneurship Journal*, *11*(4), 441–463.

Clougherty, J. A., Duso, T., & Muck, J. (2016). Correcting for self-selection based endogeneity in management research: Review, recommendations and simulations. *Organizational Research Methods*, *19*(2), 286–347.

Cox, N. (2011). Cube roots. *The Stata Journal*, *11*(1), 149–154.

Croci, E., & Grassi, R. (2014). The economic effect of interlocking directorates in Italy: New evidence using centrality measures. *Computational and Mathematical Organization Theory*, *20*(1), 89–112.

Daily, C. M., McDougall, P. P., Covin, J. G., & Dalton, D. R. (2002). Governance and strategic leadership in entrepreneurial firms. *Journal of Management*, *28*, 387–412.

Daily, C. M., & Dalton, D. R. (1992). The relationship between governance structure and corporate performance in entrepreneurial firms. *Journal of Business Venturing*, *7*(5), 375–386.

Davis, G. F. (1991). Agents without principles? The spread. *Administrative Science Quarterly*, *36*(4), 583–613.

Davis, G. F., & Cobb, A. J. (2010). Chapter 2 Resource dependence theory: Past and future. In *Stanford's organization theory renaissance, 1970–2000* (pp. 21–42). Emerald Group Publishing Limited.

Delmar, F., Davidsson, P., & Gartner, W. B. (2003). Arriving at the high-growth firm. *Journal of Business Venturing*, *18*(2), 189–216.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, *48*(2), 147–160.

Eisenhardt, K. M., & Schoonhoven, C. B. (1990). Organizational growth: Linking founding team, strategy, environment, and growth among US semiconductor ventures, 1978-1988. *Administrative Science Quarterly*, *35*(3), 504–529.

Feldman, E. R. (2016). Dual directors and the governance of corporate spinoffs. *Academy of Management Journal*, *59*(5), 1754–1776.

Fich, E. M., & White, L. J. (2005). Why do CEOs reciprocally sit on each other's boards? *Journal of Corporate Finance*, *11*(1-2), 175–195.

Fligstein, N., & Brantley, P. (1992). Bank control, owner control, or organizational dynamics: Who controls the large modern corporation? *American Journal of Sociology*, *98*(2), 280–307.

Forbes, D. P., & Milliken, F. J. (1999). Cognition and corporate governance: Understanding boards of directors as strategic decision-making groups. *Academy of Management Review*, *24*(3), 489–505.

Foss, N. J., Klein, P. G., Lien, L. B., Zellweger, T., & Zenger, T. (2020). Ownership competence. *Strategic Management Journal*. https://doi.org/10.1002/smj.3222

Garg, S. (2013). Venture boards: Distinctive monitoring and implications for firm performance. *Academy of Management Review*, *38*(1), 90–108.

Garg, S., & Furr, N. (2017). Venture boards: Past insights, future directions, and transition to public firm boards. *Strategic Entrepreneurship Journal*, *11*(3), 326-343.

Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative Science Quarterly*, 750–783.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, *91*(3), 481–510.

Hamdan, A. (2018). Board interlocking and firm performance: the role of foreign ownership in Saudi Arabia. *International Journal of Managerial Finance*, *14*(3), 266–281.

Haniffa, R., & Hudaib, M. (2006). Corporate governance structure and performance of Malaysian listed companies. *Journal of Business Finance & Accounting*, *33*(7-8), 1034–1062.

Harris, I. C., & Shimizu, K. (2004). Too busy to serve? An examination of the influence of overboarded directors. *Journal of Management Studies*, *41*(5), 775–798.

Haunschild, P. R., & Beckman, C. M. (1998). When do interlocks matter? Alternate sources of information and interlock influence. *Administrative Science Quarterly*, 815–844.

Higgins, M. C., & Gulati, R. (2003). Getting off to a good start: The effects of upper echelon affiliations on underwriter prestige. *Organization Science*, *14*(3), 244–263.

Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource dependence theory: A review. *Journal of Management*, *35*(6), 1404–1427.

Horton, J., Millo, Y., & Serafeim, G. (2012). Resources or power? Implications of social networks on compensation and firm performance. *Journal of Business Finance and Accounting*, *39*(3–4), 399–426.

Kim, Y., & Cannella, A. A. (2008). Toward a social capital theory of director selection. *Corporate Governance: An International Review*, *16*(4), 282–293.

Kor, Y. Y., & Misangyi, V. F. (2008). Outside directors' industry-specific experience and firms' liability of newness. *Strategic Management Journal*, *29*(12), 1345–1355.

Kor, Y. Y., & Sundaramurthy, C. (2009). Experience-based human capital and social capital of outside directors. *Journal of Management*, *35*(4), 981–1006.

Kroll, M., Walters, B. A., & Le, S. A. (2007). The impact of board composition and top management team ownership structure on post-IPO performance in young entrepreneurial firms. *Academy of Management Journal*, *50*(5), 1198-1216.

Lamb, N. H., & Roundy, P. (2016). The "ties that bind" board interlocks research: A systematic review. *Management Research Review*, *39*(11), 1516–1542.

Larcker, D. F., So, E. C., & Wang, C. C. Y. (2013). Boardroom centrality and firm performance. *Journal of Accounting and Economics*, *55*(2–3), 225–250.

Li, H., Terjesen, S., & Umans, T. (2020). Corporate governance in entrepreneurial firms: A systematic review and research agenda. *Small Business Economics*, *54*(1), 43-74.

Lynall, M. D., Golden, B. R., & Hillman, A. J. (2003). Board composition from adolescence to maturity: A multitheoretic view. *Academy of Management Review*, *28*(3), 416–431.

Martin, G., Gozubuyuk, R., & Becerra, M. (2013). Interlocks and firm performance: The role of uncertainty in the directorate interlock-performance relationship. *Strategic Management Journal*, *36*(2), 235–253.

Mizruchi, M. S. (1996). What do interlocks do? An analysis, critique, and assessment of research on interlocking directorates. *Annual Review of Sociology*, *22*(1), 271–298.

Neville, M. (2011). The role of boards in small and medium sized firms. *Corporate Governance: The International Journal of Business in Society*, *11*(5), 527–540.

Non, Mariëlle C.; Franses, Philip Hans (2007) : Interlocking Boards and Firm Performance: Evidence from a New Panel Database, Tinbergen Institute Discussion Paper, No. 07-034/2, Tinbergen Institute, Amsterdam and Rotterdam. Available at: http://hdl.handle.net/10419/86269

Omer, T. C., Shelley, M. K., & Tice, F. M. (2014). Do well-connected directors affect firm value?. *Journal of Applied Finance (Formerly Financial Practice and Education)*, *24*(2), 17–32.

Pearce, J. A., & Zahra, S. A. (1991). The relative power of CEOs and boards of directors: Associations with corporate performance. *Strategic Management Journal*, *12*(2), 135–153.

Pérez-Calero, L., Villegas, M. del M., & Barroso, C. (2016). A framework for board capital. *Corporate Governance (Bingley)*, *16*(3), 452–475.

Pfeffer, J. (1972). Size and composition of corporate boards of directors: The organization and its environment. *Administrative Science Quarterly*, *17*(2), 218–228.

Pfeffer, J. (1983). Organizational demography. *Research in Organizational Behavior*, *5,* 299–357

Rocha, V., Van Praag, M., Folta, T. B., & Carneiro, A. (2019). Endogeneity in strategy-performance analysis: An application to initial human capital strategy and new venture performance. *Organizational Research Methods*, *22*(3), 740–764.

Romanelli, E. (1989). Environments and strategies of organization start-up: Effects on Early Survival. *Administrative Science Quarterly*, *34*(3).

Santos, R. L., da Silveira, A. D. M., & Barros, L. A. (2012). Board interlocking in Brazil: Directors' participation in multiple companies and its effect on firm value and profitability. *Latin American Business Review*, *13*(1), 1–28.

Sewpersadh, N. S. (2020). Governing board attributes as profitability influencers under endogeneity: An econometric analysis in South Africa. *ACRN Journal of Finance and Risk Perspectives*, *8*(1), 133–151.

Smith, M., & Sarabi, Y. (2020). "What do interlocks do" revisited – a bibliometric analysis. *Management Research Review*. https://doi.org/10.1108/MRR-05-2020-0258

Song, H. J., Lee, S., & Kang, K. H. (2021). The influence of board interlocks on firm performance: In the context of geographic diversification in the restaurant industry. *Tourism Management*, *83*, 104238.

Statistics Norway. (2001). *Classification of economic regions*. https://www.ssb.no/a/english/publikasjoner/pdf/nos_c634_en/nos_c634_en.pdf

Stinchcombe, A. L. (1965). Organizations and social structure. *Handbook of Organizations*, *44*(2), 142–193.

Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical Science*, *25*(1), 1–21.

Useem, M. (1984). *The inner circle: Large corporations and business politics in the US and UK*. New York: Oxford University Press.

Vandenbroucke, E., Knockaert, M., & Ucbasaran, D. (2016). Outside board human capital and early stage high-tech firm performance. *Entrepreneurship: Theory and Practice*, *40*(4), 759–779.

Wooldridge, J. M. (2016). *Introductory econometrics: A modern approach*. Nelson Education.

Zahra, S. A., & Pearce, J. A. (1989). Boards of directors and corporate financial performance: A review and integrative model. *Journal of Management*, *15*(2), 291–334.

Zimmerman, M. A., & Zeitz, G. J. (2002). Beyond survival: Achieving new venture growth by building legitimacy. *Academy of Management Review*, *27*(3), 414–431.

Zona, F., Gomez-Mejia, L. R., & Withers, M. C. (2018). Board interlocks and firm performance: Toward a combined agency–resource dependence perspective. *Journal of Management*, *44*(2), 589–618.

APPENDIX 1: Estimation of the change in growth in case of cube-rooted dependent variable

The dependent variables in this study are cube-rooted, instead of the more common

alternative of log-transformation. While the standard interpretation of a regression parameter

β is that a unit change in the independent variable (e.g. x) results in β change in the dependent

variable, in this study the cube root of the growth variables are predicted by the regression.

Therefore, this cube-root transformation necessitates taking additional steps to arrive at the

change in growth variables rather than in transformed dependent variables. To undo the cube

root transformation, there is a need to raise both the dependent variable and explanatory

variables to the power of three. The function explaining the change in growth is expected to

be expressed through β and x, and as the function is not linear – at different values of x, the

one unit of change will affect the growth variable (g) disproportionately. When x increases by

1, the "new" growth variable (g_{new}) can be expressed as: $g_{new} = \left(\beta(x+1)\right)^3$, and the "old"

growth variable as: $g_{old} = (\beta x)^3$. Therefore, the change in g will be as: $\left(\beta(x+1)\right)^3 -$

$(\beta x)^3$. After simplifying, the expression takes the following form:

$$\Delta g = \beta^3(3x(x+1)+1) \qquad\qquad (1)$$

When the independent variable is also transformed (e.g. logged) with the purpose to test for a

different functional form, the change in g can be expressed by the principle of the above

function only substituting x with lnx:

$$\Delta g = \beta^3(3lnx(lnx+1)+1) \qquad\qquad (2)$$

With the same principle, the effect of a unit change in the cube-rooted independent variable

on g will be defined by the following function:

$$\Delta g = \beta^3\left(3\sqrt[3]{x}\left(\sqrt[3]{x}+1\right)+1\right) \qquad\qquad (3)$$

APPENDIX 2: Visualization of the main findings of the most advanced models
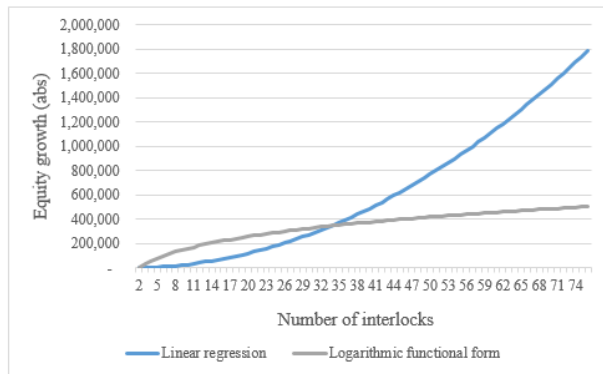

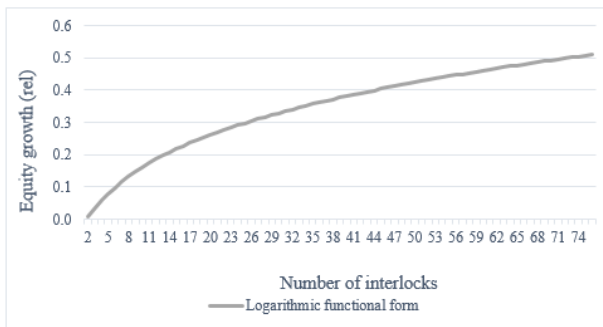**FIGURE 2:** The effect of number of interlocks on equity growth (absolute)

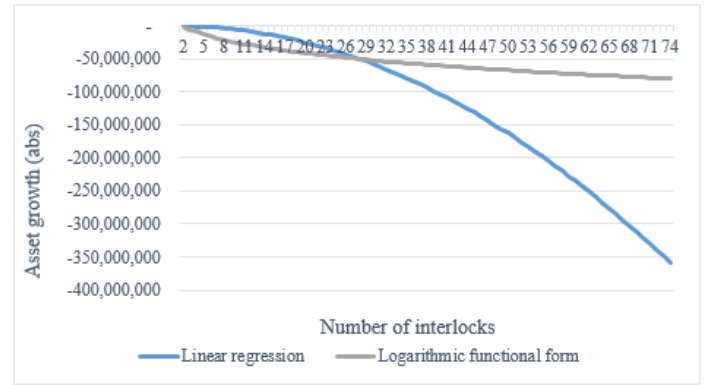**FIGURE 3**: The effect of number of interlocks on equity growth (relative)

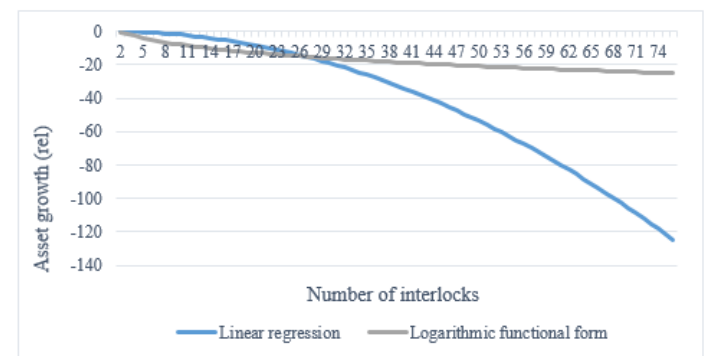**FIGURE 4:** The effect of number of interlocks on asset growth (absolute)

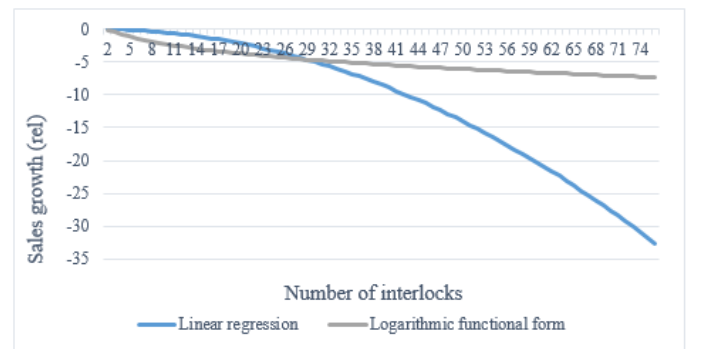**FIGURE 5**: The effect of number of interlocks on asset growth (relative)

FIGURE 6: The effect of number of interlocks on sales growth (relative)

43

ARTICLE 3

The Odd One Out? A Portfolio Perspective on Board Director Exit

Tatevik Harutyunyan

NHH Norwegian School of Economics

Department of Strategy and Management

Tatevik.Harutyunyan@nhh.no

Bram Timmermans

NHH Norwegian School of Economics

Department of Strategy and Management

Bram.Timmermans@nhh.no

Lasse B. Lien

NHH Norwegian School of Economics

Department of Strategy and Management

Lasse.Lien@nhh.no

ABSTRACT

Board research explains board director exit in terms of director-specific characteristics, the compositional characteristics of the board in question, and firm-level drivers and events. At first glance, this may seem to exhaust the categories to which any explanatory mechanism could possibly belong, but directors who hold multiple directorships adds a potential portfolio-level effect. Currently, we have hardly any knowledge of these portfolio effects. Therefore, the present paper investigates the extent to which dissimilarity within a director's portfolio of firms is associated with the likelihood of exit. The results from our analysis of 7,473 individuals acting as directors in 19,462 Norwegian firms support the existence of a portfolio effect. The more diverse the director's portfolio, the more likely that the director will exit at least one of their firms. After investigating which firm that will more likely to be, we found that the more dissimilar a given firm is relative to the rest of the director's portfolio, the higher the probability that the director will exit. However, if the director has prior experience with diverse portfolios, the positive association between dissimilarity and probability of exit weakens, indicating that generalist skills can to some extent be learned and are to some extent demanded. We contribute to the corporate governance literature by demonstrating that portfolio effects are important determinants of director exit, incorporating a broad spectrum of portfolio characteristics, and identifying patterns of learning in the director's prior portfolio that may influence current directorship decisions.

Keywords:

board of directors, director exit, portfolio, diversity, dissimilarity

1. INTRODUCTION

Boards and their directors are potentially critical in shaping firm outcomes. Accordingly, both director selection and director exit have received considerable scholarly attention. Director exit is often studied in the light of past or expected dramatic adverse events (e.g., fraud, financial restatement, [expected] bankruptcy, and organizational crisis) and poor performance more generally (Arthaud-Day et al., 2006; Asthana & Balsam, 2010; Daily & Dalton, 1995; D'Onza & Rigolini, 2017; Marcel & Cowen, 2014; Withers, Corley, & Hillman, 2012). Typically, director exit is seen as driven by a combination of director-specific factors (Boivie et al., 2012; Main & Gregory-Smith, 2018; Renneboog & Zhao, 2011; Withers, Corley, & Hillman, 2012), characteristics at the board level (D'Onza & Rigolini, 2017; Garg et al., 2018; Souther, 2018), firm-level drivers and events (Eriksson et al., 2001; González et al., 2019), and issues at the interface between different corporate governance entities (Balachandran et al., 2019; Garg et al., 2018; Zhu & Shen, 2016). Taken as a whole, this research has generated important and valuable insights into the determinants of director exit.

When a director holds multiple directorships (i.e., a portfolio of firms), this adds portfolio-level considerations to the discussion. However, only an extremely limited amount of research has come close to recognizing and incorporating any portfolio effects. In this study, the portfolio perspective indicates that not only the absolute but also the relative firm characteristics within the portfolio may matter for understanding *which* firms the focal director will exit (Masulis & Mobbs, 2014; Ormazabal, 2018). In other words, the characteristics of each firm relative to the others in the same portfolio can inform us about decisions to exit a board, as well as the decision by a board to replace a given member. There is a potentially dual impact: on the director's relationship with—and approach to—the firms in their portfolio and on how each firm experiences the value of the director's service.

3

Fundamentally, this is because holding multiple directorships poses a challenge both for the director and for the firms they serve by placing constraints on the time and attention available for each firm/board and by adding to the cognitive complexity that the director faces in their role (Ferris et al., 2003). Therefore, there are opportunity costs associated with the allocation of the director's time and attention across the firms, so directors need to balance the demands of each directorship. The acknowledgement that not *all* directorships are equally demanding for a given individual raises questions about the similarity and dissimilarity of the focal firm compared to the other firms that the director in question serves (Boivie, 2016; Carpenter & Westphal, 2001). Therefore, the purpose of this paper is to investigate the extent to which dissimilarities across a director's portfolio are associated with the likelihood of director exit.

It seems reasonable to expect that when firms are similar, a director will be more likely to face similar decision processes and decision-making problems and be able to learn faster and process information more effectively (Boivie et al., 2016). This in turn should reduce workload pressure and increase the director's perception of having a useful role on the board. Conversely, a dissimilar firm would be more likely to add disproportionately to the director's workload and decrease the likelihood of feeling useful.

Moreover, the extent to which directors are able to manage their *busyness* and the demands of other directorships will presumably be reflected in their board work. Therefore, depending on the focal firm's dissimilarity to the other directorships, firms may experience different levels of contribution and involvement from a director (Ferris et al., 2003). Moreover, given that firms come in different shapes and sizes, their needs and preferences regarding contributions from board members will differ. The director's failure to adapt and align their role with the needs of a dissimilar firm may also lead to director exit.

A factor that may mitigate the positive association between dissimilarity and probability of exit is the director's experience with a diverse portfolio. Experience with a diverse portfolio may indicate that the director has learned to adapt and developed the necessary cognitive frames to meaningfully contribute. Moreover, some firms may feel that the contribution they need is that of a generalist. Such firms would be more inclined to want to hold on to a director with experience from a diverse set of firms.

For our empirical analysis of these issues, we employed longitudinal Norwegian registry data covering all Norwegian firms and residents. The registry dataset enabled the identification of all the directors and all the firms on whose boards they served, including the ability to track this over time. Based on the analysis of 18,541 director–year observations over 2007–2014, we found, in line with our predictions, that the more diverse the director's portfolio in terms of the firms' industry and size, the more likely it was that the director would exit at least one of their portfolio firms. A further analysis covered 67,513 director–firm–year observations for the period 2007–2014, and our findings partially supported our predictions regarding which firms were more likely to experience director exit. The more dissimilar the focal firm was to the other firms in a given director's portfolio in terms of age, industry, and asset size, the more likely that the director would exit its board. However, if the director had experience with diverse portfolios, the likelihood that a dissimilar firm would experience that director's exit diminished.

Our study contributes to corporate governance research. It introduces novel predictions regarding drivers of director exit, as well as suggests a moderator that existing research has not considered. We also examined a broader spectrum of dissimilarity characteristics (i.e., firm age, industry, and size), providing a more finely grained analysis by placing these characteristics on a continuum, whereas prior research has at best used simple binary approaches. Additionally, we incorporated and emphasized the two-sidedness of the event of

exit, acknowledging that director exit may be director-driven, firm-driven, or a combination of the two. The latter is in line with the emerging firm–director interdependence perspective, which suggests a mutual selection process between firms and board directors when their dependencies on each other match (Jiang et al., 2021). Furthermore, as noted above, most existing research focuses on dramatic adverse conditions as a precursor of director exit while ignoring more benign, less adverse cases (Boivie et al., 2012). The current study is more inclusive due to its consideration of benign exits in both the theorizing and the empirical analyses.

2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1. A portfolio perspective on director exit

While still understudied (Boivie et al., 2012; Larcker & Tayan, 2015), there is a research stream that sheds light on important aspects of director exit. The causes of director exit can be specific to the director, including their motivations, identity, and human and relational capital (Boivie et al., 2012; Main & Gregory-Smith, 2018; Renneboog & Zhao, 2011; Withers, Corley, & Hillman, 2012). A set of firm-level and board-level factors have also been found to be important, including the firm's performance and performance volatility, the firm's potential need to restore organizational legitimacy, the characteristics of various corporate governance bodies, the within-board hierarchy, the board's interactions with top management, interpersonal interactions within the board, and intra-board social ties (D'Onza & Rigolini, 2017; Eriksson et al., 2001; Garg et al., 2018; Souther, 2018; González et al., 2019; Zhu & Shen, 2016). Some of these factors are obviously related to each other, and the causes of exit may often be due to the interplay of several of them.

Predominantly, these drivers of exit have been studied in the context of major negative events, such as fraud, financial restatement, (expected) bankruptcy, and other instances of

organizational crisis (Arthaud-Day et al., 2006; Asthana & Balsam, 2010; Daily & Dalton, 1995; D'Onza & Rigolini, 2017; Li & Aguilera, 2008; Marcel & Cowen, 2014; Withers, Corley, & Hillman, 2012). Still, it is important to realize that most director exits occur during normal operating conditions and are due to less sensational factors. Consequently, the most common class of exits has received scant attention (Boivie et al., 2012; Larcker & Tayan, 2015). So far, only two studies have recognized and incorporated the importance of portfolio-level considerations for understanding *which* firms the focal director will exit. These studies found evidence that the focal director's largest firm (i.e., their most prestigious appointment; Masulis & Mobbs, 2014) was the one least likely to be exited. Conversely, the firm with the most volatile stock returns (i.e., the director's riskiest firm; Ormazabal, 2018) was the one most likely to be exited. In both these studies, the director is pictured as the main decision maker behind the exits. The overall argument is that directors are driven by reputational risks and rewards, and firms are seen as sources of such reputational outcomes. In other words, the relative characteristics of firms within a portfolio shape the relative risks and rewards for the directors' reputations, which, in turn, inform their decisions regarding exit (Masulis & Mobbs, 2014; Ormazabal, 2018).

In addition to these heterogeneous reputational incentives, there are other relative firm characteristics that can affect director exit. Here, we argue that the director's *busyness* is not necessarily an equally sized hurdle across *all* firms in a portfolio; rather, specific relative characteristics will predict how much *busyness* a given firm adds to a given director's portfolio, ultimately to an increase in the likelihood of the director's exit. In line with this argument, we examined a selection of the relative characteristics of all the firms in a director's portfolio, placing the firms along a continuum. This provided more nuanced and richer insights than a focus on whether a firm was the largest or riskiest unit in the portfolio. To counterbalance the fact that the underlying mechanisms leading to exit were unobserved in

this study, which is one of the challenges faced in the research on director exit, we incorporated the perspectives of firms hosting directors with multiple directorships, as well as the perspectives of board directors themselves. Director exit can be the decision of either party—or a combination of the two. Embracing the two-sidedness of exit gives room to theoretically explore whether we should expect the same directional influence on the probability of director exit from both the firm's and the director's perspectives.

2.2. Portfolio diversity and director exit

The time required for board work has increased in recent years (Boivie et al., 2012). In the case of multiple board directorships, there are opportunity costs associated with the allocation of board directors' time and attention across the firms. The consequences of these opportunity costs can extend to the firms that board directors serve (Ferris et al., 2003; Field et al., 2013). This implies that directors sitting on multiple boards should be able to navigate their *busyness*. The workload pressure of having multiple commitments often turns intrinsic motivations into extrinsic motivations, leading to lower creativity and less time devoted voluntarily to the task (Boivie et al., 2012; Deci et al., 1999). Busyness is presumably an important reason why directors decline new board appointments and discontinue their service at current ones (Boivie et al., 2012).

To be effective at the focal firm, the director needs to have a high level of understanding of the firm and its environment. This understanding in turn requires acquisition and effective processing of relevant information (Boivie et al., 2016). This leads to our first hypothesis, which will set the foundation for the second one:

> **Hypothesis 1 (H1):** *The more diverse the director's portfolio, the more probable it is that the director will exit one of their firms.*

2.3. Dissimilarity among portfolio firms and director exit

The previous discussion begs the question of *which* firm the director is more likely to exit. The fact that not *all* directorships are equally demanding leads naturally to a discussion of the similarities and dissimilarities of the focal firm with respect to the other firms that the director serves (Boivie et al., 2016; Carpenter & Westphal, 2001). When firms are similar, the director is able to process information in a more efficient manner and guide the firm in similar decision-making processes. This, in turn, reduces the cognitive burden that the director experiences (Boivie et al., 2016; Khanna et al., 2014). It can also affect directors' perceptions of how much they can contribute to the firm (Carpenter & Westphal, 2001). Their perceptions of not having a useful role in the firm were found to be one of the reasons why they rejected offers of directorships (Lorsch & MacIver, 1989). This strongly suggests that perceptions of not having a useful role can also lead directors to exit a dissimilar firm.

In summary, dissimilarity within a director's portfolio involves a larger commitment in terms of time, attention, and adaptation to the dissimilar firms and their respective challenges. Conversely, similarity across firms within a director's portfolio can foster the director's productivity and ease their time management.

The role of a board ranges from monitoring the firm and mitigating executive opportunism (Zahra & Pearce, 1989) to providing resources (i.e., their knowledge, skills, and other resources through their social ties), enhancing the legitimacy of the firm (Pfeffer & Salancik, 1978; Hillman et al., 2000), and shaping its strategic direction (Zahra & Pearce, 1989). As strategic decision makers, directors can influence organizational outcomes; hence, the *level, quality*, and *type* of their input can potentially matter a great deal. If a director has multiple directorships, we may question whether they will be sufficiently involved and present in the strategic decision-making processes of a firm that is dissimilar to the others in their portfolio.

It is also questionable whether their input quality will be perceived as high by a dissimilar firm.

While firms are the recipients of a board director's service, this does not make them passive actors in determining who should serve on their boards and who should exit them. When taking a portfolio perspective, the more obvious focus is on the director's portfolio management. However, director exit can also be initiated by the firm or by mutual agreement (D'Onza & Rigolini, 2017; Marcel & Cowen, 2014). The extent to which directors are able to manage their busyness and balance the demands with their other directorships will likely be reflected in their board work. Dissimilarity increases the odds that the firm will experience lower contribution and involvement from a director (Ferris et al., 2003), which in turn makes it more likely that the firm will seek a replacement.

Firms come in different shapes and sizes, and their needs and preferences for board directors are, accordingly, different. This can have implications for both director selection and director exit (Withers, Hillman, & Cannella, 2012). The governance of each firm requires a certain level of adaptation and alignment of directors' roles to the needs of the firm. In other words, the extent and type of the board's contribution can differ depending on the characteristics of the firm. In particular, as emphasized by a number of governance scholars (Dalton et al., 1998; Zahra & Pearce, 1989), larger firm size implies higher organizational complexity and various vested interests. The challenges that this poses for the board and its directors are different from those of smaller firms. Firm size affects both the resource provisional and monitoring functions of a board director. Because of the higher number of interfaces between a larger firm and its environment, the scope of action and advice that a board director can provide narrows. Consequently, there may be hindrances and hurdles to obtaining high-quality information and a good information flow. Some scholars have even argued that it is

easier for a board to exercise both its resource provisional and monitoring functions in smaller firms and that boards therefore have more influence in smaller firms (Dalton et al., 1998).

Firm age is another characteristic that we incorporate as a dimension of firm dissimilarity. Some aspects of a board's role can be more salient than others, depending on the firm's age. Notably, research has underlined that for newer or younger firms, the resource provisional role of boards and directors is more relevant (Garg & Furr, 2017; Kroll et al., 2007; Neville, 2011) than their monitoring function. This is due to younger firms' inherent uncertainty and their more acute need for resources and counsel. Additionally, due to a better alignment of interests in these firms, agency problems and agency issues play a lesser role (Audretsch & Lehmann, 2014).

Industry characteristics will also affect a firm's needs. The extent to which the focal firm is able to respond, adapt, and meet these needs can shape organizational outcomes (Martin et al., 2013). Since board directors are often pictured as boundary spanners who bridge the firm and its environment (Hillman et al., 2009), the role that a director performs is likely to be shaped by the industry in which the firm operates. Thus, the navigation of firm needs can vary substantially, depending on the characteristics of the firm's industry.

Firms differ from each other, but a firm also differs from its past self. As firms grow up and transition to other life cycle stages, they experience changes in their size and strategy. Such changes can lead to changes in firms' complexity, in the type of uncertainty they face and in their needs for resources, monitoring, and strategy formation (Lynall et al., 2003; Withers, Hillman, & Cannella, 2012). Thus, the focal firm's initial fit with a focal director may weaken over time. At the portfolio level, firms can, over time, *become* dissimilar to other firms in the same director's portfolio. This implies changing demands with respect to their boards and board members (Lynall et al., 2003; Withers, Hillman, & Cannella, 2012; Zahra & Pearce,

1989), resulting in either additional adaptation costs for the director or removal of the director due to the decreasing relevance of their input.

Taken together, the *dissimilarity of the firms* in the portfolio will affect the probability of director exit. The director may find it less attractive to remain on the board of a dissimilar firm, and a dissimilar firm may find it less attractive to retain the services of a director.

> **Hypothesis 2 (H2):** *The more dissimilar a firm from the rest of the director's portfolio firms, the more likely that the director will exit that firm.*

2.4. The director's experience with diverse portfolios

Serving at a firm that is dissimilar to other firms in the portfolio can introduce learning costs and a larger time commitment for the director. However, we argue that once the director has adapted and learned to manage this diversity, the effect of dissimilarity will be mitigated. Put differently, being exposed to diverse portfolios over time helps the director develop mental frameworks, points of reference, and skills to manage their busyness and adapt. This experience can change the director's perceptions of their ability to meaningfully contribute, as well as increase this ability. Furthermore, the director's experience with diverse portfolios can also indicate a preference for serving at dissimilar firms or that the director has skills that are transferable across different firms. Whichever mechanisms are captured by their experience with diverse portfolios, we argue that it will mitigate the likelihood of the director's exit from a dissimilar firm.

> **Hypothesis 3 (H3):** *The director's prior experience with diverse portfolios negatively moderates the positive relationship between the dissimilarity of firms and the director's probability of exiting the portfolio.*

3. DATA AND METHODS

3.1. Data

To test the hypotheses, we relied on detailed information from the Norwegian registry database. The universal character of the register allowed us to create a sample based on the entire population of firms and individuals in Norway, while the unique individual and firm identifiers allowed us to follow individuals and firms over time. For this study, we merged two datasets, taking the Norwegian board director dataset as the point of departure. This dataset includes individual identifiers for all Norwegian residents who were appointed as a board director in all types of organizations in Norway, including private, public, profit, and non-profit organizations, during the period 2004–2014. In addition to individual identifiers, the dataset contains unique firm-level identifiers, so we could identify the portfolios of firms for all board directors. The longitudinal character of the dataset allowed us to track individuals and firms over time; thus, we were able to subsequently identify changes in directors' portfolios. Based on the unique firm identifiers, we merged the board director dataset with the firm registry. This firm registry holds detailed information on all Norwegian firms, including financial indicators, date of establishment, industry, and geographic location, allowing us to construct the diversity and dissimilarity measures for firms within portfolios.

3.2. Sample

While we could observe all the directorships, when constructing our sample, we applied a number of restrictions regarding the characteristics of the board directors, the firms that were part of the portfolios, and the minimal size of the portfolios. First, we only included board directors with experience as a director for at least 3 years. The reason for this restriction was the need to track a director's (previous) portfolio characteristics to establish whether and to what extent this experience mattered for the turnover in the director's current portfolio.

Second, we added restrictions regarding the types of firms that were part of the directors' portfolios. We were only interested in identifying board directorships in private (and active) firms that were registered as limited corporations. Therefore, we excluded board directorships in public sector industries (e.g., education, healthcare, and public administration) as well as community services. In addition, we excluded board directorships in heavily regulated industries (e.g., agriculture and public utilities) and private enterprises that are often regarded as investment vehicles (e.g., real estate, holding structures, and financial intermediaries). To ensure that a director had a seat on the board of an active firm, we only included firms with a minimal level of economic activity. This minimal activity requirement was a sales level of at least 500,000 Norwegian crowns (NOK)[19] or having at least one employee and paying at least 500,000 NOK in salaries. Finally, since we were studying *busy* board directors, we imposed a cutoff in the number of directorships in the portfolios in year *t-1*. This minimal size requirement was set at three directorships (Cashman et al., 2012). In addition to fitting our requirement for busyness, these minimal size requirements allowed us to construct meaningful dissimilarity measures for the portfolios.

Based on these restrictions, the final sample comprised board directors with at least 3 years of prior board experience in active private firms in the period 2007–2014, who also had three or more active firms in their portfolio in the year preceding the event of interest—the director's exit. This left us with a final sample of 7,737 individuals who acted as board directors for 19,462 firms. When linking board directors to firms over all the years we observed them, we identified 109,125 director–firm–year observations.[20] This dataset was the point of departure

---

[19] Over the period 2004–2014, the daily exchange rate fluctuated between 4.56 NOK/USD and 7.49 NOK/USD. On average, over the period, 500,000 NOK equaled 82,063 USD.

[20] Due to multiple instances of missing values at individual and firm levels (including demographic characteristics used in the estimation of multiple variables), many of these observations were eliminated during the regression analyses. Therefore, the sample size differed from model to model.

for the construction of two datasets: one with director–year observations, where H1 was

tested, and the second with director–firm–year observations, where H2 and H3 were tested.

3.3. Variables

The *dependent variable* in our analysis was the event where a board director *exited* a firm that

was part of their portfolio. The exit of a director was marked with the value *one* if the director

had a directorship in a given firm in year *t-1* but was no longer part of the firm's board in year

t. Otherwise, the exit variable took the value *zero*. One of the events that perfectly explained

why a director exited a firm was bankruptcy, which affected 173 firms in our sample. By

design, bankrupt firms were automatically excluded from our sample when we conducted our

analysis.[21]

Our *independent variables* were based on four sets of characteristics of the firms in the

portfolios: firm age, industry affiliation, size measured by assets, and size measured by

number of employees. For our measure of firm age, we placed firms into three categories: 5

years or younger, between 6 and 10 years, and 11 years or older. For our variable of industry

affiliation, we relied on the NACE (i.e.Nomenclature statistique des activités économiques

dans la Communauté européenne) three-digit industry codes. To estimate firm size by assets

and number of employees in the firm, we constructed categorical variables for asset and

employee size based on quartiles of the respective original variables.

To test our first hypothesis (H1), we created measures for portfolio diversity in terms of firm

age (D_{age}), industry (D_{ind}), asset size ($D_{sizeasset}$), and employment size ($D_{sizeempl}$), utilizing the

Blau diversity index (Blau, 1977):

---

[21] Descriptive examination of the data showed a pattern whereby very few firms had a board director in the same year as or in the year(s) preceding the bankruptcy year. This suggested that firms dissolved their board at least formally before proclaiming the firm bankrupt or that directors tended to leave the boards of declining firms to preserve their reputation (Finkelstein et al., 2009). Thus, the respective variable was binary, taking the value of one if the focal firm's year of bankruptcy was in year *t-1*, *t*, or *t+1*.

$$D = 1 - \sum p_i{}^2,$$

where D is the degree of diversity and p_i is the proportion of observations in the *i*-th category. The minimum value of this index is reached when all the observations are in one category. The maximum value is not the same for every variable, as it depends on the number of different categories and the distribution of these categories. More categories and a more equal distribution of the categories included in the measure lead to a higher Blau index score.

To test H2, we constructed several measures of dissimilarity. By dissimilarity, we mean how different each firm in the portfolio was compared to the other firms in the portfolio based on the set of four firm characteristics indicated earlier. The dissimilarity variables were estimated as the proportion of firms in the same portfolio that were *dissimilar* to the focal firm (excluding the focal firm) in terms of the given characteristics of the portfolio firms . In constructing this measure, we relied on director–firm–year observations.

We followed several steps to construct our *moderator* variable to test H3. As a first step, we used the Blau diversity index to measure directors' portfolio diversity based on the four firm-level characteristics for the previous 3 years. As a second step, we averaged the separate diversity scores for each director's portfolio over the last 3 years (years *t-3*, *t-2*, and *t-1*). Third, we aggregated these diversity constructs into an overall measure of *experience with diverse portfolios.* Thus, this measure was estimated as the sum of the average diversity indices over the past 3 years across the four criteria. The purpose was to arrive at a variable that could capture the directors' experiences with complex portfolios accommodating multiple forms of diversity.

We also constructed a set of *control variables*, including multiple firm and board director characteristics that have been demonstrated by previous research to affect director exit. First, we included measures for the board characteristics of the focal firm. One such measure was

board size, which we measured based on the number of board directors in the focal firm. Through this measure, we accounted for possible disagreements within the boardroom and heterogeneity of intentions, as well as simply, bigger boards inferring higher probability of any member's exit (Acharya & Pollock, 2021).

Previous research has demonstrated that board diversity is associated with different perspectives and opinions and different levels of risk aversion, experience, status, power, and ambition (Johnson et al., 2013). These differences may result in conflict and, subsequently, the director's exit (Westphal, 1999; Zhu & Shen, 2016). In this regard, we created a measure for board diversity, again using the Blau diversity index, based on the directors' gender, country of birth, educational level, and industry experience. We constructed a different board diversity measure for age that incorporated minimum–maximum scaling. The variable was a ratio in which the nominator was the difference between the range of age per board and the minimum age range found in the boards of the sample, which was zero in this study. The denominator was the difference between the maximum and minimum age ranges in the sample.

In addition to board characteristics, research has demonstrated that firm performance affects the decisions of directors to exit a firm (Finkelstein et al., 2009; González et al., 2019). Thus, as a second set of control variables, we constructed different performance measures: prior growth in assets, employment, and sales in relative and absolute terms. In addition to controlling for performance, we also included controls for general features of the firm, such as industry (based on NACE two-digit industry codes) and region (based on economic regions) dummies, as well as *year* dummies for unobserved year-specific effects.

Finally, we created director-level control variables. The first director-level control was the extent to which a board director experienced a high turnover in their portfolio in the previous

years. The logic behind this was that if a director had demonstrated a tendency to exit their firms, this could be an indicator for subsequent exits. This *portfolio turnover* variable was the proportion of the number of firms that the director exited in years *t-2* and *t-1* over the number of distinct firms in their portfolio in the respective preceding years (i.e., years *t-3* and *t-2*). The second variable was that of a director's *tenure* in a given firm,[22] measured by number of years as board director. Third, as a measure of involvement in and commitment to the firm, we created a measure indicating whether a person was an *inside* (owner, manager, employee, or family member) or *outside director* (González et al., 2019). Along these lines, the model also included a variable indicating whether a board director acted as the *chairperson of the board,* as it has been argued that a chairperson is less likely to exit the firm (Boivie et al., 2012). Another variable was *portfolio size* (i.e., the number of directorships that a director held), which was expected to be positively correlated with the director's exit from a firm in their portfolio (Boivie et al., 2012). The model also included some demographic characteristics (e.g., directors' age and gender).

All the independent and control variables were *lagged* by a year (*t-1*) to comply with the requirement of temporal precedence for causal claims (Antonakis et al., 2010) and avoid instances with the simultaneous determination of exit and other variables.

3.4. Descriptive statistics

In Table 1, we present the descriptive statistics for the samples we used in our pooled (7,473 directors and 24,394 director–year observations) and fixed-effect (4,052 directors and 18,541 director–year observations) panels (for logit regressions, see Table 3). We can observe that throughout these years, 48.1% of our directors exited at least one of their firms in a given year (11,816 observations). Not all directors exited a firm every year; nevertheless, we can observe

---

[22] Due to the left-censored data, it was impossible to track any given directorships earlier than 2002.

that 6,381 directors (85.4% of all board directors) exited a firm at least once during 2007–2014. Thus, there were individuals who exited their boards more often than others.

As for directors' portfolio diversity in year *t-1*, from Table 1, we can observe that the highest levels of diversity are related to firm industry, followed by diversity in firm size (number of employees and assets), while the lowest level of diversity can be seen in firm age. The average portfolio consisted of over four firms, with just over 21% of the firms in the portfolio representing relatively new directorships, as they had only been part of the portfolio for up to 2 years.

Finally, and as expected, board directors tended to be middle-aged men, as the average age was nearly 53 years, and over 94% of our director–year observations included male directors. Only 524 out of the 7,473 unique directors were women, comprising 7% of all board directors.

TABLE 1: Descriptive statistics for director–year observations within 2007–2014

Variables	Pooled (n = 24,394)		Fixed-Effect Panel (n = 18,541)	
	Mean	Std. Dev.	Mean	Std. Dev.
Exit from portfolio	0.481	0.500	0.460	0.498
Firm age diversity in portfolio	0.409	0.208	0.413	0.206
Industry diversity in portfolio	0.557	0.225	0.569	0.221
Asset diversity in portfolio	0.463	0.203	0.468	0.202
Employment size diversity in portfolio	0.530	0.179	0.538	0.176
Director's age	52.665	8.944	53.31	9.097
Female director	0.057	0.232	0.049	0.215
Share of firms with up to 2 years in the portfolio	0.212	0.234	0.194	0.223
Portfolio turnover for the last 2 years	0.149	0.191	0.160	0.188
Portfolio size in year t-1	4.353	2.266	4.567	2.423

Table 2 is based on our director–firm–year sample (n = 67,513), which formed the foundation for testing our second and third hypotheses (the results are presented in Table 4). We can observe that within 2007–2014 on 10,534 occasions, firms experienced director exit. This accounted for 15.6% of the observations. From Table 2, we can observe some variation in

terms of how firms were dissimilar compared to the other firms in the portfolio (this variation is more clearly represented in Figure 2 of the Appendix). Firms tended to be most dissimilar in terms of industry affiliation, as over 50% of the firm–year observations were dissimilar in this respect to all the other firms in their respective portfolio. Given the large number of three-digit industry classes, it was expected that the industry measure would be more skewed toward higher levels of dissimilarity. Firm size in terms of employees was, on average, the second highest dissimilarity indicator, followed by asset size. The least dissimilarity can be observed in the age categories of the firms, where 20% of firms were dissimilar to all the other firms in their respective portfolio, while 15% were similar to all the other firms in their respective portfolio.

Figure 3 in the Appendix shows that the distribution of director's experience with diversity was left-skewed. This indicated that during the previous 3 years, the majority of the board directors had some degree of experience with diverse portfolios, which was also reflected in the mean (Table 2). Furthermore, on average, directors exited around 14% of their portfolio firms during the preceding 2 years (years *t-2* and *t-1*). This was also the case when converting the sample into director–year observations.

In terms of board director characteristics, we have already reported on the overrepresentation of middle-aged men. In addition, in 44% of our observations, the director was identified as the chair of the board. Moreover, the average number of directorships (i.e., portfolio size) was 5.5, with an average board tenure of 6.4 years[23] . In our sample, in the majority of the observations, the directors were classified as outsider directors (70.5%). The sample restrictions drove this relatively high percentage, as we only included directors who had at least three directorships in the preceding year and who had 3 years of directorial experience.

---

[23] Note that the data here are left-censored, as we do not have any information prior to 2002

This made it less likely that this individual also acted as a manager, employee, or family member.

In terms of board-level characteristics, in Table 2, we can observe relatively low levels of diversity in terms of gender and country of origin of board members. These numbers fitted the general pattern of the underrepresentation of women and non-Norway-born board directors. The diversity measures in terms of educational background and age were considerably larger. The average board size was nearly four board directors.

Regarding firm performance during the previous years, sales growth demonstrated the most variation in our sample. This could be because the sample encompassed firms at different life stages and across 8 years, including years of crisis.

TABLE 2: Descriptive statistics for director–firm–year observations (2007–2014; n=67,513)

Variables	Mean	Std. Dev.
Director exits	0.156	0.363
Dissimilarity in firm age	0.529	0.333
Dissimilarity in industry	0.735	0.339
Dissimilarity in assets	0.618	0.324
Dissimilarity in employees	0.710	0.288
Experience with a diverse portfolio	1.905	0.539
Portfolio turnover for the last 2 years	0.138	0.171
Director's age	53.632	8.969
Female director	0.048	0.213
Director is the chairperson	0.440	0.496
Portfolio size	5.493	4.183
Board tenure of the director	6.426	2.610
Outside director	0.702	0.457
Board's ethnical diversity	0.038	0.118
Board's education diversity	0.502	0.209
Board's gender diversity	0.111	0.181
Board's age diversity	0.236	0.138
Board size	3.961	1.488
Asset growth relative (t-2)	0.171	2.378
Employment growth relative (t-2)	0.127	0.713
Sales growth relative (t-2)	0.142	3.086
Asset growth relative (t-1)	0.103	1.963

Employment growth relative (*t-1*)	0.594	26.087
Sales growth relative (*t-1*)	1.049	127.787

4. RESULTS

4.1.Portfolio diversity and director exit

Our regression analysis started by conducting three logit panel regressions—pooled, random, and fixed-effect. This way, we estimated the probability that a director would exit a firm in their portfolio based on portfolio and director-level characteristics (Table 3). As the portfolio perspective on director exit has rarely been examined, this set of different models enabled a closer investigation of factors at different levels (i.e., firm level, individual level, and portfolio level) that are able to drive director exit, as well as serving as robustness tests for our findings. All models demonstrated the positive effect of a diverse portfolio on the likelihood that a director would exit at least one of the firms. The Hausman test provided evidence that the fixed-effect model was the model with the most efficient estimators. In this fixed-effect model, we were able to control for unobserved time invariance (i.e., whether there were additional director-level characteristics that might explain exit). This model, Model 3, showed that the portfolio diversity–director exit relationship was relatively strong in portfolios with higher levels of industry and asset-size diversity. More specifically, the odds ratio of exiting was 1.28 for one standard deviation increase in industry diversity and 1.10 for one standard deviation increase in asset diversity.[24]

In logit models, the magnitude of the effects is not directly interpretable from the coefficients, as we are not dealing with linear relationships (Baum, 2006). Therefore, following the recommendation of Hoetker (2007), we present graphical representations of the marginal effects (Figures 1–4). These marginal effects were estimated for approximately 10 values for each independent variable and the moderator, including their minimum and maximum values.

---

[24] The logit coefficient was 1.198 and 0.653 for industry and age diversity, respectively. From Table 1, we can identify the standard deviation for industry and asset diversity to be 0.208 and 0.203, respectively. Multiplying and exponentiating these numbers gives an odds ratio of 1.283 for industry diversity and 1.099 for asset diversity.

For plotting the marginal effects, including for continuous variables and their interactions, we utilized Stata's marginscontplot2 package (Royston, 2013). Referring to Figure 1, which is based on Model 1, an increase in portfolio diversity from no age diversity to the highest possible age diversity caused an increase in the likelihood of exit of approximately 6 percentage points (pp). The highest magnitude was observed in the case of industry diversity, which drove the exit likelihood up by 20 pp from its lowest to its highest values. Asset diversity, however, demonstrated the lowest magnitude (an approximately 3 pp increase). Overall, based on this analysis, we can confirm Hypothesis 1.

TABLE 3: Pooled, random-effect and fixed-effect panel regressions for portfolio diversity and director exit

VARIABLES	MODEL 1	MODEL 2	MODEL 3
	Pooled Regression	Random-Effect Panel	Fixed-Effect Panel
Firm age diversity in portfolio	0.440***	0.433***	0.041
	(0.066)	(0.071)	(0.123)
Industry diversity in portfolio	0.880***	0.950***	1.198***
	(0.065)	(0.070)	(0.172)
Asset diversity in portfolio	0.161**	0.191**	0.653***
	(0.070)	(0.076)	(0.138)
Employment size diversity in portfolio	-0.055	-0.052	0.066
	(0.081)	(0.086)	(0.148)
Share of firms with up to 2 years in the portfolio	0.570***	0.486***	-0.950***
	(0.055)	(0.060)	(0.094)
Portfolio turnover	0.747***	-1.462***	-1.462***
	(0.069)	(0.113)	(0.113)
Portfolio size in year t-1	0.130***	0.427***	0.427***
	(0.009)	(0.021)	(0.021)
Director age	0.000	-0.000	0.085***
	(0.002)	(0.002)	(0.010)
Female director	0.102*	0.116*	
	(0.057)	(0.064)	
Constant	-1.605**	24,394	
	(0.644)	7,473	
Director fixed effects	no	no	yes
Year controls	yes	yes	in firm fixed effects
Region controls	yes	yes	in firm fixed effects
Log-likelihood	-16,191.75	-16,168.03	-6,724.42
Observations	24,394	24,394	18,541
Clusters		7,473	4,052

Robust standard errors in parentheses
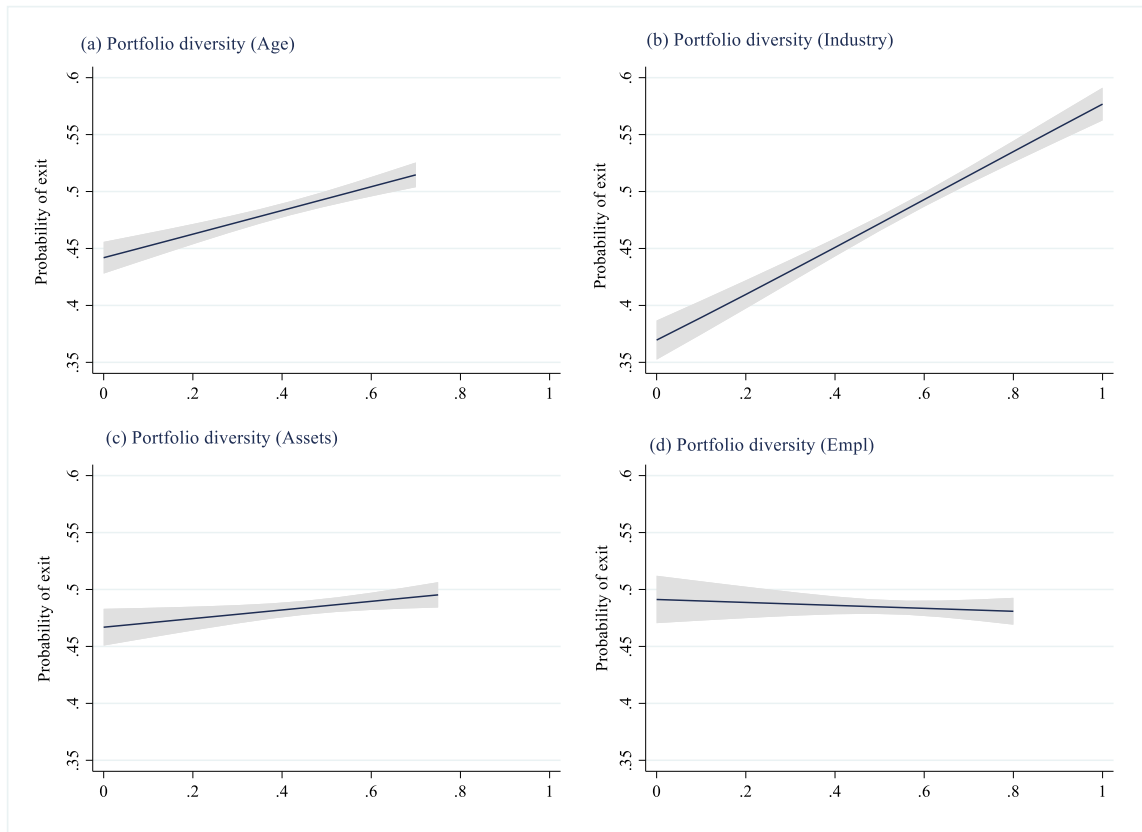*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

FIGURE 1: The relationship between portfolio diversity and probability of exit based on a pooled logit model

4.2. Dissimilarity among portfolio firms and director exit

The results from Table 3 allowed us to identify whether diversity in the portfolio was a driver for exit, but it does not allow us to identify whether a director tend to exit the firm that was *the odd one out* (H2) or whether experience with diversity moderates this effect (H3). For this purpose, we ran three additional logit regression models. Unobservable time-invariant features of directors and firms in the portfolios can lead to endogeneity concerns. Thus, similar to the models in Table 1, a panel model could account for this when testing H2 and H3. However, the lack of variation in our dissimilarity variables would imply that our analyses were built on a considerably smaller set of firms. Furthermore, the use of panel data might address to some extent the issue of heterogeneity, but the issue of endogeneity and therefore reverse causality might still remain. Subsequently, we proceeded with a logit model, but we encourage future research to address the endogeneity issue in more detail. In Model 4,

we included all our dissimilarity measures, while Model 5 aimed to test whether the director's prior experience with diverse portfolios affected the director's likelihood of exiting from a firm. Model 6 was the saturated model.

TABLE 4: The relationship between firm dissimilarity and director exit with the moderation of director experience with diverse portfolios

VARIABLES	MODEL 4	MODEL 5	MODEL 6
Dissimilarity in terms of firm age	0.120***		0.272**
	(0.034)		(0.114)
Dissimilarity in terms of industry	0.093***		0.447***
	(0.035)		(0.110)
Dissimilarity in terms of assets	0.005		0.198*
	(0.036)		(0.120)
Dissimilarity in terms of employees	-0.058		-0.311**
	(0.040)		(0.124)
Experience with a diverse portfolio		-0.040*	-0.035
		(0.022)	(0.068)
(Dissimilarity firm age) * (Experience with a diverse portfolio)			-0.062
			(0.062)
(Dissimilarity industry) * (Experience with a diverse portfolio)			-0.179***
			(0.065)
(Dissimilarity assets) * (Experience with a diverse portfolio)			-0.082
			(0.067)
(Dissimilarity employees) * (Experience with a diverse portfolio)			0.180**
			(0.071)
Director's age	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)
Female director	0.035	0.021	0.028
	(0.054)	(0.054)	(0.054)
Portfolio turnover for the last 2 years	0.711***	0.753***	0.775***
	(0.062)	(0.063)	(0.063)
Diversity of board in nationality	0.290***	0.299***	0.288***
	(0.090)	(0.090)	(0.090)
Diversity of board in education	-0.041	-0.035	-0.034
	(0.059)	(0.059)	(0.059)
Diversity of board in gender	0.058	0.051	0.051
	(0.069)	(0.069)	(0.069)
Diversity of board in age	-0.099	-0.097	-0.092
	(0.094)	(0.094)	(0.095)
Board size	0.018**	0.018**	0.017*
	(0.009)	(0.009)	(0.009)
Director is the chairperson	-0.072***	-0.067***	-0.067***
	(0.023)	(0.023)	(0.023)

Portfolio size	-0.009***	-0.008**	-0.004
	(0.003)	(0.003)	(0.003)
Board tenure of the director	-0.143***	-0.139***	-0.140***
	(0.023)	(0.023)	(0.023)
(Board tenure of the director)^2	0.005***	0.005***	0.005***
	(0.002)	(0.002)	(0.002)
Outside director	0.204***	0.206***	0.209***
	(0.026)	(0.026)	(0.026)
Constant	-1.037***	-0.841**	-1.143***
	(0.342)	(0.341)	(0.357)
Firm performance controls[1]	yes	yes	yes
Industry controls	yes	yes	yes
Region controls	yes	yes	yes
Observations	67,513	67,513	67,513
McFadden's R-squared	0.024	0.024	0.025
McFadden's R-squared (adj)	0.017	0.017	0.017
Log-likelihood	-28520.172	-28529.42	-28502.53

Robust standard errors in parentheses

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

[1] Firm performance measures are not significant.

As hypothesized in H2, the results for Model 4 (Table 4) demonstrated that directors were more likely to exit those firms that were different in terms of age and industry. More specifically, directors were 1.04 and 1.03 more likely to exit when the firm was one standard deviation more dissimilar in terms of age and industry, respectively. There were some director-level measures that drove exit, as we demonstrated that directors who had less *skin in the game* (i.e., those who were an outside director and those who were not a chairperson) were more likely to exit.

As for the magnitudes of the firm dissimilarity effects, we observed the steepest slope in the case of age dissimilarity (Figure 2, (a)), amounting to an approximately 2 pp increase in the probability of exit when the focal firm was absolutely similar versus absolutely dissimilar in terms of age compared to the other firms in the portfolio. A smaller effect was observed in the cases of industry dissimilarity (over 1 pp) and asset dissimilarity (around 0.5 pp). Thus,

overall, the findings were partially consistent with the expectations stated in H2. The only

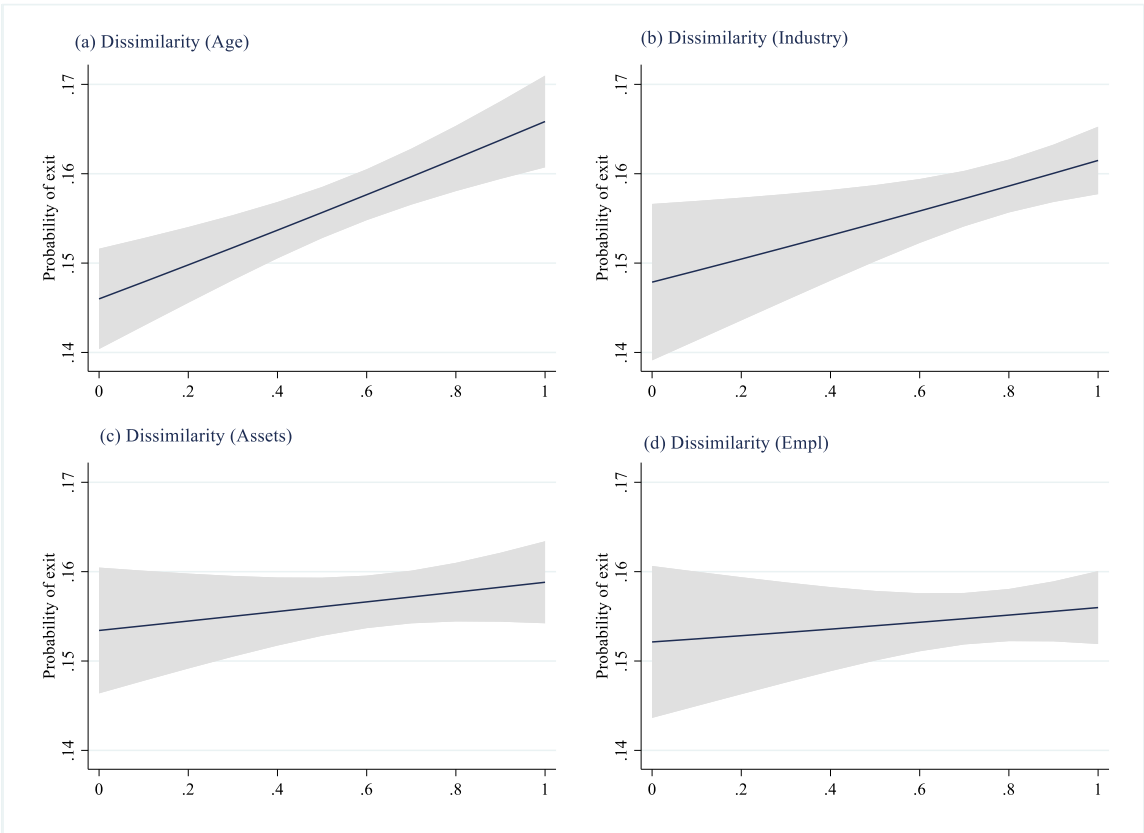exception was the effect of dissimilarity with respect to the number of employees.

FIGURE 2: The relationship between firm dissimilarities and probability of exit

Our hypothesized moderator (experience with a diverse portfolio) in itself also helped to

explain exits. Directors were less likely to exit a firm when they had experience with a diverse

portfolio (see Model 5). However, when we interacted this moderator with our main variables

of interest (see Model 6), we observed several nuances. While the effects of age dissimilarity

and industry dissimilarity remained positive, even with a larger coefficient sizes, we also

observed that directors were more likely to exit those firms that were dissimilar in assets.

However, unlike the dissimilarities relating to the above-mentioned criteria, we found a

reverse-effect pattern for firm size dissimilarity in terms of number of employees. Experience,

however, appeared to be a moderator, at least with respect to firms that were dissimilar in

terms of industry (decreasing the likelihood of exit) and employment size (increasing the

likelihood of exit).

Figure 4 illustrates how the magnitude of the relationship between the dissimilarity of firms and the probability of exit differed depending on how much experience with diverse portfolios the director had. Accordingly, the trends could also differ, manifesting negative, positive, and even flat trends conditional on the degree of experience. According to Table 4 and Figure 4, directors' experience with diversity mitigated the effect that a firm's age dissimilarity had on the likelihood of exit, without turning the relationship negative. With increasing experience, for dissimilar firms, the likelihood decreased by 6 pp compared to 3 pp for a firm similar to the rest of the portfolio. Directors' experience with diversity diminished the likelihood of exit in the case of dissimilar firms, turning the relationship negative when the degree of experience was around 2.4 in the case of both industry dissimilarity and asset dissimilarity (with 3 being the highest degree). In the case of the highest industry dissimilarity, experience lowered the exit probability by around 7 pp, while for the lowest dissimilarity, the probability of exit was practically the same, irrespective of the degree of experience. For asset dissimilarity, at its highest value, the exit probability ranged from 13% to 20% (a decrease of 7 pp in the case of most experience with diversity). At the lowest degree of asset dissimilarity, experience pushed the exit probability down by approximately 3 pp.

When it came to firm-size dissimilarity (employment), the picture was different. The more dissimilar the firm, the less probable was exit when the director had no experience with diversity. With an increasing degree of experience (from around 2.1), the negative relationship between dissimilarity and probability of exit turned positive. Thus, as the dissimilarity increased, the exit probabilities across different experience levels converged. Still, when the focal firm was absolutely dissimilar from the rest of the portfolio firms, more experience predicted a lower probability of exit than no experience (with a 3 pp difference in

probability). With experience, the likelihood of exit in the case of similar firms went down by

11 pp at its highest level. Overall, the analysis provided partial support for H3.
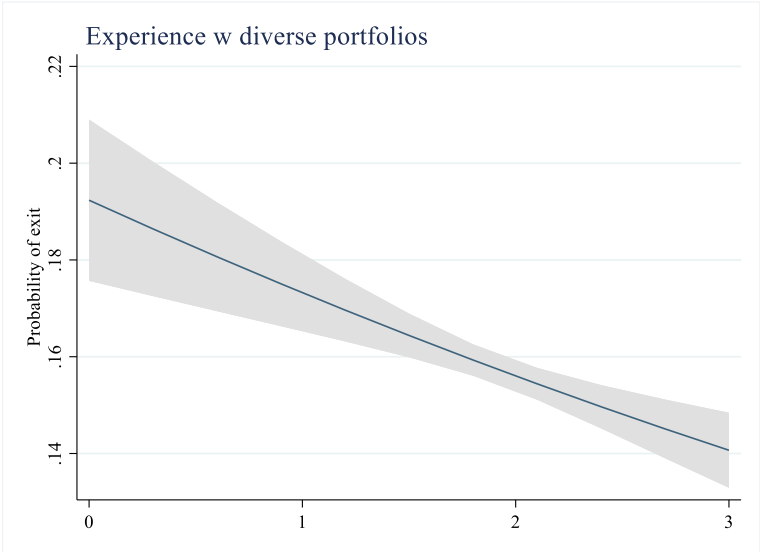

FIGURE 3: Experience with diverse portfolios in relation to probability of exit
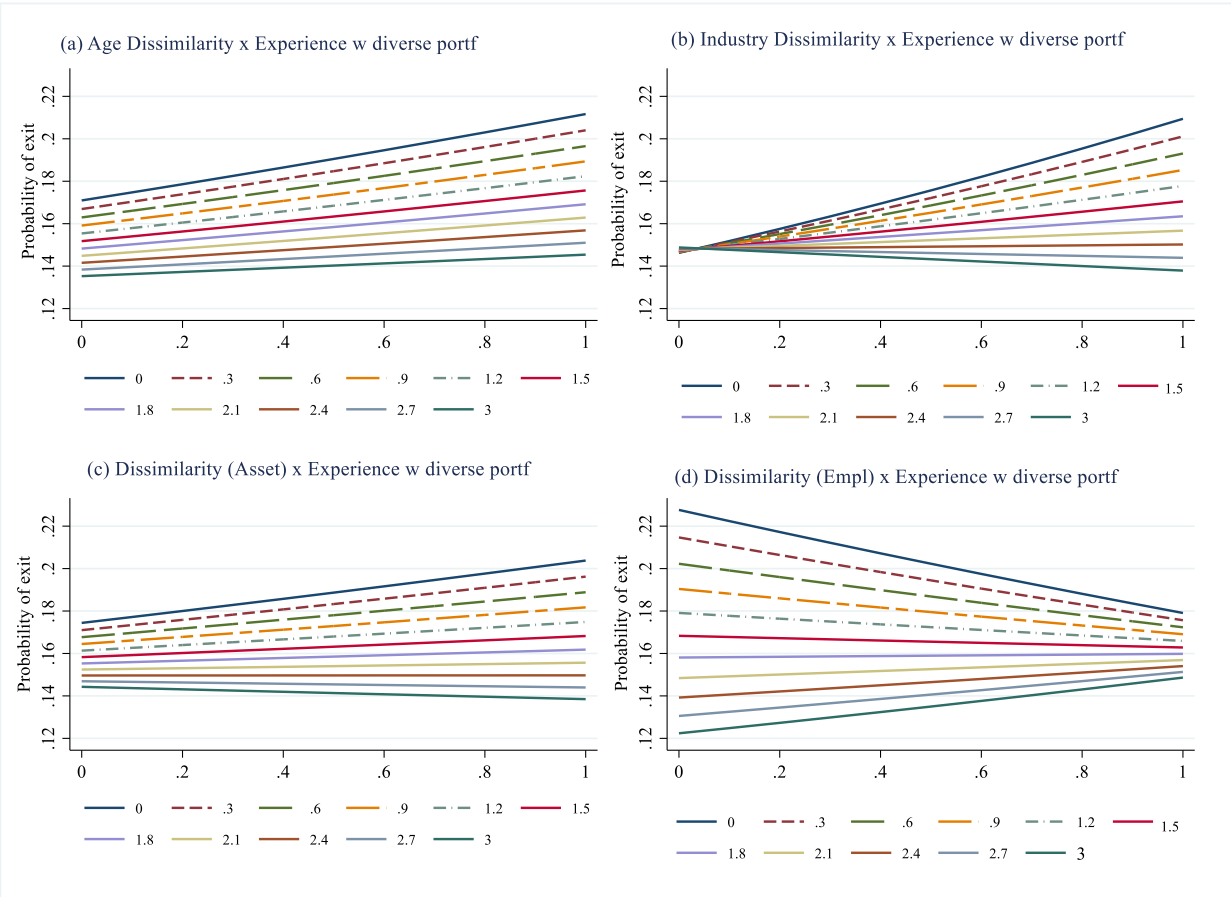

FIGURE 4: The interaction between dissimilarity of firms and the director's experience with diverse

portfolios in relation to probability of exit

As mentioned, previous turnover in a director's portfolio was also examined as a control variable. The findings showed that portfolio turnover was associated with a higher probability of exit than was expected (a significance of $p < 0.01$). In terms of the other control variables' associations with the probability of director exit, it became clear that the focal firm's board diversity in terms of directors' country of birth ($p < 0.01$) and board size ($p < 0.1$) were related to an increased probability of director exit. Being the chair of the board decreased the probability of the director's exit significantly. Meanwhile, the board tenure of the focal board director demonstrated a U-shaped relationship with exit, with a declining slope having a bigger effect size. Moreover, outside directors with fewer vested interests in a firm were more likely to exit the firm. These findings were robust across all models and significant at the $p < 0.01$ level. Surprisingly, the growth rates of the firms in previous periods were not shown to somehow affect the probability of director exit, contrary to what might be expected from research (Finkelstein et al., 2009; González et al., 2019).

As a measure of goodness of fit, I employed McFadden's pseudo R-squared, which is the difference between the log-likelihood of the model with only an intercept and that of the estimated model (with regressors) (Hoetker, 2007). Together with the log-likelihood, the pseudo R-squared showed that the model fit improved in the saturated model.

DISCUSSION

The presence and departure of a board director have significant consequences for both the firm and the director. Given that directors can, and often do, hold multiple directorships, it is worth investigating when they are more likely to exit one of their firms and if so, which firm that would be. From the descriptive statistics, we learned that almost half of the directors exited at least one of their firms over the period that we observed them.

Holding multiple directorships implies opportunity costs associated with the allocation of directors' time and attention across multiple firms. Moreover, having a diverse portfolio can become challenging to navigate. Therefore, we hypothesized that the more diverse the portfolio, the more likely that the director will exit one of their firms. Given that each firm has its own preferences and expectations concerning the contributions of its directors, we theorized that the more the focal firm is dissimilar, the more its desired contribution will also be dissimilar from the rest of the director's portfolio, and the higher the likelihood of director exit. In this, we integrated in our theorizing the perspectives of both the director and the firm since they both can pull in the direction of increased likelihood of separation as dissimilarity increases. While firm dissimilarity implies a higher likelihood of exit, we also argued that the likelihood would be lower when the focal director had prior experience with diverse portfolios.

Examining what drove director exit, we found that when the director's portfolio was diverse in terms of the industries in which the firms operated and their asset sizes, it was more likely that the director would exit one of them. This amounts to support for the general point that portfolio level effects exist, and that attention to such effects are justified. More specifically, it suggested that managing industry and firm-size diversity posed a comparatively bigger challenge for a director than other dimensions of diversity. This was in line with our theoretical predictions. After controlling for director-specific time-invariant factors, we observed that the positive association between age diversity and director exit lost its significance. A possible reason for this change in significance is that the sample was restricted to those directors who held at least three board seats in a given year. Directors eliminated from the sample after executing the fixed-effect panel models were those who either did not hold multiple directorships over those years any more or had stopped acting as board directors. So, while panel models grant the opportunity to control for unobserved factors, they

may also introduce bias, as in the case of this study. We were left with individuals who themselves chose to hold multiple directorships and/or those experiencing high demand for their services. In their case, then, the age diversity of the portfolio did not play a significant role in causing their exit from any of their firms.

Next, our findings partially confirmed our theoretical predictions regarding which specific firms the director would more likely exit: The more dissimilar a firm was to the other firms in the same portfolio in terms of age, industry, and asset size, the more likely that this firm would experience the director's exit. Comparing our four dissimilarity measures provides us with the opportunity to examine their relative importance as precursors of director exit. Dissimilarity in terms of industry had the largest effect, followed by age, while asset size is only marginally significant ($p<0.1$) in the full model. Dissimilarity in terms of employment size demonstrated the most puzzling finding (the exact opposite of our theoretical predictions): An increase in dissimilarity with respect to the number of employees decreases the likelihood of exit significantly. This finding could possibly be due to rewards, both economic- and reputation wise, associated with having board seats in firms with higher numbers of employees. However, we acknowledge that this finding is inconsistent with our predictions and that we are unable to provide a robust explanation for why asset size and employee size appears to have quite different effects. This topic warrants further attention.

Regarding the moderation effect of experience with diverse portfolios, the director was less likely to exit a dissimilar firm in terms of industry and more likely to exit a firm that was dissimilar in terms of the number of employees. In general, directors who have experience with diverse portfolios may serve in a similar role across boards, or they may have joined a dissimilar firm for learning and experience-based returns (Jiang et al., 2021). If they perform similar roles across boards, irrespective of firm (dis)similarity, dissimilarity should matter less for their exit. If board directors serve on a board for experience-based returns, several

consequences can be expected, which point in different directions. Some directors may fulfill their learning goals and exit afterwards. Others may become used to being with a dissimilar firm and continue serving on the firm's board, or they may realize that they prefer not to serve on a firm that is different from the others and leave. The reason why different dimensions of dissimilarity were affected differently (positively, negatively, or not affected at all) may be that these incentives and outcomes weighed differently in the case of each dimension. Clearly more research is needed to disentangle such effects.

One aspect not hypothesized upon but explored in the analysis is turnover in the director's portfolio. This factor stands out due to its large positive effect size and significance in relation to the probability of director exit. One interpretation is that there are board directors who are mission-oriented; that is, they join a firm for a particular purpose and leave the board when they have fulfilled their mission. Research has shown that firms going public or experiencing acquisitions often need directors who have relevant experience or a certain reputation to guide them through the process (Kroll et al., 2007; Kroll et al., 2008) or who signal prestige (Chen et al., 2008). Along these lines, researchers have found that around the initial public offering (IPO), directors with multiple directorships prevail; only years after an IPO, as the firm matures, does the incidence of *busy* directors decline (Certo, 2003; Field et al., 2013).

However, when we tested our first hypothesis by executing fixed-effect panel models, we witnessed a change in the significance of this effect (from positive to negative) compared to the pooled logit model. The impression was that of two mechanisms: (1) the directors' behavior was characterized by the tendency to exit firms, so previous exits could predict future exits; (2) at the same time, the more firms a director exited, the fewer firms there were in the portfolio to exit. When we controlled for director-specific time-invariant factors, the first effect was removed, and we were left with a negative effect of portfolio turnover.

To summarize, the industry and firm-size diversity of directors' portfolios influenced the likelihood that a director exits from one of their firms. It was more probable that they would exit those firms that were dissimilar in terms of their age, industry, and asset size but similar in terms of their number of employees. However, once the director had experience with diverse portfolios, the probability of exiting a firm that is dissimilar in terms of industry decreased, while the probability of exiting a dissimilar firm in terms of number of employees increased. Clearly, there is more going on than we have covered in our theorizing, but this does not detract from the general point that portfolio level effects matter for director exit. Quite the contrary, the more unexpected patterns appearing in our data should inspire us to devote more attention to understand such effects.

Contributions to corporate governance research

We believe that this paper provides valuable insights into different areas of research. Most of the research on the determinants of director exit focuses on the firm, board, and director levels. However, director exit is rarely explored in the light of directors' and their firms' challenges when the director sits on multiple boards. This adds a portfolio-level dimension to the discussion of director exit. The director's joint approach to these firms (i.e., their portfolio of directorships) can determine *which* firm they will be more likely to exit, both on their own initiative and because of their perceived contribution by the firms they serve. So far, only two studies have recognized that not only the absolute but also the relative characteristics of the firms in the portfolio can matter for understanding *which* firms the focal director will exit. Research so far has considered two such characteristics: firm size and volatility of a firm's stock returns (Masulis & Mobbs, 2014; Ormazabal, 2018). We theorize and empirically examine a selection of the relative characteristics of portfolio firms as dissimilarity criteria. These characteristics are able to capture more aspects of firm dissimilarities than existing research has done. The current study considers firm size in terms of assets and number of

employees, as well as firm age and industry. Moreover, our approach is more nuanced. By moving from binary classifications of the largest or most volatile firms (as employed in the research so far) to putting firm characteristics on a continuum, we are able to offer more finely grained measurements.

The existing research on directors' portfolio characteristics and director exit comes from the finance literature. Therefore, the theorizing partially underappreciates the richness of the corporate governance perspective and a multidimensional take on dissimilarity. In particular, the dominant tendency of this research is to take a one-sided perspective, as opposed to acknowledging that potential drivers of exit may come from both the firm side and the director side. The current study attempts to elaborate how dissimilarity can result in both firm-driven and director-driven exits.

The study is also inclusive in terms of the context of director exits. Research has paid significant attention to director exit in the contexts of major expected or past negative events in firms, such as fraud, financial restatement, (expected) bankruptcy, and organizational crisis (Arthaud-Day et al., 2006; Marcel & Cowen, 2014). The most common cases of director exit, however, occur for more benign reasons, but such exits have not received their fair share of researchers' attention (Boivie et al., 2012).

Overall, our contribution to corporate governance research has two aspects. First, the study enhances our understanding of the determinants of director exit, which in turn can affect organizational outcomes in several ways. Second, it provides a bridge to the research stream on interlocking or *busy* directors. Interlocking and busy directors' effects on firm performance are widely debated (Mizruchi, 1996), but insights into their choices to exit boards or their removal are largely missing. This study's insights into director exit should be able to inform this debate.

Implications for firms and board directors

As boards and their directors can be critical in shaping organizational outcomes, instances of director exit are an important area of study. Both firms and directors can initiate director exit, and the consequences of director exit also extend to both parties. Understanding why and from which firm a given director is more likely to exit can help firms retain a director or assist in the director selection phase. Predicting which director will most likely exit their firm can be especially valuable for firms that are vulnerable or needy, including those in crisis, those going through an organizational change process, and young entities struggling to attract valuable human resources to their firms. Furthermore, a firm-driven director exit can have implications for the director. Often, board work is an important component of a director's career, so accounting for the determinants of director removal can help directors manage their portfolio of directorships.

Limitations and future research

This study is not without limitations. While Norwegian registry data provide a rich spectrum of variables regarding all residents in Norway and every Norwegian firm, some important mechanisms behind the focal relationships are not observable. Most notably, we cannot identify when exit occurs at the initiative of the firm, the director, or both. Moreover, the measurement of several relevant variables was constrained because of the left censoring of the data. Demographic characteristics for some directors were missing from the registry, presumably because the individuals were not Norwegian residents. This hindered the measurement of some variables, particularly board diversity. Furthermore, our empirical strategy does not enable us to make causal claims.

Some of the limitations of the study can be addressed in future research. One avenue would be the incorporation of both the firm's and the director's perspectives to inductively explore the

significance of the relationship between different portfolio dimensions and director exit, as well as identifying additional dimensions. This would further our understanding of the determinants of director exit and unpack the portfolio perspective's potential to help explain boardroom-related outcomes. Another avenue would be to look more closely at the previous turnover in directors' portfolios that has demonstrated not only a large effect size, but also a change from a positive to a negative significant association with director exit that is of particular interest. Examining director exit as a function of a director's prior choices can offer more of a dynamic take on director exit.

REFERENCES

Acharya, A. G., & Pollock, T. G. (2021). Too many peas in a pod? How overlaps in directors' local and global status characteristics influence board turnover in newly public firms. *Academy of Management Journal*, *64*(5), 1472–1496.

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *Leadership Quarterly*, *21*(6), 1086–1120.

Arthaud-Day, M. L., Certo, S. T., Dalton, C. M., & Dalton, D. R. (2006). A changing of the guard: Executive and director turnover following corporate financial restatements. *Academy of Management Journal*, *49*(6), 1119–1136.

Asthana, S., & Balsam, S. (2010). The impact of changes in firm performance and risk on director turnover. *Review of Accounting and Finance, 9*(3), 244-263.

Audretsch, D. B., & Lehmann, E. E. (2014). Corporate governance and entrepreneurial firms. *Foundations and Trends® in Entrepreneurship*, *10*(1–2), 1–160.

Balachandran, C., Umans, T., & Wennberg, K. J. (2019). Directors turnover in new venture boards. *Academy of Management Proceedings*, *2019*(1), 19117.

Baum, C. F. (2006). *An introduction to modern econometrics using Stata*. Stata press.

Blau, P. M. (1977). *Inequality and heterogeneity: A primitive theory of social structure*. Free Press.

Boivie, S., Bednar, M. K., Aguilera, R. V, & Andrus, J. L. (2016). Are boards designed to fail? The implausibility of effective board monitoring. *Academy of Management Annals*, *10*(1), 319–407.

Boivie, S., Graffin, S. D., & Pollock, T. (2012). Time for me to fly: Predicting director exit at large firms. *Academy of Management Journal*, *55*(6), 1334–1359.

Carpenter, M. A., & Westphal, J. D. (2001). The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making. *Academy of Management Journal*, *44*(4), 639–660.

Cashman, G. D., Gillan, S. L., & Jun, C. (2012). Going overboard? On busy directors and firm value. *Journal of Banking and Finance*, *36*(12), 3248–3259.

Certo, S. T. (2003). Influencing initial public offering investors with prestige: Signaling with board structures. *Academy of Management Review, 28*(3), 432–446.

Chen, G., Hambrick, D. C., & Pollock, T. G. (2008). Puttin'on the Ritz: Pre-IPO enlistment of prestigious affiliates as deadline-induced remediation. *Academy of Management*, *51*(5), 954–975.

Daily, C. M., & Dalton, D. R. (1995). CEO and director turnover in failing firms: An illusion of change? *Strategic Management Journal*, *16*(5), 393–400.

Dalton, D. R., Daily, C. M., Ellstrand, A. E., & Johnson, J. L. (1998). Meta-analytic reviews of board composition, leadership structure, and financial performance. *Strategic Management Journal*, *19*(3), 269–290.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effect of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, *125*(6), 627–668.

D'Onza, G., & Rigolini, A. (2017). Does director capital influence board turnover after an incident of fraud ? Evidence from Italian listed companies. *Journal of Management and Governance*, *21*(4), 993–1022.

Eriksson, T., Madsen, E. S., Dilling-Hansen, M., & Smith, V. (2001). Determinants of CEO and board turnover. *Empirica*, *28*(3), 243–257.

Ferris, S. P., Jagannathan, M., & Pritchard, A. C. (2003). Too busy to mind the business? Monitoring by directors with multiple board appointments. *The Journal of Finance*, *58*(3), 1087–1111.

Ferris, S. P., Jayaraman, N., & Liao, M. Y.. (2020). Better directors or distracted directors? An international analysis of busy boards. *Global Finance Journal*, *44*, 100437.

Field, L., Lowry, M., & Mkrtchyan, A. (2013). Are busy boards detrimental? *Journal of Financial Economics*, *109*(1), 63–82.

Finkelstein, S., Hambrick, D. C., & Cannella, A. A. (2009). *Strategic leadership: Theory and research on executives, top management teams, and boards*. Oxford University Press.

Garg, S., & Eisenhardt, K. M. (2017). Unpacking the CEO–board relationship: How strategy making happens in entrepreneurial firms. *Academy of Management Journal*, *60*(5), 1828–1858.

Garg, S., & Furr, N. (2017). Venture boards: Past insights, future directions, and transition to public

firm boards. *Strategic Entrepreneurship Journal*, *11*(3), 326–343.

Garg, S., Li, J. Q., & Shaw, J. (2018). Undervaluation of directors in the board hierarchy: Impact on turnover of directors (and CEOs) in newly public firms. *Strategic Management Journal*, *39*(2), 429–457.

González, M., Guzmán, A., Pablo, E., & Trujillo, M. A. (2019). Is board turnover driven by performance in family firms? *Research in International Business and Finance*, *48*, 169–186.

Higgins, M. C., & Gulati, R. (2003). Getting off to a good start: The effects of upper echelon affiliations on underwriter prestige. *Organization Science*, *14*(3), 244–263.

Hillman, A. J., Cannella, A. A., & Paetzold, R. L. (2000). The resource dependence role of corporate directors: Strategic adaptation of board composition in response to environmental change. *Journal of Management Studies*, *37*(2), 235–256.

Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource dependence theory: A review. *Journal of Management*, *35*(6), 1404–1427.

Hoetker, G. (2007). The use of logit and probit models in strategic management research: Critical issues. *Strategic Management Journal*, *28*(4), 331–343.

Jiang, H., Xia, J., Devers, C. E., & Shen, W. (2021). Who will board a sinking ship? A firm-director interdependence perspective of mutual selection between declining firms and director candidates. *Academy of Management Journal, 64*(3), 901-925.

Johnson, S. G., Schnatterly, K., & Hill, A. D. (2013). Board composition beyond independence: Social capital, human capital, and demographics. *Journal of Management*, *39*(1), 232–262.

Khanna, P., Jones, C. D., & Boivie, S. (2014). Director human capital, information processing demands, and board effectiveness. *Journal of Management*, *40*(2), 557–585.

Kroll, M., Walters, B. A., & Le, S. (2007). The impact of board composition and top management team ownership structure on post-IPO performance in young entrepreneurial firms. *Academy of Management Journal*, *50*(5), 1198–1216.

Kroll, M., Walters, B. A., & Wright, P. (2008). Board vigilance, director experience, and corporate outcomes. *Strategic Management Journal*, *29*(4), 363–382.

Larcker, D., & Tayan, B. (2015). *Corporate governance matters: A closer look at organizational choices and their consequences*. Pearson Education.

Li, Y., & Aguilera, R. V. (2008). Target director turnover in acquisitions: A conceptual framework. *Corporate Governance: An International Review*, *16*(6), 492–503.

Lorsch, J. W., & Maciver, E. (1989). *Pawns or potentates: The reality of America's corporate boards*. Harvard Business School Press.

Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated choice methods: Analysis and applications*. Cambridge University Press.

Lynall, M. D., Golden, B. R., & Hillman, A. J. (2003). Board composition from adolescence to maturity: A multitheoretic view. *Academy of Management Review*, *28*(3), 416–431.

Main, B. G., & Gregory-Smith, I. (2018). Symbolic management and the glass cliff: Evidence from the boardroom careers of female and male directors. *British Journal of Management*, *29*(1), 136–155.

Marcel, J. J., & Cowen, A. P. (2014). Cleaning house or jumping ship? Understanding board upheaval following financial fraud. *Strategic Management Journal*, *35*(6), 926–937.

Martin, G., Gozubuyuk, R., & Becerra, M. (2013). Interlocks and firm performance: The role of uncertainty in the directorate interlock–performance relationship. *Strategic Management Journal*, *36*(2), 235–253.

Masulis, R. W., & Mobbs, S. (2014). Independent director incentives: Where do talented directors spend their limited time and energy? *Journal of Financial Economics*, *111*(2), 406–429.

Mizruchi, M. S. (1996). What do interlocks do? An analysis, critique, and assessment of research on interlocking directorates. *Annual Review of Sociology*, *22*(1), 271–298.

Neville, M. (2011). The role of boards in small and medium sized firms. *Corporate Governance: The International Journal of Business in Society*, *11*(5), 527–540.

Ormazabal, G. (2018). Are directors more likely to relinquish their riskiest directorships after the Financial Crisis? *Journal of Corporate Finance*, *53*, 1–20.

Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective*. Harper & Row.

Renneboog, L., & Zhao, Y. (2011). Us knows us in the UK: On director networks and CEO compensation. *Journal of Corporate Finance*, *17*(4), 1132–1157.

Royston, P. (2013). marginscontplot: Plotting the marginal effects of continuous predictors. *The Stata Journal*, *13*(3), 510–527.

Souther, M. E. (2018). The effects of internal board networks: Evidence from closed-end funds. *Journal of Accounting and Economics*, *66*(1), 266–290.

Westphal, J. D. (1999). Collaboration in the boardroom: Behavioral and performance consequences of CEO–board social ties. *Academy of Management Journal*, *42*(1), 7–24.

Withers, M. C., Corley, K. G., & Hillman, A. J. (2012). Stay or leave: Director identities and voluntary exit from the board during organizational crisis. *Organization Science*, *23*(3), 835–850.

Withers, M. C., Hillman, A. J., & Cannella, A. A. (2012). A multidisciplinary review of the director selection literature. *Journal of Management, 38*(1), 243–277.

Zahra, S. A., & Pearce, J. A. (1989). Boards of directors and corporate financial performance: A review and integrative model. *Journal of Management*, *15*(2), 291–334.

Zhu, D. H., & Shen, W. (2016). Why do some outside successions fare better than others? The role of outside CEOs' prior experience with board diversity. *Strategic Management Journal*, *37*(13), 2695–2708.

APPENDIX

TABLE 1: Correlation matrix

|	Director exit	Dissimilarity Firm Age	Dissimilarity Industry	Dissimilarity Assets	Dissimilarity Empl Size	Experience w diverse portf	Director's age	Female director	Portfolio turnover last two yrs	Diversity of board in nationality	Diversity of board in education	Diversity of the board in gender	Diversity of the board in age	Board size	Director is the chairperson	Number of directorships	Board tenure of the director	(Board tenure of the director)^2	Outside director	Growth in assets t-2	Growth in assets t-1	Growth in empl t-2	Growth in empl t-1	Growth in sales t-2	Growth in sales t-1
Director exit	1																								
Dissimilarity Firm Age	**0.03**	1																							
Dissimilarity Industry	**0.03**	**0.08**	1																						
Dissimilarity Assets	0.01	**0.08**	**0.16**	1																					
Dissimilarity Empl Size	0.00	**0.10**	**0.16**	**0.27**	1																				
Experience w diverse portf	0.00	**0.28**	**0.43**	**0.36**	**0.34**	1																			
Director's age	**-0.02**	**-0.08**	**0.06**	0.01	0.01	**0.08**	1																		
Female director	**0.01**	**-0.01**	**-0.05**	**-0.05**	**-0.03**	**-0.12**	**-0.13**	1																	
Portfolio turnover last two yrs	**0.06**	**0.05**	**0.08**	-0.01	0.00	**0.20**	0.03	-0.03	1																
Diversity of board in nationality	**0.02**	0.00	0.00	-0.01	-0.02	-0.04	-0.03	0.01	0.01	1															
Diversity of board in education	0.00	-0.01	**0.06**	0.00	-0.01	0.02	0.06	0.02	0.02	0.07	1														
Diversity of the board in gender	**0.01**	**-0.03**	0.00	**-0.06**	**-0.05**	**-0.10**	-0.01	**0.37**	0.02	**0.04**	**0.10**	1													
Diversity of the board in age	0.00	**-0.02**	**0.04**	**-0.04**	**-0.02**	**-0.02**	**0.15**	**0.04**	0.02	0.03	**0.32**	**0.19**	1												
Board size	**0.01**	**-0.02**	**0.07**	**-0.09**	**-0.06**	**-0.07**	**0.05**	**0.08**	0.03	**0.05**	**0.40**	**0.26**	**0.49**	1											
Director is the chairperson	**-0.02**	0.00	**0.03**	**0.02**	0.00	**0.11**	**0.10**	-0.09	**0.07**	0.00	**-0.11**	-0.02	**-0.10**	**-0.21**	1										
Number of directorships	-0.01	**-0.03**	**-0.07**	**-0.06**	**-0.05**	**0.25**	**0.05**	-0.07	-0.04	-0.05	-0.02	**-0.09**	-0.05	**-0.07**	**0.09**	1									
Board tenure of the director	**-0.09**	**-0.14**	**-0.02**	0.01	**0.03**	**0.06**	**0.22**	-0.05	-0.06	-0.03	-0.03	-0.03	-0.02	**-0.08**	**0.11**	0.01	1								
(Board tenure of the director)^2	**-0.08**	**-0.15**	-0.01	0.02	**0.03**	**0.06**	**0.22**	-0.05	-0.05	-0.03	-0.03	-0.03	-0.02	**-0.08**	**0.13**	0.02	**0.96**	1							
Outside director	**0.04**	-0.01	**0.04**	-0.04	**-0.06**	**0.07**	0.03	-0.03	**0.08**	**0.02**	0.00	**0.02**	-0.04	0.02	**0.07**	**0.13**	**-0.20**	**-0.18**	1						
Growth in assets t-2	0.00	0.01	0.01	0.01	**0.01**	0.00	**-0.01**	0.00	0.00	**0.01**	0.00	-0.01	0.00	0.00	-0.01	**-0.03**	**-0.03**	0.00	1						
Growth in assets t-1	0.00	**0.03**	0.00	0.00	**0.01**	0.00	**-0.03**	-0.01	**0.01**	0.00	-0.01	-0.02	-0.01	-0.01	0.00	-0.01	**-0.06**	**-0.05**	0.00	-0.01	1				
Growth in empl t-2	**0.01**	**0.01**	0.01	-0.01	0.00	0.00	**-0.01**	0.00	**0.01**	0.01	0.00	0.00	0.00	**0.01**	0.00	0.00	**-0.02**	**-0.02**	0.00	**0.02**	0.00	1			
Growth in empl t-1	0.00	**0.01**	0.00	-0.01	0.00	0.01	**-0.01**	0.00	0.00	0.01	0.01	-0.01	0.00	**0.01**	-0.01	0.00	**-0.02**	**-0.02**	-0.01	0.00	**0.05**	0.00	1		
Growth in sales t-2	0.00	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.00	**-0.01**	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	**0.01**	0.00	**0.01**	**0.05**	1	
Growth in sales t-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	-0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**	0.00	0.00	0.00	1

Bold values are significant at a $p < 0.05$ level.
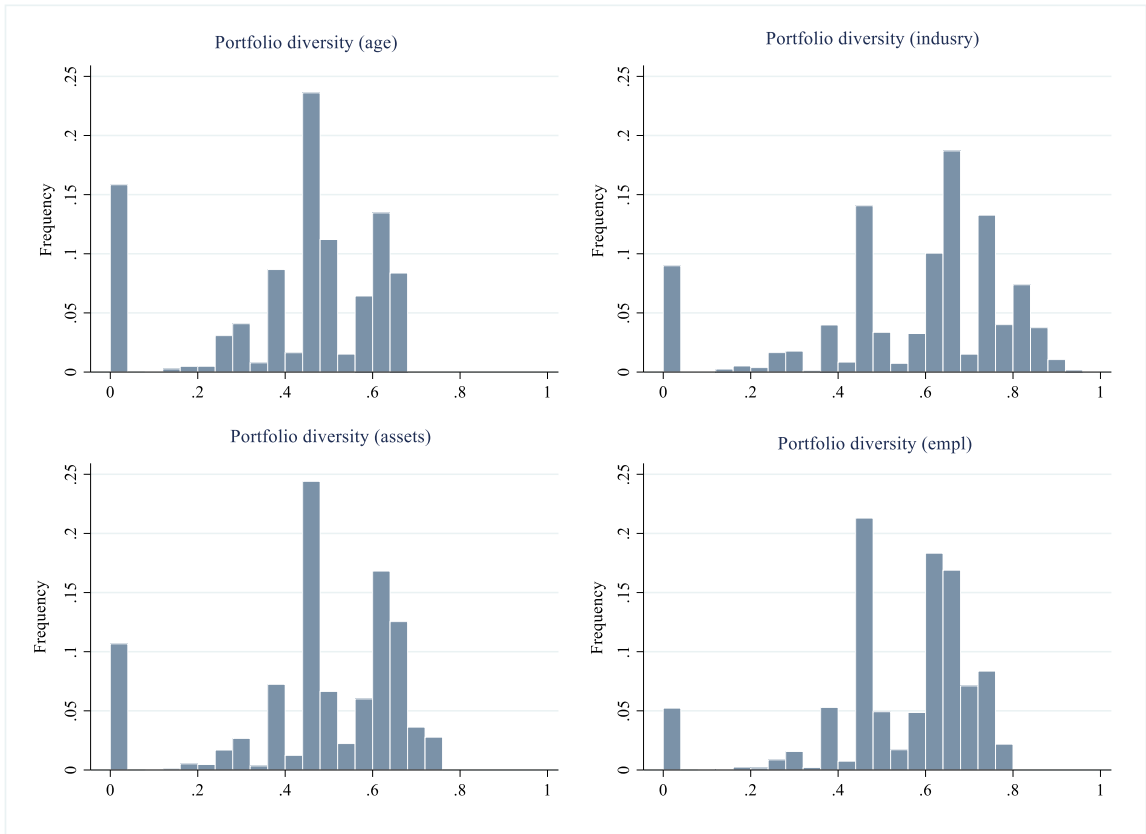
FIGURE 1: The distribution of portfolio diversity by age, industry, and size (assets and employees)
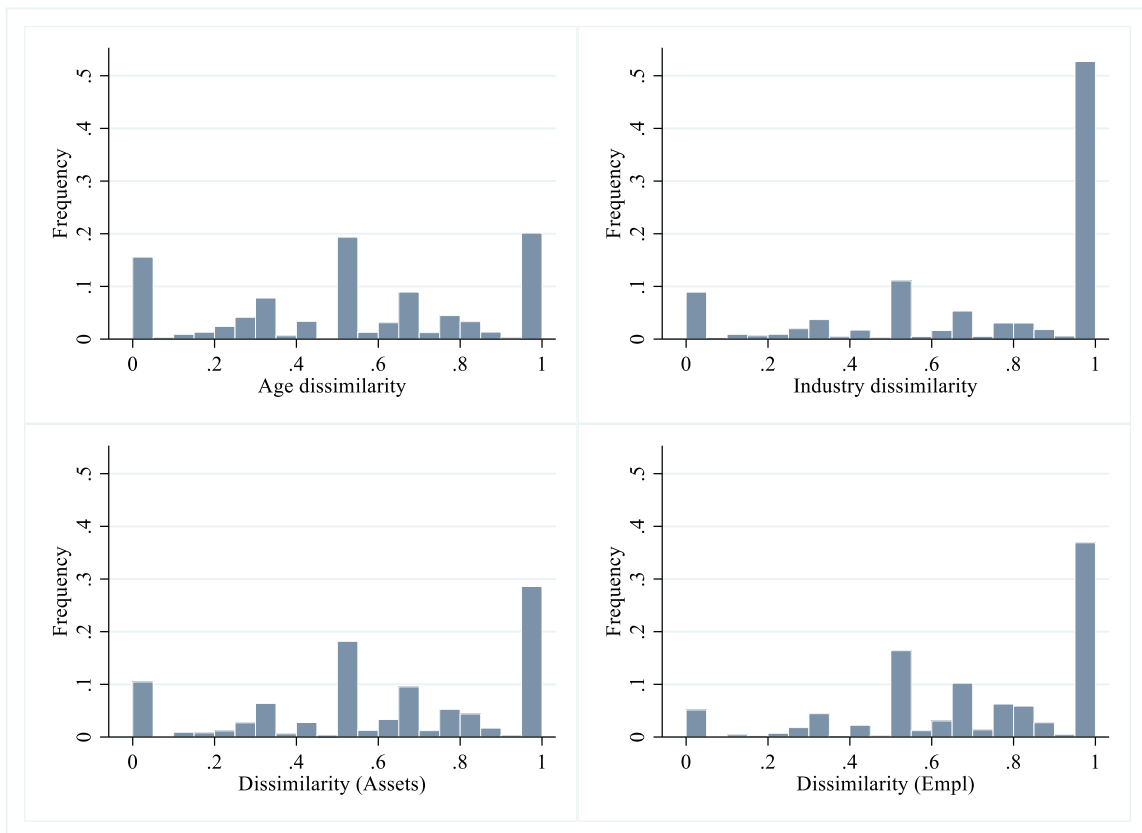

FIGURE 2: The distribution of dissimilarity of firms by age, industry, and size (assets and employees)
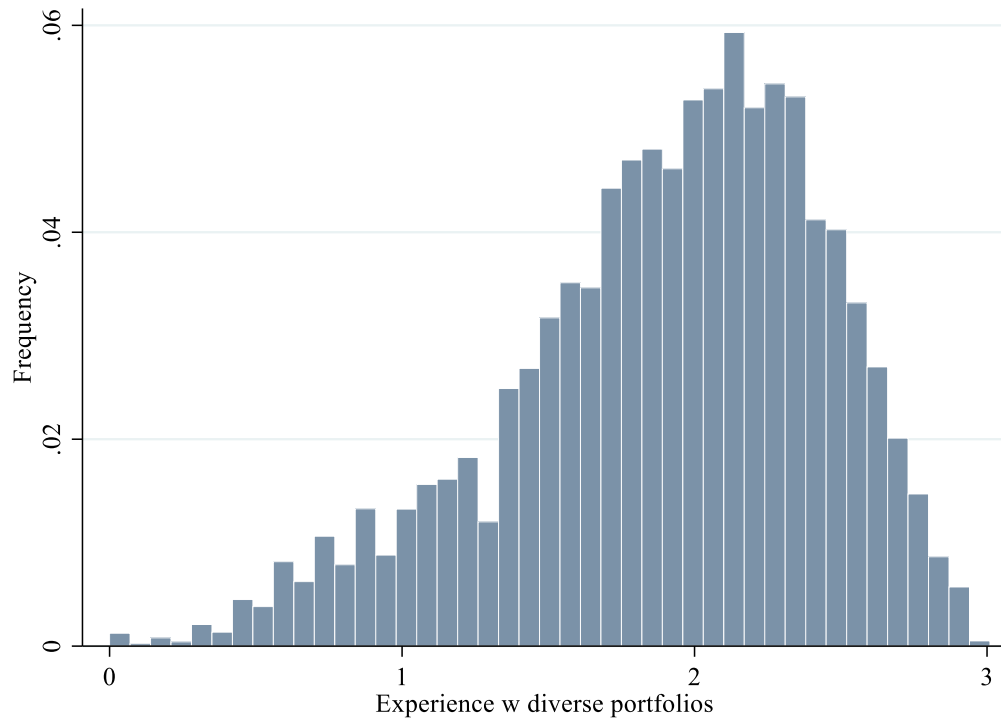
FIGURE 3: The distribution of directors' degree of experience with diverse portfolios for all four criteria