HUMAN CAPITAL AND NEW FIRM PERFORMANCE: FOUNDERS, EMPLOYEES AND BOARD MEMBERS

Sujit Pandey

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Introductory Chapter

I. Entrepreneurship and Human Capital

Although entrepreneurs were largely relegated to making small cameos in economic theories of the past (Schultz, 1980), entrepreneurship research has experienced rapid growth over the past three decades. This growth may be attributable to increased interest among policy makers in promoting entrepreneurship to help ailing economies as well as researchers' interest in understanding how economic agents like entrepreneurs make decisions (Wennekers & Thurik, 1999; Holmes & Stone, 2010). While there are now several journals dedicated solely to entrepreneurship research, major management and economics journals have increasingly been publishing articles on various aspects of entrepreneurship, signaling broader acceptance of the field as an important scholarly discipline (Busenitz et al., 2014). The result has been significant theoretical and empirical advances over the years, leading to better understanding of the various aspects of the entrepreneurship phenomenon (Davidsson, 2016). In fact, with the growth in the field, we have seen the emergence of several sub-fields that explore the intersection of entrepreneurship and other constructs, such as immigrant entrepreneurship, female entrepreneurship, international entrepreneurship, etc.

In parallel, there has been a significant increase in the recognition by policy makers of entrepreneurship as an important tool for economic growth and employment creation (Audretsch, Grilo, & Thurik, 2007). For instance, in order to help deal with the structural changes facing the Norwegian economy, the government has identified the creation and growth of new businesses as an important strategic tool; consequently, it has introduced a range of initiatives to promote entrepreneurship (Norwegian Ministry of Trade, Industry, and Fisheries, 2016). Not only national governments but also the supranational institutions such as the United Nations and the European Union have formulated various policies over the years to help member countries prosper via more

and/or better entrepreneurship. Such policies aimed at promoting new business formation and growth will be only successful if based on solid entrepreneurship research.

In their review of entrepreneurship research, Praag and Versloot (2007) find that entrepreneurship adds significant economic value not only through employment creation, productivity growth, production and commercialization of innovations, but also via positive regional spillover effects on the employment growth of other firms. While these findings may give the impression that entrepreneurship is a bed of roses, plenty of thorns do admittedly exist. Most new firms fail to survive beyond 10 years, and only a small minority of firms are responsible for the vast majority of job creation (Decker et al., 2014). Mata and Portugal (1994) find that one fifth of new firms in their sample of Portuguese firms failed in the first year, and only half survived for four years. Similarly, Storey and Strange (1992) find that a third of all jobs in new firms were created by only two percent of the new firms in their sample. At the same time, the net job creation by new firms may not be substantial, meaning that they may simply be replacing jobs of existing firms[1] (Van Stel & Storey, 2004). Shane (2009) cautions against entrepreneurship promoting policies that induce "typical start-ups that are not innovative, create few jobs, and generate little wealth" (p. 141). Instead, he argues that the focus should be on high quality, high growth firms. This points to the need to focus on factors and characteristics that help (or hinder) the growth and success of entrepreneurial firms.

Policy makers need more insight from entrepreneurship research to help nurture "the right firms" since it is clear that simply creating as many new firms as possible is unlikely to produce net value for society as a whole. While policy makers are beneficiaries of entrepreneurship

[1] If the new firms create jobs with higher productivity than existing firms, then they are creating value in the economy even if they are merely replacing jobs.

research at the macro level, entrepreneurs, investors, creditors, and other stakeholders are prime beneficiaries of such research insights at the micro level. For instance, if there is overwhelming agreement in the literature that having a board member with industry experience has a positive effect on the performance of new firms, policy makers can facilitate conditions whereby entrepreneurs are matched with such prospective board members, or entrepreneurs can take such action on their own.

As such, both policy makers and entrepreneurs take an interest in knowledge that increases the chances of new firm survival and high performance. One cause of performance differences that has been the subject of extensive study by entrepreneurship scholars is human capital.

The OECD defines human capital as "the knowledge, skills, competence, and attributes embodied in individuals that facilitate the creation of personal, social, and economic well-being" (Liu Gang, 2011, p. 7). Indicators of human capital include education, experience, health, and even migration (Becker, 1964; Schultz, 1961).

Although the widespread recognition of human capital as an important explanatory variable in economic growth emerged in the second half of the twentieth century through the works of Mincer (1958), Becker (1964), and Schultz (1961, 1975), there have been references to it since long before that, as documented by Kiker (1966). Now, human capital is a distinguished field of scholarship in its own right. Human capital has been established as one of the most potent sources of competitive advantage (Barney, 1991; Campbell, Coff, & Kryscynski, 2012). In their meta-analysis of the relationship between human capital and firm performance, Crook, Todd, Combs, and Woehr (2011) find that the two are strongly related, particularly when the human capital in question is firm-specific.

Besides having a direct effect on firm performance through enhanced productivity, human capital can also affect an individual's social capital, thus also affecting firm performance indirectly. Social capital refers to "networks together with shared norms, values, and understandings that facilitate cooperation within or among groups" (Cote & Healy, 2001, p. 41). A high level of human capital can help individuals attain central positions in networks, which in turn increases the social capital of individuals (Nahapiet, 2011), with consequent direct as well as indirect effects on individual and firm outcomes.

Following the establishment of human capital as a scholarly discipline, its application to the understanding of entrepreneurial performance also gained momentum. Schultz (1975, 1980) was one of the more significant proponents of the role played by human capital in entrepreneurship. He envisaged human capital as an individual's ability to deal with disequilibria by reallocating resources. As such, entrepreneurs' ability to create and capture value through reallocation of resources and push the market from disequilibrium to equilibrium was dependent on their human capital.

Scholarly inquiry into human capital in entrepreneurial firms has been growing in recent decades. Marvel, Davis, and Sproul (2016) conducted a critical review of human capital in entrepreneurship research. They summarize the arguments made in entrepreneurship research linking human capital and entrepreneurial outcomes as follows. Human capital affects entrepreneurs' ability to discover, create, and exploit opportunities. Human capital also helps entrepreneurs acquire financial and additional human capital. We may even argue that human capital is even more important for entrepreneurial firms because they face rapid internal changes as they grow, in addition to the external uncertainties that all firms face. Based on these and other arguments, various entrepreneurship scholars have studied the effect of human capital on

outcomes such as opportunity identification (Ucbasaran, Westhead, & Wright, 2008; Bhagavatula, Elfring, Van Tilburg, & Bunt, 2010), firm entry (Bates, 1995; Kim, Aldrich, & Keister, 2006), firm survival (Gimeno, Folta, Cooper, & Woo, 1997; Geroski, Mata, & Portugal, 2011), firm growth (Cooper, Gimeno-Gascon, & Woo, 1997; Colombo & Grilli, 2005). In their meta-analytic review of the empirical relationship between human capital and various indicators of entrepreneurial success, Unger, Rauch, Frese, and Rosenbusch (2011) document a positive relationship between the two.

Entrepreneurial firms and non-founder human capital

One striking observation from the meta-analysis by Unger et al. (2011) and the critical review by Marvel et al. (2016) is that whereas there is significant focus on the human capital of the entrepreneur, scant inquiry has been conducted into the role of other sources of human capital in entrepreneurial firms, such as employees and board members. In fact, if we look at extant studies in strategic human capital (Hitt, Bierman, Shimizu, & Kochhar, 2001; Hatch & Dyer, 2004), upper echelons theory (Hambrick & Mason, 1984; Hambrick, 2007) and entrepreneurship research, it seems like the human capital of top-level management[2] and employees take primacy in studies based on established firms (addressed by strategic human capital and upper echelons literature), while the human capital of founders take primacy in entrepreneurship research. This leaves the research on the human capital of employees in entrepreneurial firms neglected. Similarly, in the corporate governance literature, there is a paucity of research on the effect of board members' human capital in new firms, and the relationship is not well understood (Li, Terjesen, & Umans, 2018).

[2] Top-level management may or may not include founders.

In entrepreneurship research, the focus on the entrepreneur is quite understandable since entrepreneurship primarily concerns the actions of entrepreneurs. The human capital of entrepreneurs, as an antecedent of their actions, does deserve considerable attention. However, the human capital of other individuals in the firm can also have significant effects on its success or failure. For example, it may be the case that an entrepreneur is good at opportunity-spotting or creation but lack sales skills or the ability to build a well-functioning team. More generally, an entrepreneur often needs complementary human capital to convert a good idea into a successful venture. Good employees might take information from their tasks, interaction with clients, etc., and convey it as feedback to entrepreneurs to improve their services/products or their way of running the business. Sharp board members might anticipate or sense changes in the environment at an early stage and alert entrepreneurs or assist in developing strategies and solving problems. The quality of the feedback given by employees or the interpretation of events in the environment by board members will depend on their human capital. Bennett and Robson (2004) even argue that directors and external consultants' human capital may function as a substitute for that of internal management.

Therefore, even though the significant focus on the human capital of entrepreneurs is justified, the lack of adequate attention on other sources of human capital in entrepreneurial firms is lamentable. This oversight implies that we assume one of the following two arguments to be true. The first is that the other sources of human capital in entrepreneurial firms are simply not important. However, even to confirm that this is true, we would need extensive research on other sources of human capital. The second argument is that the roles played by the other sources of human capital in entrepreneurial firms are the same as in established firms; hence, we can simply extrapolate the findings of research on established firms to new firms. This argument is not

particularly plausible, because of the obvious and important differences between new and established firms in terms of their characteristics and challenges they face.

There has been some research on small and medium enterprises studying the effect of the human capital of employees (Hayton, 2003; Andries & Czarnitzki, 2014) and board members on firm performance (Huse, 2000; Bennett & Robson, 2004; Neville, 2011; Wincent, Anokhin, & Ortqvist, 2010). The relevance of these studies on new firms is questionable because SMEs are different from new firms in a number of ways. Entrepreneurial/new firms represent the classification of firms by age (usually less than 10 years), whereas SMEs are a result of classification by firm size (usually, firms with 10–249 employees are classified as SMEs). According to this classification, many new firms are actually micro-SMEs, i.e., have fewer than 10 employees. The difference can be illustrated by looking at the average firm age in studies that use SMEs. For example, the average firm age in Bennet and Robson (2004), Brunninge, Nordqvist, and Wiklund (2007), and Basly, (2007), which study the effects of board members on firm outcomes in SMEs, are 13, 31, and 55 years, respectively. Similarly, the average firm age in Andries and Czarnitzki (2014), which studies the effects of employee human capital on innovation outcomes in SMEs, is over 20 years. As firms grow old, their age-related diversity declines as the differences from their early age disappear (Bennet & Robson, 2004). Furthermore, new firms are in their formative years; hence, they are more open to imprinting (Burton & Beckman, 2007). Therefore, employees or board members may be more likely to leave a lasting impact on the firm, while this is probably less likely to happen in SMEs that have moved beyond their formative years. For example, since new firms are characterized by a lack of routines, procedures, culture, values, etc., an employee can be instrumental in shaping them as they are built, whereas in older SMEs, such characteristics are already built-in and, thus, more resistant to

change. For such reasons, SMEs are unlikely to be an appropriate sample to use to study new firm phenomena.

Based on these arguments, it is clear that non-founder human capital and its effects on entrepreneurial firm performance is a research area with significant gaps. Referring back to the attractiveness among policy makers of entrepreneurship as a tool for employment generation and economic growth, understanding factors that explain entrepreneurial success is important. Furthermore, entrepreneurs themselves would benefit from a better understanding of the importance (or lack thereof) of other sources of human capital in the firm and an ability to act accordingly. As such, filling in the research gaps herein identified has not only scholarly value but also significant practical implications. In order to address these gaps, this research focuses on two sources of non-founder human capital—board members and early employees—and examines their performance impact on entrepreneurial firms.

Entrepreneurial firms and human capital of board members

A large body of corporate governance literature has studied the antecedents (Hermalin & Weisbach, 1988; Burton, 2000; Boone, Field, Karpoff, & Raheja, 2007; Linck, Netter, & Yang, 2008; Kaczamarek & Kimino, 2012) and, more importantly, consequences (Baysinger & Butler, 1985; Dalton, Daily, Ellstrand, & Johnson, 1998; Erhardt, Werbel, & Shrader, 2003; Rose, 2007; Guest, 2009; Garg, 2013) of various board and/or board member characteristics. Some studies find a relationship between board characteristics and firm outcomes (Kiel & Nicholson, 2003; Kroll, Walters, & Le, 2007; Kim & Lim, 2010; O'Connell & Cramer, 2010), while others do not (Daily & Dalton, 1992; Bhagat & Black, 2002). Surprisingly, two meta-analyses that examine these links—Dalton et al. (1998) and Rhoades, Rechner, and Sundaramurthy (2000)—arrive at different findings: the former finds no relationship while the latter notes a small positive

relationship. One inference from these divergent findings is that there is a need for a more detailed look at the characteristics of individual board members. As Boyd (1990) and Hillman, Withers, and Collins (2009) suggest, resource-rich board members should be the focus of these studies.[3] One such important resource a board member can bring is human capital, which is our focus here.

Most of the studies in the corporate governance literature, including those linking the human capital of board members to firm performance, seem to be based on large/established/public firms. The reason for this might be as follows. The primary function of the board in such firms is generally understood to be the oversight of management. The board is there to protect the interests of the shareholders against any self-serving actions of top management. This is evident from the fact that the literature predominantly uses agency theory to study this control function of boards (Boivie, Bednar, Aguilera, & Andrus, 2016). This research premise lends itself to a sample of large and public firms in which the owners may not be very close to the day-to-day operations or even be able to keep track of the strategies the firms are pursuing. This is not the case for new/entrepreneurial firms, where the founder is usually in command of the firm. This implies that the control function of board members takes primacy in mature firms, while strategy, service, and legitimacy functions (Zahra & Pearce, 1989; Hillman & Dalziel, 2003; Neville, 2011) take primacy in new firms.[4] *Strategy function* refers to aiding the management of the firm in formulating strategies to help enhance performance. The *service function* of board members includes providing advice, counseling management, and helping them access critical resources. *Legitimacy function* refers to tasks that help improve firms' image in

[3] However, in order to understand the effect of resource-rich board members, we need to contrast them with resource-poor board members.
[4] There is an emerging literature (Garg, 2013) on venture boards, where board members have significant monitoring obligations (although distinct from those of large public firms) to protect the interests of external investors.

their environment. Strategy, service, and legitimacy functions are sometimes bundled together as resource-provision roles (Hillman & Dalziel, 2003).

It is intuitive that the human capital of board members would be a good predictor of how well they can fulfill the demands of the service role, that is, advising, strategizing, and providing legitimacy by lending their reputation to the firm. Those studies that have looked into the effect of board members' human capital on firm performance generally find a positive relationship (Kor & Sundaramurthy, 2009; De Villiers, Naiker, & Van Staden, 2011; Johnson, Schnatterly, & Hill, 2013; Khanna, Jones, & Boivie, 2014). These studies tend to focus on established firms; furthermore, these studies cannot distinguish between the selection and treatment effects of board members since they are riddled with endogeneity issues.

Some studies also examine the relationship between board member human capital and firm outcomes in small and medium enterprises (Bennett & Robson, 2004; Pugliese & Wenstøp, 2007; Neville, 2011). These studies highlight the service role of board members and find a positive relationship between board member human capital and firm outcomes. Van Gils (2005) finds that SMEs do not take sufficient advantage of the resource boards can represent and advises them to do so. While the findings from these studies can be useful in speculating about the link between boards of directors in entrepreneurial firms and performance, we must keep in mind that there are significant differences between SMEs and entrepreneurial/new firms, as explained above.

Conceptually, the potential importance of board of directors' human capital for entrepreneurial firms seems obvious. Entrepreneurial firms' liability of newness (Stinchcombe, 1965) is a good starting point from which to understand why director human capital can be crucial for survival and performance. Summarizing the essence of Stinchchombe's original idea

of the liability of newness and subsequent developments in the construct, Wiklund, Baker, and Shepherd (2010) distinguish between internal and external sources of liability of newness in new firms. Internally, a new firm has roles that are ill defined or remain undefined. Figuring out those roles and creating appropriate routines takes time, and until this is achieved, it is unlikely that these new firms will be economically efficient. Furthermore, a new firm likely consists of individuals (founders and employees) who have not worked together before. These individuals need to be able to adapt to each other and gain each other's trust, which also takes time.[5] Externally, new firms may not have built a competitive knowledge stock of their environment or the capability to scan the environment and identify threats and opportunities. Similarly, they have to spend resources to establish legitimacy with their stakeholders and mobilize their required contributions. Singh, Tucker, and House (1985) find that external legitimacy constitutes a bigger source of liability of newness than do internal coordination processes for new firms.

These external and internal challenges that new firms face, combined with their bare-bones resource stocks, mean that they should accept any help they can find. Board members can be of value in offsetting these challenges. For example, a board member with industry experience may be able to help the entrepreneur define rules and set up routines. A board member can also help the entrepreneur recruit employees from her network and thus alleviate the trust issue that arises from hiring complete strangers. Similarly, a board member is often expected to act as a "linking pin, connecting the firm and its environment (Zahra & Pearce, 1989, p. 299). Huse and Zattoni (2008) observe that the board is involved in helping a firm gain legitimacy during the start-up phase. A board member with high human and social capital can accomplish these tasks

[5] At the same time, new firms are likely to be internally less complex, which somewhat mitigates the liability of newness.

better on behalf of a resource-constrained firm, thereby helping it to overcome the external challenges. In sum, board member human capital can potentially be used as a strategic resource for an entrepreneurial firm.

We have only a handful of studies that actually explore the role played by board member human capital in firm performance in the context of entrepreneurial firms. Kor and Misangyi (2008) find that outside directors' industry-specific experience can compensate for the lack of it in entrepreneurial firms' top management. Looking at early-stage high-tech firms, Vandenbroucke, Knockhaert, and Ucbasaran (2016) find that specific experience, diversity, and tenure exert significant positive performance effects. Christman and McMullan (2004) find that use of outside assistance in terms of advice and counseling can help new ventures' survive. Therefore, bringing advisors into the firm in the form of directors should enhance new venture performance. Indeed, Knockaert and Ucbasaran (2013) find that firms that lack certain types of human capital in their top management teams receive higher levels of support from their outside board members. This indicates that board member human capital is indeed used to supplement founders' human capital, as Bennett and Robson (2004) suggest.

Zhang, Baden-Fuller, and Pool (2010) find a more intriguing link between venture board and top management team human capital. They find that in high-tech ventures, the board functions as an extension of the top management team, thus transcending the duties emphasized by the principal-agent model that dominates the corporate governance literature. They claim that the board members in their study "often act as business model architects, both initiating and developing strategy in collaboration with—or even leading—their less-skilled top executives" (p. 113). It is easy to imagine how important the human capital of board members would be in undertaking such roles.

One noticeable aspect of the handful of studies examining the human capital effect of board members on firm performance is that they all focus on the high-tech sector and predominantly investigate venture boards. This focus is understandable, given that such firms make a significant contribution in terms of economic and employment growth. However, the contributions board members make to the "normal" new firm should also be of interest from an academic as well as a policy perspective. At the very least, not all successful startups originate in the high-tech sector, and not all successful startups rely on venture capital. In the research design and methods section below, detailed discussion is provided of what constitutes entrepreneurship and why the types of firms in the samples have been selected.

Immigrant entrepreneurial firms and human capital of board members

While immigrant entrepreneurship is an important phenomenon and now an established scholarly discipline in its own right, it is also appropriate to view it as a special context of entrepreneurship. We expect immigrant entrepreneurs to face a more severe form of liability of newness. Immigrant entrepreneurs are likely to face bigger challenges obtaining external legitimacy with their stakeholders, compared to native entrepreneurs, because of their lack of social embeddedness (Portes & Sensenbrenner, 1993). They may also struggle to design roles and routines that fit the host country's institutions and practices. Immigrant entrepreneurs may face bigger trust and communication issues while hiring local employees, or even other immigrant employees from different countries, due to cultural differences. This implies that they may end up either hiring inferior employees or even getting less output from their competent employees. Furthermore, it is also possible that they face discrimination from consumers in the product

market, from suppliers in factor markets, and from financial institutions in capital markets (Parker, 2018).

Consistent with these arguments, studies suggest that firms with lower levels of social embeddedness exhibit a lower level of performance (Uzzi & Gillespie, 2002; Jack & Anderson, 2002). In this context, having a resource that can connect immigrant-owned firms to local socio-economic institutions would be valuable. One such resource can be a native board member. It is a plausible argument to make that most of the disadvantages that an immigrant entrepreneur faces in the host country that are due to foreignness can be alleviated by recruiting a board member that can function as a bridge between the firm and the socio-economic institutions of the host country. As such, native board members with relevant human capital (such as industry experience) can help immigrant entrepreneurs be competitive with native entrepreneurs in the host country.

It appears that the intersection of immigrant entrepreneurship and corporate governance is a fertile ground for research, especially for boards' service and strategy roles. Despite the fact that this is a seemingly obvious observation, I cannot find any study that has looked into it.

In conclusion, the relationship between the human capital of board members and firm performance in the context of entrepreneurial firms is an under-researched area. Extrapolating from the research done in the context of established public firms and SMEs, as well as the handful of studies conducted in the context of high-tech entrepreneurial firms, we expect to find that board member human capital positively and significantly affects entrepreneurial firm performance. The research gap needs to be addressed not only because there is scholarly value in it but also because it can help policy makers design policies capable of improving new firm growth and helping both native and (perhaps particularly) immigrant entrepreneurs understand how they can strategically use boards rather than treating them as some formality to be fulfilled.

Human capital or board capital?

Board capital is comprised of the human and social/relational capital of board members (Hillman & Dalzier, 2003; Wincent, Anokhin, & Ortqvist, 2010). It has been argued that the human capital of board members is essential for them to perform their strategy role, which consists in helping the firm develop strategies to be competitive in product or factor markets; moreover, social capital is essential to performing the service role, which concerns linking the firm to the external environment to gain legitimacy and build reputation (Wincent, Anokhin, & Ortqvist, 2010). Haynes and Hillman (2010) have developed a construct of board capital that combines the breadth and depth of the human and social capital of board members. In order to do so, they integrate occupational heterogeneity (human capital), functional heterogeneity (human capital) and directorate interlock (social capital) to form board capital breadth. Similarly, they integrate industry occupation (human capital) and industry directorate interlocks (social capital) to form board capital depth. Then, they combine board capital breadth and depth to form composite board capital. While this is an intuitive way of looking at the value a board can add to a firm, there are reasons why the current research sticks with human capital.

First, our overall quest is to determine the importance of the human capital of non-founders in the firm. Therefore, we are primarily interested in human capital as a variable. Second, with our data, it is not possible to accurately measure all the components required by the Haynes and Hillman (2010) approach, for example, the functional heterogeneity measure of board capital. Additionally, due to the interdependent nature of human and social capital, especially measures such as industry experience, we may already be capturing the essence, albeit crudely, of board capital with some of this study's human capital measures. For example, as Nahapiet (2011) states, "education level is a good predictor of centrality in networks and thus

high structural social capital. Educational credentials may deliver social capital through social prestige and access to high-status networks" (p. 88).

Entrepreneurial firms and human capital of employees

The entrepreneurship literature has, by and large, neglected the human capital of initial employees. Still, a handful of studies have looked into employee human capital in entrepreneurial firms, and these find significant effects on firm outcomes. Initial employees could be valuable resources for helping new firms overcome the liability of newness and increase their chances of survival (Bruderl & Schussler, 1990; Geroski, Mata, & Portugal, 2010). They can also contribute to innovation performance (Andries & Czarnitzki, 2014). Coad, Nielsen, and Timmermans (2016) conclude that employee characteristics seem less important for firm success, although they find a positive relationship between college-graduate employees and firm success when they exclude family hires from their analysis. Rocha, Praag, Folta, and Carneiro (2018) find that initial employees' human capital has a significant effect on the survival and performance of entrepreneurial firms.

Initial employees in an entrepreneurial firm might contribute to its performance through various mechanisms. The first reason is the direct value they add via their human capital. Numerous studies in the strategic human capital discipline look at the importance of employee human capital (Hitt et al., 2001; Crook et al., 2011; Oldroyd & Morris, 2012) and find a positive effect. There is also recognition in the strategic human resource management literature that certain employees are more important than other employees in terms of the value they add to the firm (Becker & Huselid, 2006; Hausknecht, Rodda, & Howard, 2009; Call, Nyberg, & Thatcher, 2015). These studies are not conducted in the context of entrepreneurial firms, but it is not difficult to conceive of the importance of employee human capital in entrepreneurial firms as

generally demonstrated by the few studies in this area (Geroski, Mata, & Portugal, 2010; Rocha, Praag, Folta, & Carneiro, 2018; Rauch, Frese, & Utsch, 2005). For example, employees with industry experience can help the founder establish industry-standard practices in the new firm, thus enhancing productivity and helping gain legitimacy. Similarly, employees with high human capital have a higher capacity to learn and produce new knowledge, which is the basis of innovation (De Winne & Sels, 2010).

Imprinting theory (Stinchcombe, 1965; Johnson, 2007; Marquis & Tilcsik, 2013) offers a second mechanism through which initial employees' human capital leaves a long-lasting mark on the firm. While the first mechanism refers to immediate effect and would cease upon the individuals leaving the firm, the imprinting effect persists even after individuals leave the firm. The individuals shape the roles and routines in a new firm and thus leave their unique imprints. The subsequent occupants of such roles can be affected those position imprints left by initial employees (Burton & Beckman, 2007).

The third mechanism involves a signaling effect (Spence, 1971) that the human capital of one employee can potentially have in attracting future employees. Recruitment is a process riddled with information asymmetry in which firms know little about the actual abilities of candidates and candidates have no first-hand knowledge of the quality of the firm. This issue is even more prominent for the recruitment process in entrepreneurial firms. On the one hand, entrepreneurial firms do not have the same name recognition and reputational assets that established firms have; thus, the candidates have even less information about job quality. Conversely, entrepreneurial firms do not usually have a dedicated human resource management department or established screening mechanisms, and they lack the experience of hiring numerous employees that large firms, or even SMEs, have. Therefore, they have to make the

most of whatever resources they possess. Their existing employees, in this context, can be valuable in projecting the quality of the firm. A firm that has hired a high-quality initial employee can introduce her to prospective candidates and thus convey the quality of the firm.

The fourth (and related) mechanism through which employees can be an important strategic resource to entrepreneurial firms is by giving the founder access to their social network. There is an extensive literature in personnel economics that studies how entrepreneurs can use employees' referrals to hire subsequent employees (Rees, 1966; Rees & Shultz, 1970; Montgomery, 1991; Hensvik & Skans, 2013). It is less costly in terms of time and money to hire through existing employee referrals, and such hires are found to have higher productivity and lower turnover (Holzer, 1987; Montgomery, 1991). Since social networks are characterized by homophily (McPherson & Smith-Lovin, 2001), an entrepreneur is likely to attract high ability candidates through the social network of her high ability employees. Employee referrals can be a particularly effective recruitment mechanism because it reduces information asymmetry problems for both the firm and candidates. A survey by CareerBuilder (2010) suggested that 26% of external hires are generated from employee referrals and 88% of employers considered employee referrals to be the best hiring method in terms of the quality of matches.

While the first mechanism pertained to the direct contribution of employee human capital through productivity, even in the third and the fourth mechanisms, the human capital of the employee continues to play an important role. The second and third mechanisms offer insight into the process of human capital accumulation in firms in their early stages. Considering that we take the importance of human resources in firms for granted, inquiry into how such human capital is accumulated in the first place is an important research question. I explore these mechanisms in one of my papers.

II. Research Design and Methods

Measuring Entrepreneurship

"Who is an entrepreneur and who is not?" is a question that has gained significant attention in entrepreneurship literature (Hebert & Link, 1988; Wennekers & Thurik, 1999; Henrekson & Sanandaji, 2019). How we define entrepreneurs has direct implications for how we measure entrepreneurship. By synthesizing the works of Cantillon, Schumpeter, Schultz, and Kirzner, Hebert and Link (1988, p. 39), we propose that an entrepreneur is "someone who specializes in taking responsibility for and making judgmental decisions that affect the location, the form, and the use of goods, resources, or institutions." Winnekers and Thurik (1999) argue that the definition provided by Hebert and Link (1988) does not fully capture entrepreneurship from an economic growth perspective, which policy makers and the majority of scholars are mostly interested in. They build on Herbert and Link (1988) and define entrepreneurship as follows:

> the manifest ability and willingness of individuals, on their own, in teams, within and outside existing organizations, to: (a) perceive and create new economic opportunities (new products, new production methods, new organizational schemes, and new product market combinations) and (b) introduce their ideas in the market, in the face of uncertainty and other obstacles, by making decisions on location, form, and the use of resources and institutions (p. 46).

While talking about entrepreneurship, it can be tempting to focus exclusively on Schumpeterian entrepreneurs because of their supposed contribution to economic growth. However, routine or replicative businesses, which constitute the vast majority of new firm

registrations, contribute significantly to the economy even though they do not innovate (Henrekson & Sanandaji, 2019). While it is instructive to distinguish between firms that are involved in radical innovation and those that are involved in more routine businesses, it is also important not to lose interest in the latter types by maligning them as being non-entrepreneurial. There is a sense that entrepreneurship scholars have been overly focusing on high-tech and high-growth firms at the expense of ordinary business start-ups even though the latter represent the vast majority of firms and contribute significantly to the economy (Lehmann, Schenkenhofer, & Wirsching, 2018). These ordinary firms contribute to the economy, besides through creating employment, by replacing less productive exits or merely by motivating established firms to improve in order to avoid being replaced. Also, some of the "non-glamorous" firms presumed not to be high growth have the potential to become high growth eventually. Therefore, from the point of view of measuring entrepreneurship, I believe that it is as erroneous to neglect legitimate firms doing replicative/routine activities as it is to include any entity just because it is registered in the company registrar's office.[6]

Translating the theoretical definition of entrepreneurship into the empirical measure is challenging. We need to make sure that the firms in our sample include elements of entrepreneurship as included in the definition, such as risk-taking, uncertainty, opportunity identification, exploitation, etc., particularly when using registry data as I do. However, it is possible to identify firms that represent greater entrepreneurial endeavors than others. One important measure to identify more entrepreneurial firms is their legal form. Levine and

[6] Earlier, on page 3, there is a reference to Shane (2009) cautioning policy makers against making policies that promote creating firms that neither innovate nor create jobs or wealth. This is an argument for promoting high-growth ventures. However, we do not know which firms are going to be high-growth firms ex ante. Therefore, researchers ought to include all legitimate firms, some of which may eventually be high-growth firms, while studying drivers of firm growth/performance.

Rubinstein (2013) study differences between unincorporated (sole-proprietorship) firms and incorporated (limited liability) firms. They highlight two characteristics of incorporated firms that distinguish them from unincorporated firms—limited liability and separate legal entity status. They explain:

> Limited liability reduces the potential downside losses to equity holders, increasing the appeal of purchasing equity in high-risk, high-expected return projects. A separate legal identity means that corporations can own property and enter into contracts independently of shareholders. This means that shareholder-specific shocks are less likely to disrupt firm activities, increasing the appeal of investing in large, long-gestation projects.

This means that limited liability firms are more likely to be entrepreneurial. They find that owners of limited liability firms are cognitively different from owners of sole-proprietorship firms in general and that limited liability firms outperform sole-proprietorships. Consistent with this finding, Åstebro and Tåg (2017) find that founders of limited liability firms are in general more educated, earn more as employees, and spend less time unemployed. Åstebro and Tåg (2015, 2017) also find that limited liability firms create significantly more jobs than do sole-proprietorship firms. Guzman and Stern (2016) find that compared to sole-proprietorships, limited liability firms represent higher quality entrepreneurship. After comparing various quantitative measures of entrepreneurship, Henrekson and Sanandaji (2019) endorse the limited liability status of a firm as the only measure that captures potentially high-impact Schumpeterian entrepreneurship.

Based on this assessment, I include only the limited liability firms that have had some economic activity such as having sales of at least NOK 50,000 or having hired one or more

employees. This ensures that firms that are investment vehicles, tax instruments, etc., are removed from the sample. Therefore, I believe that in my papers, I strike a sensible balance between excluding too much and including too much when sampling. In other words, I capture the essence of entrepreneurship that is of interest to scholars, practitioners, and policy makers.

Measuring Human Capital

Human capital in organizational research refers to skills, knowledge, and capabilities embedded in individuals associated with the organization, such as founders, top management, employees, and board members. Human capital is acquired through activities such as "schooling, on-the-job training, medical care, migration, and search for information about prices and incomes" (Becker, 1994, p. 11). These activities, which are called *investment in human capital*, are usually taken as proxies for an individual's actual human capital, and evidence shows that human capital investments and human capital outcomes are related (Unger et al., 2011).

Crook, Todd, Combs, and Woehr (2011) identify dozens of human capital measures used in organization research, such as education; general, industrial, managerial, and entrepreneurial experience; training; leadership capabilities; IT knowledge; selling skills, etc. Thus, extant literature uses both outcomes of human capital investments (skills, knowledge, and capabilities) and investment in human capital while assessing effects on firm performance. The distinction between human capital investment and outcomes of human capital investment is important because it has been found that the effect of the outcomes of human capital investment on firm performance is higher than the effect of human capital investment (Unger et al., 2011). Availability of variables is a limiting factor in determining which measures to use. Marvel, Davis, and Sproul (2016) report that the most common human capital constructs used in entrepreneurship research are work experience, education, and entrepreneurial experience. Since I

use registry data, investment in human capital such as education, experience, board experience, and industry experience are used as proxies for human capital rather than the outcomes of related investments. However, in one of the papers, person fixed effects of entrepreneurs and employees are used as indicators of their unobserved skill level. This measure is an outcome of investment in human capital.

Human capital measures can and should vary based on context (Baron, 2011). The dimension of an individual's human capital that is relevant in a particular setting depends on the role that person is supposed to play there. This argument is captured by the task-relatedness aspect of human capital. For example, experience being on boards of directors may be an appropriate measure of human capital for a board member but not necessarily for employees. Consistent with this argument, Unger et al. (2011) find that the human capital-firm performance relationship is stronger if the human capital is task-related. I have used different indicators of human capital for different roles.

In the first paper, where the importance of board members to entrepreneurial firms is studied, I include education, general work experience, and the board experience of board members to measure their human capital. In the second paper, which explores the role of native board members in helping immigrant entrepreneurs overcome their lack of embeddedness in the host country's socio-economic structures, education and industry experience are used as indicators of human capital because they are good measures of the ability and level of access of such board members. Similarly, in my third paper, which investigates the relationship between the human capital of founders and first and second employees, I include education, experience, and person fixed effects as indicators of human capital. Person fixed effects derived from a wage equation has been shown to be a good indicator of individuals' productivity (Abowd, Kramarz, &

Margolis, 1999; Iranzo, Schivardi, & Tosetti, 2008), making it an appropriate human capital measure for that paper. This measure captures the skills acquired through unobserved activities as well as unobserved differences in skill quality, thus helping us alleviate the endogeneity arising from omitted variable bias (Rocha et al., 2018).

Unger et al. (2011) also highlight the importance of exploring context as a moderator of the relationship between human capital and entrepreneurial firm performance. Keeping this in mind, this relationship is tested in different contexts in each of the papers. For example, in examining how important a board member is to an entrepreneurial firm, I test if the relationship is different when the board member is a chairperson or not, an outside board member or not, and the quality of board members compared to other board members in the same industry. In the second paper, in assessing the effect of native board members on the performance of immigrant entrepreneurs compared to native entrepreneurs, I test if the relationship varies based on different characteristics of the board member and the entrepreneur. Similarly, in the third paper, quartile analysis is conducted to examine if the relationship varies in different parts of the human capital distribution.

Human capital is a multidimensional construct that cannot be captured by any single indicator (Folloni & Vittadini, 2010). Comparing two individuals when the difference between them varies significantly regarding different dimensions of human capital is challenging. For example, how do we compare a college graduate with two years of work experience to a high school graduate with 15 years of experience? Therefore, it is more meaningful if we can construct a human capital measure that combines different dimensions of human capital, such as education

and experience, into a continuous one-dimensional scale. Portela (2001)[7] suggests one such method whereby we can multiplicatively combine two or more human capital dimensions based on the individual's relative position in the distribution of each of these human capital dimensions. Which dimension of human capital to use in building a composite measure depends on the relevance of these dimensions in the context of our research question. I use this method to construct a composite human capital measure for board members using education, experience, and board experience in the first paper. Similarly, I also use this to measure the human capital of employees and entrepreneurs in the third paper using education, experience, and person fixed effects. I do not use this method to measure the human capital of immigrant and native entrepreneurs or board members in the second paper because the wage penalty faced by immigrants in the labor market will misleadingly yield lower human capital scores for them. The details of how I built the measures are explained in the respective papers.

Measuring Performance

The relationship between human capital and entrepreneurial firm performance may differ based on the measure of firm performance used (Unger et al., 2011). Therefore, it is important to ensure that the dependent variables capture meaningful aspects of firm performance in the context of the research questions. Extant research in the field tends to use financial performance, such as sales, assets, profitability, etc., or the operational performance of firms, such as innovativeness, market share, employment size, and quality (Unger et al., 2011; Marvel, Davis, & Sproul, 2016). Unger et al. (2011) argue that human capital theory is more relevant in explaining

[7] There have been suggestions for alternative measures to unify different dimensions of human capital into a linear scale, such as the latent human capital measure by Folloni and Vittadini (2010) and the aggregated index of human capital by Arrazola and Hevia (2007).

financial performance since the theory originated in order to explain differences in the financial returns of education for employees. In my papers, I use both types of measures.

One of the topics entrepreneurship scholars are most interested in is the growth of new firms. In studying which growth measures are most relevant in entrepreneurship research, Davidsson, Delmar, and Wiklund (2006) observe that sales growth has been the most accepted measure of performance from both a conceptual and a convenience point of view. They point out some flaws in employment and asset growth compared to sales. They argue that employees can be replaced with machines, which means that having fewer employees is not necessarily a sign of poor performance. Similarly, they point out that asset growth is less relevant in the service sector. However, it is also important to point out that some entrepreneurial firms may have long product-gestation periods during which they hire employees to create products that can be sold only in a few years' time. In such firms, sales revenues, let alone profitability, may only appear after several years. Sales growth may be an inappropriate indicator in these cases. Besides sales, employment, and assets growth, Gilbert, McDougall, and Audretsch (2006) identify market share growth as a popular growth indicator used in entrepreneurship research.

Given that any single indicator cannot fully capture performance because of the diverse nature of entrepreneurial businesses, the best practice is to use multiple, objective indicators of firm performance (Murphy, Trailer, & Hill, 1996; Davidsson, Delmar, & Wiklund, 2006). Therefore, I use asset, employment, and sales growth as indicators of firm performance in my first paper. In the second paper, which explores performance differences between immigrant and native entrepreneurs and whether native board members can moderate such performance differences, I add a profitability measure (EBITDA margin) and equity ratio because I expect them to be different for immigrant and native entrepreneurs. The third paper is different from the

first two in terms of the dependent variable because, in that paper, I am interested in the relationship between the quality of first and second employees. Therefore, the human capital of the second employees is the measure of performance in that paper.

Data Sources

In all three papers in this thesis, I use Norwegian registry data. The data come from different government agencies and is merged by Statistics Norway using unique firm and person identifiers. It has detailed information on demography, education, income, and the labor market status of all individuals legally residing in Norway; furthermore, it contains financial and business information on all firms registered in Norway as well as information on individuals connected to firms through various roles. The variables used in these studies are taken from various registers, as shown in Tables 1, 2, and 3 for papers 1, 2, and 3, respectively. Data sources are discussed in each of the papers separately, so here I would like to discuss the general pros and cons of using registry data in entrepreneurship and human capital research in general.

Entrepreneurship research has suffered from a lack of rich data that allows researchers to understand the mechanisms underlying this dynamic phenomenon. Ireland, Webb, and Coombs (2005) underscore that "the available data [are] typically used to form convenience samples rather than samples that are most appropriate to test the researcher's theoretically based expectations." Traditionally, empirical entrepreneurship research has mostly employed primary data, of which the predominant form is survey data, which has prompted calls for the use of longitudinal objective data to overcome most of the weaknesses of survey designs (Chandler & Lyon, 2001; McDonald et al., 2015). More specifically, there have been calls to use linked employer-employee datasets to study entrepreneurship as they help us untangle the interaction of industry, firm, and individual dynamics (Campbell, 2006; Echambadi, Campbell, and Agarwal,

2006). These datasets allow entrepreneurship researchers to "develop a clearer picture of how new firms come into being, obtain workers, grow, shrink, and exit, and how this dynamic process is related to employment and economic growth" (Goetz, Hyatt, McEntarfer, & Sandusky, 2016, p. 21). Consequently, we are seeing growing use of linked employer-employee data in entrepreneurship research (Dahl & Klepper, 2015; Coad et al., 2017; Burton, Dahl, & Sorenson, 2018).

Because of the extensive welfare state policies (Sørensen, 2004) and perhaps the tolerance for high transparency in these societies, the Nordic countries[8] collect and make available comprehensive data on firms and individuals. In explaining the advantages of Norwegian registry data, Hovde Lyngstad and Skardhamar (2011) list the following:

> . . . the ability to maintain data on the total population; the possibility of studying small subpopulations; a virtually continuous timeline in longitudinal datasets; using panel data designs with no sample attrition; having few or no non-responses or other missing data; making connections between different observation units, such as family members; and the ability to construct research designs that are practically impossible with surveys (p. 613).

In the Norwegian registry data, we can identify an individual's family relationships, the level and type of education she has obtained, the firms she has worked for in the past and tenure there, her occupation, her income disaggregated into different sources, and welfare benefits she has received, including unemployment benefits, parental benefits, and sickness benefits. With

[8] Timmermans (2010) presents a comprehensive description of the Danish registry database.

this richness of information, Norwegian microdata is extremely suitable for research on human capital and entrepreneurship.

Despite the strengths of the registry data, it has some weaknesses that may limit its usefulness in answering certain research questions. For example, the registry databases are not suitable for understanding motivations or other cognitive aspects of entrepreneurship. This is particularly challenging when studying nascent entrepreneurship, where most activities are not registered in government databases.

Another challenge of using Norwegian registry data is the identification of new firms. Many firms change their company registration, meaning that they may appear as new firms in our samples even when they are not really new. Great care should therefore be taken in making sure that we weed out re-registered firms. Some of the steps I have taken to remove those potential re-registered firms include removing firms that start out with a certain threshold of employees, removing firms that have employees registered for more than six months before their formal registration, removing firms that share their unique job identifier with other firms in previous years, and firms that are established as subsidiaries of existing firms.

Yet another challenge when using the registry data is the inability to precisely identify the activities firms are involved in, as explained by Timmermans (2010). First, using industry classifications like NACE codes involves tradeoffs. Using more granular classification may give us a more precise idea of what the firm is involved in, but then we will make the cell size so small that we run into statistical challenges. Using less granular classification will group together firms that are very diverse in terms of their activities. Second, industry classification may not even represent the actual activities a firm is involved in. Therefore, firms in an industry division/class may not belong together in terms of what they actually do. This means that the

actual industry controls we use in our models may lead to erroneous results. Third, it is difficult to learn about the business model of firms through registry data. Therefore, effects that are the result of business model peculiarities are difficult to identify.

Finally, in the Norwegian registry data, it is not possible to ascribe an individual's income to particular jobs. This is because we have annual income that is not linked to the jobs database. Therefore, if an individual has held multiple jobs, we are unable to ascertain income from those jobs separately. This was particularly problematic for us while computing person fixed and firm fixed effects using a wage equation in the third paper. When an individual holds multiple jobs in multiple firms, it is impossible to identify firm fixed effects since we do not know what portion of their income they earned from which firm. I removed those individuals from our sample when calculating person fixed effects for that reason.

Table 1

Variables Used in Paper I and Their Source Datasets

Variables	**Variable type**	**Source register**
Asset growth	Continuous	Register of Company Accounts in Brønnøysund
Sales growth	Continuous	Register of Company Accounts
Employee growth	Continuous	Register of Company Accounts
Board member death	Dummy	Population Register (Befolkning)
Board experience	Continuous	Corporate and Business Register (Virksomhets- og foretaksregisteret)
Board member has above average Human Capital	Dummy	Education Register, Population Register, Corporate and Business Register
Board member is Chairperson	Dummy	Corporate and Business Register
Board member is Outsider	Dummy	Corporate and Business Register, Population Register, Register of Employers and Employees (FD Trygd),
Education of owners, CEO, board members	Continuous	Education Register (Utdanning)

Single/multiple owner firms	Dummy	Corporate and Business Register
Age of owners, CEO	Continuous	Population Register
Family ownership of CEO	Ratio	Population Register, Corporate and Business Register
CEO is a board member	Dummy	Corporate and Business Register
Industry category	Categorical	Corporate and Business Register

Table 2

Variables Used in Paper II and Their Source Datasets

Variables	**Variable type**	**Source register**
Asset growth	Continuous	Register of Company Accounts
Sales growth	Continuous	Register of Company Accounts
Employee growth	Continuous	Register of Company Accounts
Full-time equivalent employment days	Continuous	Register of Company Accounts
Equity ratio	Ratio	Register of Company Accounts
EBITDA margin	Ratio	Register of Company Accounts
Immigrant status	Dummy	Population Register
Assimilated/Not assimilated	Dummy	Population Register
Education of founders	Continuous	Education Register
Presence of native board member	Dummy	Corporate and Business Register, Population Register
Presence of native, non-family native board members	Dummy	Corporate and Business Register, Population Register,
Presence of native board member with industry experience	Dummy	Corporate and Business Register, Population Register, Register of Employers and Employees
Marital status	Dummy	Population Register
Gender	Dummy	Population Register
Age	Continuous	Population Register
Education categories	Dummy	Education Register
Industry	Categorical	Corporate and Business Register
Region	Dummy	Register of Company Accounts

Big city	Dummy	Register of Company Accounts

Table 3

Variables Used in Paper III and Their Source Datasets

Variables	**Variable type**	**Source register**
Human capital of founders and employees	Continuous	Education Register, Population Register, Corporate and Business Register, Register of Employers and Employees (FD Trygd), Income Register
Occupation similarity	Dummy	Register of Employers and Employees
Family ownership of employee	Dummy	Population Register, Corporate and Business Register
Immigrant status	Dummy	Population Register
Marital status	Dummy	Population Register
Gender	Continuous	Population Register
Age	Continuous	Population Register
Education categories	Dummy	Education Register (Utdanning)
Industry	Categorical	Corporate and Business Register
Industry skill ratio	Ratio	Register-based employment statistics
Industry labor intensity	Continuous	Register-based employment statistics
Big city	Dummy	Register of Company Accounts

Choice of Empirical Strategy

The research question, the research setting, and the nature of variables of interest dictate the choice of empirical strategy. The empirical strategy, in turn, dictates whether we can make causal inferences or just associational inferences. The gold standard for empirical research designs that enables causal inferencing is the randomized experiment. However, as Angrist and Pischke (2010) note, conducting randomized experiments is time consuming, expensive, and above all, not always practical. In cases where randomized experiments are not possible, natural or quasi-experiments are preferred for causal inference. A natural experiment exploits an

exogenous treatment of the population to study changes in variables of interest. When natural experiments that allow for causal inferences are not possible either, then we can make only associational inferences.

While associational inferences help enhance our understanding of the phenomena in question, causal inferences help us identify the mechanisms. Bromiley and Johnson (2006) argue that the objectives of strategy research are to explain firm behavior and firm performance and offer prescriptions that enhance firm performance. These objectives can only be achieved by focusing on the mechanisms underlying the phenomena. This, in turn, dictates that our research should aspire to make causal identifications. In one of the earliest reviews of entrepreneurship research, Low and MacMillan (1988, p. 155), emphasized the "need to pursue causality more aggressively." At the same time, Bromiley and Johnson (2006, p. 26) observe that "scholarship often starts with general tests of high-level association and then moves to clearer theories and tests of the underlying mechanisms." Since entrepreneurship is a relatively young field, the study of many aspects of the phenomena are still in their infancy. Therefore, studies establishing associations between constructs can also be valuable in advancing the field.

Periodic reviews of entrepreneurship research (Low & MacMillan, 1988; Ireland, Webb, & Coombs, 2005; Marvel, Davis, & Sproul, 2016) have consistently focused on the need for the use of longitudinal studies in entrepreneurship, primarily because it is difficult to establish causal linkages with cross-sectional studies. Further, given the dynamic nature of entrepreneurship, we need to observe firms over a long period to understand their characteristics and performance more accurately. In line with these calls, two of my papers use panel data while the other one uses cross-sectional data in accordance with the nature of the research questions.

Another issue that is raised in strategy research in general and is equally applicable to entrepreneurship research is the endogeneity concern. Entrepreneurs, employees, board members, etc., choose certain actions over others (like entrepreneurs hiring employees or board members joining or leaving a firm) with an eye to the expected outcomes of such actions. This makes the identification of the actual effect of the explanatory variable (human capital of board member, for instance) on firm performance erroneous if we do not account for the endogeneity. See Rocha et al. (2018) for a detailed discussion of sources of endogeneity and how they may be addressed. Where possible, I have tried to alleviate these concerns in my papers.

The three papers in this thesis use three different empirical strategies. In the first paper, I use the death of a board member as a treatment for the entrepreneurial firm. Although death is an exogenous treatment in the sense that the firm has no control over a board member dying, there may be an indirect association between board member death and firm performance. Older board members are both more likely to die and to be wealthier than younger board members. Consequently, to the extent that board members financially back the firm, the exogeneity assumption may still be violated since the treated firms may have benefited from wealthy board members by starting out bigger, for example. Therefore, we take an extra step to match the treatment and control firms on a number of dimensions, including firm size in the second year of founding, to make sure that we are not comparing apples to oranges. Furthermore, the fact that the treatment variable is time variant means that we can use fixed effects models to estimate the treatment effect. This estimation strategy gets rid of omitted variables bias and helps to make a causal claim about the relationship between board member characteristics and firm performance.

The second paper studies the difference between immigrant and native entrepreneurs' performance and whether having a native board member affects the performance difference. This

paper uses a random effects model. Because of the time-invariant nature of our explanatory variable (immigrant status of the entrepreneurs), it was necessary to rule out the fixed effects estimation even though a Hausman test favored the fixed effects model. Therefore, the choice was between a random effects model and OLS. I used the Breusch-Pagan Lagrange multiplier (LM), which tests if there are statistically significant variances across firms, to inform this choice. The test favored a random effects model. In this paper, the same causal inferences as were made in the first paper cannot be made because of the limitations of the estimation strategy. First, the unobservable characteristics of immigrant and native entrepreneurs that affect them being in our sample (i.e., starting firms) may also affect their performance differently. This means that there may be endogenous selection bias. Second, immigrant entrepreneurs who are able to recruit native board members may be more embedded in the host country ex ante. This means that any change in performance by immigrant entrepreneurs having a native board member may reflect the immigrant entrepreneur's embeddedness in the host country rather than the treatment effect of the native board member. Thus, the treatment may also be endogenous. Despite this limitation, I believe that the paper makes a significant contribution by establishing an associational inference between having a native board member and the performance of immigrant firms, especially because this relationship has, to the best of my knowledge, never been examined before.

The third paper looks at the relationship between the human capital of the first and the second employees of an entrepreneurial firm. It is cross-sectional in nature because I am interested in the relationship at one point in time. Consequently, OLS and quantile regressions are used to estimate the relationship at different parts of the human capital distribution. I do not make causal inferences in the paper but firmly establish an associational inference between the two employees' human capital, which I believe helps enhance our understanding of the human capital

accumulation process in a new firm. Like the previous two papers, this paper addresses the calls for the use of contingency relationships among human capital and entrepreneurial outcomes (Marvel, Davis, & Sproul, 2016). I not only tested the relationship in different parts of the quality distribution but also tested other contingencies, such as similarity in occupational background and industry experience between the two employees (and the entrepreneur). These moderator variables provide important clues regarding the mechanisms in operation.

III. Summary of Articles

Paper 1: Do Board Members Matter? The Case of Entrepreneurial Firms

The first paper explores the relationship between board members and firm performance in entrepreneurial firms. It answers two questions: (1) Are board members important?; and (2) What are the characteristics that make certain board members more important than others? Board members are not randomly allocated to firms, and observed correlations between board member characteristics and firm performance might be as much about firms with high (low) expected performance attracting good (weak) board members as it is about good board members driving up performance. In this paper, I use the death of board members as an exogenous shock and coarsened exact matching followed by fixed effects estimation to answer these questions. This estimation strategy is a significant improvement in dealing with the endogeneity issues that have plagued previous research regarding the causal effect of board members on firm performance.

I find that board members do matter for entrepreneurial firm performance, but not unconditionally. Losing an inside board member has a negative effect on firm performance, while losing an outside board member does not. Losing the chairperson of the board of directors is worse for firms than losing an ordinary board member. Finally, board members with high human

capital matter more than board members with lower human capital. Thus, I find that losing board members that have high ability (human capital), strong incentives (ownership), and high authority/custodianship (the chairperson) has significant effects on firm performance.

This paper contributes to both the entrepreneurship and the corporate governance literature. First, it highlights the importance of non-founder human capital in the form of board members. As discussed earlier, this has been a blind spot in entrepreneurship research. Second, the estimation of board member effects on firm performance in the corporate governance literature has been riddled with endogeneity concerns, which I address with a strong empirical strategy in this paper.

Paper 2: Immigrant Entrepreneurs: Liability of Weak Embeddedness and Overcoming It with Native Board Members

The second paper is at the intersection of immigrant entrepreneurship and corporate governance. It answers three important questions: (1) Is there a performance difference between firms owned by immigrant versus native entrepreneurs?; (2) Does having a native board member affect the performance difference between firms owned by immigrant versus native entrepreneurs?; and (3) What characteristics of native board members make them more valuable for immigrant entrepreneurs?

From the theoretical point of view, I study the immigrant entrepreneurship phenomenon through the lens of social embeddedness theory and inquire whether having a native board member can help an immigrant firm overcome its relative lack of embeddedness in the socio-economic structures of the host country. I find that immigrant entrepreneurs, in general, exhibit a lower level of performance compared to native entrepreneurs. Immigrant entrepreneurs who have

spent substantial time in the host country are able to bridge the performance gap with native entrepreneurs to an extent. Immigrants with higher education are better able to bridge the performance gap, except in the top quartile. Finally, immigrant entrepreneurs can bridge the gap with native entrepreneurs by using board members who possibly serve as bridges connecting the firm and its host country stakeholders. However, not all board member are equally important. I find evidence that immigrant firm performance is higher when they have non-family native board members and native board members with industry experience in the host country.

This study contributes to the immigrant entrepreneurship and corporate governance literatures. I consider immigrant entrepreneurship as a special context of entrepreneurship wherein the distance between the entrepreneur and the stakeholders is large, thus inflating the impact of board members who can help bridge that distance. Research in this setting—largely overlooked until now—is important from managerial (how immigrant entrepreneurs can improve their firm performance), policy (how policy makers can help immigrant entrepreneurs integrate into the host country market/institutions), as well as scholarly points of view.

Paper 3: Human Capital Accumulation in New Ventures: The Role of Founders and Early Employees

The third paper studies the relationship between the human capital of first and second employees. While the importance of human capital for firm performance is well established, I focus on how existing human capital can influence future human capital accumulation in an entrepreneurial firm. Basing the hypotheses on network and signaling theory, I study whether having a good first employee will help a firm attain a good second employee. I construct a composite human capital measure that combines education, experience, and person fixed effects to study the impact of the first employee on the human capital of the second employee.

Moreover, I investigate different conditions under which the first employee's human capital is more or less influential.

The findings reveal that there is a positive relationship between first and second employee human capital, even after controlling for the human capital of the founder. They further show that the relationship varies in different parts of the human capital distribution. When the first and second employees share the same industry and occupation background, the correlation between their human capital is high in the top quartile, in line with predictions from network and signaling theory. On the other hand, the founder's human capital is positively related with the second employee's human capital, irrespective of their industry-occupation similarity. The findings imply that existing employees in an entrepreneurial firm can be used as strategic assets in accumulating future human capital.

IV. Conclusion and Discussion

Entrepreneurship research has grown by leaps and bounds over the last three decades. Throughout, one consistent focus has been identifying factors that can explain and lead to better performance by entrepreneurial firms. One identified factor is human capital. The studies that have examined the effect of human capital on the outcomes of entrepreneurial firms have, understandably, overwhelmingly focused on the human capital of entrepreneurs. Unfortunately, this has resulted in severe gaps in our understanding of the relationship between non-founder human capital and firm outcomes. As an attempt to address this oversight, I studied the relationship between firm outcomes and the human capital of entrepreneurs, board members, and employees. While doing so, I focused not only on the direct relationships but also on contexts where the relationship would be weakened or strengthened.

The findings of the three papers contained herein indicate that non-founder human capital can be an important source of competitiveness for entrepreneurial firms. Board members as well as employees can contribute substantially to firm performance. From the first paper, we learn that losing a high human capital board member is detrimental to firm performance, whereas losing low human capital board members has no significant effect. Similarly, we learn from the second paper that immigrant entrepreneurs that have native board members with relevant industry experience are competitive with native entrepreneurs. Finally, the third paper demonstrates that the human capital of current employees can predict the human capital of future employees, especially when they share industry-occupation backgrounds and come from the higher end of the human capital distribution.

We can draw some parallels between the founder human capital-firm performance relationship, which has been extensively studied (Unger et al., 2011), and the non-founder human capital-firm performance relationships focused on here. First, like founder human capital, non-founder human capital is important for new firm performance, but the effects are usually small. For example, losing a board member has a negative effect of 4.8% on employment growth. Similarly, there is a small positive correlation (≈ 16%) between the human capital of the first and second employees.

Second, like founder human capital, non-founder human capital is more effective when it is task-related. For example, losing a board member with above-industry-median education has no significant effect on firm employee growth, but losing a board member with above-median task-specific human capital (a measure including education, experience, and board experience) has a negative nine percent effect on employee growth. Similarly, for an immigrant entrepreneur, merely having a native board member is not adequate to be competitive with similar native firms.

Rather, native board members with industry experience are necessary. For a board member whose service task relates to linking the firm with various stakeholders in the industry, having industry experience is clearly task-specific human capital. Finally, in the third paper, the task of the first employee is to help attract a matching second employee. Theoretically, that can happen more efficiently if the first and second employees share the same industry-occupation background, i.e., have task-specific human capital. That is exactly what the findings show.

Finally, the human capital measure employed in the third paper indicates that human capital seems more important when the outcome of human capital investments (quality in labor market proxied by a person fixed effect from a wage equation) are incorporated in the measure. For example, the magnitude of the relationship between the human capital of the first and second employees when using the composite index (that includes person FE) more than doubles compared to the relationship found when using only education as the human capital measure.

The papers included in this thesis contribute to the entrepreneurship literature. First, they extend our knowledge of human capital resources in new firms beyond the entrepreneur. Since the research on entrepreneurs' human capital has received considerable attention and we know a great deal about it already, we now need to focus on other sources of human capital that can make new firms competitive. Our focus on board members and employees is an attempt to address that gap in the literature. Second, in two of the three papers, I have constructed composite human capital measures that can better capture the multidimensional nature of human capital.

The thesis has practical implications for policy makers, entrepreneurs, and investors, all of whom have an interest in new firms' performance. The findings not only tell us that non-founder human capital is important for new firm performance but also identify unique characteristics that make them useful. For example, the findings of the second paper can guide an immigrant

entrepreneur trying to be competitive with her native competitors by identifying the type of board members that can help her. Similarly, our third paper shows that entrepreneurs may be able to use their existing employee network, or use their quality as signals, to obtain good matches when hiring more employees. Since it is challenging for new firms to hire promising candidates, these clues can be quite valuable for them.

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Paper I

Do Board Members Matter?

The Case of Entrepreneurial Firms

Sujit Pandey
NHH Norwegian School of Economics

Lasse B. Lien
NHH Norwegian School of Economics

Abstract

Are board members important to an entrepreneurial firm? Which characteristics makes a board member more or less important? Attempts to answer these questions have been plagued by serious endogeneity issues. Board members are not randomly allocated to firms, and observed correlations between board member characteristics and firm performance might be as much about firms with high (low) expected performance attracting good (weak) board members, as it is about good board members driving up performance. We use board member death as a treatment to study the importance of a board member to a new firm. Board member death is unlikely to be related to the expected performance of the focal firm, or to the human capital of the board member in question. Furthermore we apply coarsened exact matching to ensure that treated and control firms are comparable, and run a fixed-effects panel model to identify the performance effects of the loss of a board member. This allows us to make improved quantitative estimates of how important a board member is, and how this varies with some key board member characteristics.

Keywords: entrepreneurship, corporate governance, board of directors, human capital

Introduction

The existence of a positive association between human capital and firm performance is probably one of the least controversial assertions in all of strategy and management. Numerous studies in strategic human capital (Coff, 1997; Hatch & Dyer, 2004; Hitt et al., 2001), strategic human resource management (Becker et al., 1997; Hoque, 1999), and upper echelons literature, among others, have found such a link. Studies in the entrepreneurship literature have established that this association exists in new firms as well (Unger et al., 2011). Given the need to shepherd a nascent firm through great uncertainties with limited resources and less-developed structures, routines, and networks, it is likely that human capital is even more consequential in new firms than in older, more established ones.

The stock of human capital at a firm's disposal in its early years will mainly consist of the human capital of its founder(s), the human capital of its early employees, and possibly, the human capital of its board members. Among these three, the role and importance of the founder—or the founding team—has by far received the largest amount of scholarly attention in entrepreneurship research (e.g., Gimeno et al., 1997; Bosma et al., 2004; Shrader & Siegel, 2007). The human capital of early employees has also received some attention, although far less than that of the founders (Koch & Strotmann, 2013; Rocha, Carneiro, & Varum, 2014). The human capital of board members in new firms has received the least amount of attention by far (Hillman & Dalziel, 2003; Stam, Arzlanian, & Elfring, 2014).

Among the few studies that have investigated the relationship between board member characteristics and firm-level outcomes, findings have been far from consistent. On the one hand, it has been suggested that board members can have a particularly large performance effect in young firms simply because such firms lack so many of the resources that more established firms

have had time to accumulate (Lynall, Golden, & Hillman, 2003; Zahra, Filatotchev, & Wright, 2009; Bocquet & Mothe, 2010; Kim & Cannella, 2008). On the other hand, it has also been suggested that entrepreneurial firms mostly see boards as a formal requirement and typically fill the required board positions with aunts and friends (Patton & Baker, 1989; Mace, 1971). This suggests that the typical board member is easily replaceable and will not have a significant performance effect.

In this paper, we focus on the role of board members in young firms, and we ask two related questions. First, how valuable are board members for firm growth and performance, on average? Alternatively, the question could be formulated in this way: is the average board member easily replaceable or not? Secondly, we ask if there is systematic variation around this average, i.e., do certain characteristics make a board member more or less important? We are not the first to ask these questions, but we do believe we are the first to answer them in the way we do in this paper, and that our approach has significant advantages in terms of estimating the causal effect of board members on firm performance.

The key problem of estimating this causal effect is to have exogenous variation in the independent variable. Board members are not randomly allocated to firms, and any observed correlation between board member characteristics and firm performance might therefore be as much about firms with high (low) expected performance attracting good (weak) board members as it is about good board members driving up returns. Rather than looking at the characteristics of incumbent board members, one might, of course, study the performance effects of board members joining or leaving boards. Unfortunately, this is also problematic since board members' decisions to join or leave a board are unlikely to be independent of the expected performance of a firm, and those board members that come or go are not necessarily representative of the other

board members either. In their review of the literature on board demographics, human capital, and social capital on firm outcomes, Johnson, Schnatterly, and Hill (2013) emphasize the endogeneity problems inherent in this literature, and they call on future studies to address this issue. We do exactly that.

Specifically, we use board member death as a treatment to study the importance of board members to a new firm. Board member death is unlikely to be related to the expected performance of the focal firm or to the human capital of the board member in question. At the same time, death does effectively remove the human capital of the deceased board member from the firm; thus, it constitutes a sad but useful natural experiment. We are not the first to use death as an exogenous treatment to study the effect of human capital on firm performance. This has been done in the finance literature for the effect of CEOs (Johnson, Magee, Nagarajan, & Newman, 1985; Bennedsen, Perez-Gonzalez, & Wolfenzon, 2010), founders (Becker & Hvide, 2017) and large shareholders (Slovin & Sushka, 1993).

We use Norwegian registry data that contain detailed demographic, human capital, and family information about all owners, employees, and board members in the Norwegian economy, along with financial information on all firms registered in Norway. We apply coarsened exact matching to ensure that the treated and control firms are comparable, and we run a fixed-effects panel model to identify the performance effects of the loss of a board member; in this way, we are able to quantify how important a board member is.

Theory and Hypothesis Development

Human Capital

Human capital is integral to firm performance as it serves as a source of competitive advantage and disadvantage (Coff, 1997; Hatch & Dyer, 2004; Hitt et al., 2001; Wang, He, & Mahone, 2009; Wright, Dunford, & Snell, 2001). It is a critical input in creating all other resources, whether brands, reputations, technology, distribution systems, or organizational capital, and it is even an important input in increasing itself—in the sense that it takes human capital to build human capital. Over the past several decades, the claim of a positive association between performance and human capital has been tested and affirmed in a range of studies. A summary of these findings is the meta-analysis by Crook et al. (2011), which documents a statistically significant positive relationship between human capital and firm performance. Perhaps unsurprisingly, this positive relationship also holds in the case of new firms, as the meta-analysis by Unger et al. (2011) finds. Indeed, it might be argued that the relationship is even stronger in newborn and young firms, given that uncertainty is a key feature of the exercise of entrepreneurship (Foss & Klein, 2012; McKelvie, Haynie, & Gustavsson; 2011) and human capital predicts an individual's ability to adapt to a changing environment and deal with disequilibria and uncertainty (Nelson & Phelps, 1966; Schultz, 1975). Notably, this is not only true for early-stage high-tech firms but also for an immigrant opening a restaurant serving ethnic food.

The most important and influential human capital source in a new firm is arguably its founders. The fact that most of the studies on new firms focus on the founders' human capital is a reflection of their primary importance (Eisenhardt & Schoonhoven, 1990; Feeser & Willard, 1990; Vesper, 1990; Cooper, Gimeno-Gascon, & Woo, 1994; Ucbasaran et al., 2003; Vanaelst et

al., 2006; Roberts, Klepper, & Hayward, 2011; Baptista, Karaoz, & Mendonca, 2014). A second source of human capital in a young firm is its early hires. The human capital of employees and its effect on firm performance has received substantial attention in the strategic human capital and human resource management literatures, including the case of new firms (Koch & Strotmann, 2013; Rocha, Carneiro, & Varum, 2014; Heneman, Tansky, & Camp, 2000). Hence, there is considerable knowledge about this association too. Finally, and most importantly, for the present paper, yet another potential source of human capital is the board of directors of a firm.

Boards and Board Members

The corporate governance literature identifies three key tasks for board members—control, service, and strategy (Huse, 1990; Neville, 2011; Machold & Farquhar, 2013). Control tasks revolve around monitoring the conduct and performance of the management team and ensuring that the firm is on track to achieve its goals. Service tasks include giving counsel and advice to the management team on managerial issues as needed. Service and strategy are sometimes lumped together into one category because the board is serving as a resource in both cases. These tasks include "providing legitimacy, expertise, advice, and counsel, facilitating access to resources and linking the firm to external stakeholders, building external relations, aiding in strategy formulation" (Machold & Farquhar, 2013, p. 149). Given the importance of these tasks, a board member can potentially add substantial value to a firm. In this paper, we are examining this through the lens of the effect of the loss of a board member. We analyze how the loss of a board member affects firm performance in young, entrepreneurial firms by comparing actual performance to their contra-factual performance absent such a loss.

If the loss of a board member has no noticeable effect on firm performance, then this must mean that board members are either easy to replace or that it is not even important to replace

them in order to maintain expected performance. In either case, it would indicate that board members are typically not a strategically valuable asset to a young firm. If, on the other hand, the effect of losing a board member *is*, on average, significantly negative, or at least significantly negative for board members with certain characteristics, then this would indicate the opposite. Board members are, or at least some board members are, strategically valuable to young, entrepreneurial firms.

Regarding the former view, it is fully conceivable that most young, entrepreneurial firms have boards because of the formal requirement to do so and that beyond large owners in the firm, it is a matter of convenience who joins the board. Decisions are, in reality, made by the founder or the founding team, and the board is just a rubber-stamping organ that formalizes those decisions. It is also possible that while young firms would like to have high-caliber individuals as both investors and board members, most young firms cannot hope to attract such board members. Whether the problem is the demand or the supply of human capital for entrepreneurial firms, the end result will be easily replaceable board members.

An alternative view holds the opposite. Precisely because young firms are typically not well endowed with human capital in the form of decision-making skills, business experience, networks, and so on, board members are likely to be strategically important contributors to firm performance and growth. This does not necessarily imply that every board member in every firm is valuable and difficult to replace but rather that a competent board member with incentives to use that competence for the good of the firm is indeed valuable to the firm and, hence, should be costly to lose.

Boards and board members have been criticized as being “creatures of the CEO” (Patton & Baker, 1989) or “rubber stamps” (Mace, 1971) and for failing to fulfill their obligations and

thus being unable to influence firm performance as intended. These criticisms are, however, mostly based on studies done on samples of large, established firms. Would boards behave any differently in new firms? If boards in large firms are "creatures of the CEO," boards in new firms will be "creatures of the owner(s)," in particular, the entrepreneur(s). If even boards in large firms are "rubber stamps," it is quite hard to conceive of them standing up to the all-powerful, concentrated ownership of an owner-manager-founder in a new firm. This skepticism against boards in smaller firms is not a recent phenomenon; Mace (1948) criticized such boards as "including merely subservient and docile appointees of the owner-manager" (p. 87).

Surveys of owner-CEOs indicate that they expect board members to play a service/strategy role more than a control role (Neville, 2011; Van den Heuvel, Van Gils & Voordeckers, 2006). Therefore, it seems more realistic to view board members in young firms as human capital resources that contribute constructively toward firm performance through counseling, network access, and other kinds of assistance, rather than as controlling agents. As far as the service/strategy role of board members is concerned, Castaldi and Wortman (1984) argue that small firms can use their board of directors to overcome weaknesses arising from their smallness and threats borne out of the external environment. When used strategically, boards could have a significant positive impact. For well-established, large firms with access to the human capital of a trained workforce, external consultants, in-house experts, and professional managers, the additional human or relational capital the board members bring might be negligible compared to their human capital stock. However, for new firms, which are usually characterized by having bare-bones resource stocks, the expertise or networks that board members bring could make a significant, positive difference. So, while new firms are *less* likely to reap significant benefits from the control function of board members, they are *more* likely to need and benefit

from the service/strategy function. Hence, the loss of a board member should have a negative performance effect on average. This forms the basis of our first hypothesis:

Hypothesis 1: Firms that lose a board member will experience a downturn in performance compared to firms that do not lose a board member.

Outside and inside board members

A large part of the corporate governance literature is dedicated to board independence. Board independence is achieved by having outside board members who are not related to owners and who are neither CEOs nor themselves employees of the firm. In theory, having an outside board member is a good thing. She will not only bring her watchful and independent eyes to monitor and control managers but also her human and relational capital to extend the resource stocks available to the firm. Yet, in empirical studies, findings do not always support this seemingly simple and intuitive idea. A meta-analytic review of the association between board composition and financial performance by Dalton et al. (1998) did not find a clear pattern. In a thorough, systematic review of corporate governance in entrepreneurial firms, Li, Terjesen, and Umans (2018) conclude that we still do not fully understand the effect of board member independence on firm performance.

With regard to focusing on control tasks, it is not clear that an outside board member is able to bring much to the table. In new firms, which are usually characterized by either family ownership and/or owner-management, agency conflicts are much smaller than in larger firms with fragmented ownership and greater distance and information asymmetry between owners and managers. The control function of outside board members is therefore more relevant and pertinent when shareholders are not in a position to monitor the firm directly. In a new firm with

a small number of owners, it is more likely that all owners are fairly close to the firm themselves; hence they do not need to rely on an external board member to carry out monitoring on their behalf.

The outside board member, however, may have a positive effect on firm performance through the service/strategy role. One could argue that an inside board member, i.e., owners, family members of owners, or employees of the firm, are likely to contribute to the firm regardless of their seat on the board. Therefore, having an outsider board member in the firm adds one extra source of human capital, while an inside board member does not. It is also true, however, that an outside board member may not have as strong a commitment to the firm as an inside board member will. Still, as long as the board has some inside board members, having outside members to complement them only adds to the relatively small human capital stock of a new firm. This suggests that having an outside board member can have positive performance implications for new firms, and losing an outside board member should therefore have a negative effect on performance:

Hypothesis 2a: Firms that lose an outside board member will experience a downturn in performance compared to firms that do not lose a board member.

Losing an insider board member can have a negative performance effect for several reasons. First, of course, there is the direct loss of human capital by the firm. Second, if the inside board member is an owner, there is the effect of losing an owner or an employee in addition to losing a board member. Third, if the inside board member is a family member of the owner and/or the entrepreneur, the grief at the loss of a loved one may further subtract critical human capital from the firm. The loss of an inside board member should, therefore, also have a negative effect on performance:

Hypothesis 2b: Firms that lose an inside board member will experience a downturn in performance compared to firms that do not lose a board member.

Between an outside and an inside board member, losing the latter should have a larger adverse effect on the performance of the firm. Inside board members have larger stakes in the firm and incentives to invest more time and resources; hence, the human capital loss to the firm will—all else being equal—be larger if an internal board member becomes unavailable. Inside board members are a source of funding that might be challenging for a new firm to replace. And finally, when an inside board member dies, the emotional impact on other key individuals in the firm may impose added costs and problems on the firm that are larger than when an outside board member dies.

Hypothesis 2c: Firms that lose an inside board member will experience a downturn in performance compared to firms that lose an outside board member.

The human capital of board members

Human capital is decisive for economic outcomes, both for firms and individuals, because human capital is decisive for productivity (Becker, 1962). Presumably, this basic relationship holds on the factory floor, in the boardroom, and anywhere else in-between.

Schultz (1975) argues that investment in human capital, i.e., education and experience, helps individuals enhance their ability to allocate and reallocate resources. In other words, human capital enables people to adapt their resource allocation in the face of change and learning. People with such dynamic skills are highly valuable for new firms, given the turbulence and change they are likely to face. New firms face a dynamic external environment as they try to carve out a viable position, but they also face a rapidly changing internal environment, for

instance, as a result of hiring new people or introducing new structures and processes (Scott & Bruce, 1987). Therefore, new firms are likely to be particularly sensitive to variations in the human capital of key personnel and their resulting ability to facilitate adaptation to the rapid changes they experience.

Board members are in a unique position to use their control role to caution the young firm about dangers lurking in the environment and to use their service role to help the firm better adjust to internal and external changes. To the extent that the board members have the authority to perform their control function, members with high human capital ought to be more capable of fulfilling this role, ensuring higher and more sustainable growth and performance.

From the point of view of the service and strategy function, what board members bring to the table is their human and relational capital (Hillman & Dalziel, 2003). Their human capital enables them to positively influence performance through better advice and strategic input, while their relational capital enables them to affect performance by helping firms obtain legitimacy, secure resources, and generally better manage relationships with external stakeholders. While existing research, as we have argued, suffers from serious endogeneity problems, empirical findings have been supportive of a positive association between the general human capital of board members and firm performance (Carpenter & Westphal, 2001; Khanna, Jones, & Boivie, 2014; Kor & Misangyi, 2008). In sum, then, there seems to be both a conceptual and an empirical basis to hypothesize that board members with higher human capital are more important to a firm than board members with lower human capital.

Hypothesis 4a: Firms that lose a board member with a level of human capital above the industry median will experience a downturn in performance compared to firms that do not lose a board member.

Hypothesis 4b: Firms that lose a board member with a level of human capital above the industry median will experience a downturn in performance compared to firms that lose a board member with human capital below the industry median.

Loss of the chairperson

The chairperson in a firm is arguably a highly influential member of the board—indeed, often *the* most influential member. In new firms, they are usually large owners themselves, which provides them with strong incentive to play both control and service roles. Secondly, we expect that the role of chairperson will tend to be filled by a board member with comparatively high levels of human capital (compared to other board members).

Here we are interested in chairpersons who do not simultaneously serve as the CEO of the firm so that we do not confound the board member effect with the CEO effect. This restriction may dampen the effect of the loss of a chairperson for two primary reasons: first, a non-executive chairperson will not be as influential in a firm as an executive chairperson will be; second, the loss is limited since the executive team will still be around. Despite this, we expect that the loss of a chairperson will cause an adverse effect on firm performance and that this effect is larger than the loss of an ordinary board member.

Hypothesis 5a: Firms that lose the chairperson of the board will experience a downturn in performance compared to firms that do not lose a board member.

Hypothesis 5b: Firms that lose the chairperson of the board will experience a downturn in performance compared to firms that lose an ordinary board member.

Data Sources and Sample Construction

We use Norwegian registry data to test how important board members are to the growth of a firm. We exclusively sample privately owned limited liability firms. We merge a range of different registry databases to obtain our dependent, explanatory, and control variables. These registries have the advantage that they contain information on all firms registered in Norway as well as all employees, owners, and board members that reside in Norway.

The source of accounting data is the Register of Company Accounts, in which every registered firm must submit its annual financial statement. The source of information on ownership and the allocation of roles such as CEO, chairperson, or board member is the Business and Enterprise Register. Employer-employee links were obtained from the Register of Employers and Employees. Information on education came from the National Education Database, which contains detailed information about the education level and category of the entire population. From this dataset, we use the highest level of completed education and the category of education for employees, founders, and board members in our analyses. Finally, we use the National Registry as a source of additional demographic information, such as dates of birth and death, municipality of residence, immigration category, and family relationships such as parents, siblings, spouse, and partners. All these registries are linkable by unique firm and person identifiers.

Sample Selection

Our sample selection starts with the identification of privately owned limited liability firms that were established between the years 2000 and 2010 with up to three individual owners.[9] From this list, we exclude the following:

- firms that are majority owned by other firms;
- firms that never achieve an annual revenue of NOK 50,000 (~USD 5,800);
- firms in which the CEO is not identified;
- firms in which the CEO dies inside the window of +/- 5 years of a board member's death, so that the effect of the CEO death does not confound the effect of board member death (this means that we also exclude firms where the dead board member was also the CEO); and
- firms that experience another board member death inside the window of +/- 5 years of a board member death.

Applying these restrictions to the sample gives us 54,001 firms. We winsorize the top and bottom one percent of assets and sales of the firms in their second year of operation to eliminate outliers. This results in 52,458 firms, out of which 291 experience a board member death.

Measuring Growth

As proxies of firm performance, we use three different size-based growth indicators—asset, employee, and sales growth. These are some of the most commonly used indicators to measure firm performance in entrepreneurial firms. Davidsson and Wiklund (2006) argue that the

[9] We impose the owner count criterion to be able to better control for owner-specific effects. Even with this restriction, we retain over 80% of the firms.

choice of growth indicators should be informed by both empirical and theoretical considerations. They support using sales, employment, and asset growth when governance structures are the units of analysis, as is the case in our paper.

Delmar (2006) critically examines the empirical growth literature on new firms and recommends the use of objective growth indicators such as employee and sales growth. He cautions against using asset growth since it is more relevant to capital-intensive industries. This criticism of asset growth may be less relevant in our case because we exact-match the control and treatment firms based on industry codes, as explained in detail below. Therefore, in effect, we are comparing treated firms in a manufacturing (service) industry to control firms in a manufacturing (service) industry. Furthermore, there is no reason to believe that the treated firms are unequally distributed between manufacturing and service industries.

Similarly, although sales growth is widely used in the growth literature, Gilbert, McDougall, and Audretsch (2006) remind us that sales growth may be a misleading indicator of performance when firms belong to industries in which product development takes a long time, thus favoring employment growth. Delmar (2006) argues that employment growth and sales growth do not necessarily have to be correlated since an entrepreneur may respond to an increase in demand by hiring employees, increasing sub-contracting, or increasing labor productivity. Therefore, it is conceivable that a firm may be able to lay off employees, shed some assets, and still maintain (or even increase) sales by improving productivity or subcontracting.

We accept all three growth measures to be indicators of performance, but we caution that they may not necessarily be aligned in the same way.

Explanatory Variables

Death of a board member

We use a binary treatment variable to indicate whether a firm experiences a board member death or not. This variable absorbs the effect of losing a board member. The binary variable indicating the treatment status of a firm will tell us if board members in general are important to the firm or if they are easy to replace. However, it is perhaps more interesting to examine if certain board members are more important than others. To this end, we subdivide the dead board members based on their characteristics.

Human capital

A board member's human capital measures her ability to influence firm performance (Hillman & Dalziel, 2003). When a board member dies, a certain stock of human capital is taken away from the firm. Traditionally, years of education and experience are used separately as indicators of human capital. However, we argue that this is inadequate. Education, work experience, and board experience are different dimensions of a board member's human capital. Judging a board member based on these dimensions taken separately does not truly reflect the value she brings to the firm. Therefore, we combine the three into a composite human capital measure.

We use two different measures of board members' human capital to quantify the stock of human capital that is taken away. First, we use the number of years of education the dead board member had. Then we create a composite measure of human capital by combining years of education, experience, and board experience using the method proposed by Portella (2001) and illustrated in Appendix A. We calculate the median human capital in the industry in the given

year and differentiate firms that lose board members below the median human capital and above the median human capital. We then compare the performance of these two groups of firms with firms that do not lose any board members.

Chairperson

The chairperson of a firm is a particularly important member of the board of directors. She likely enjoys more authority than other board members, and those selected for this role are prone to have particularly high levels of human capital. Therefore, we examine the effect of losing a chairperson compared to a normal board member, using an indicator variable.

Outsider/Insider

A board member that is also an owner of the firm, a family member of an owner, or an employee in the firm may have stronger incentives to contribute to the firm, relative to an outsider. Therefore, we use an indicator variable to distinguish inside board members and outside board members and test whether the effect of losing an inside board member is stronger than the effect of losing an outsider.

Descriptive Statistics

Table 1 shows the relationships between board members and owners. The table includes board members in 40,795 firms during the second year of operation. Since we have ownership data from 2004 onwards only, this sample excludes firms if their second year of operation was before 2004 or after 2011.[10] Out of the 65,899 board members in our sample, more than half are owners themselves. Approximately 18% of the board members are family members of the

[10] This sample also excludes firms that are not present in our database in their second year.

owners, and about 28% are outsiders, i.e., neither owners nor family of owners. Out of the 40,795 firms, 36,866 firms (90%) have at least one owner or family member of an owner on the board, and 12,235 firms (30%) have at least one outsider on their board. Outsiders are defined as board members that are neither owners, relatives of owners of the firm with at least a 1% stake, nor employees of the firm.

Insert Table 1 about here

Table 2 shows the distribution of board size in our sample in the second year of operation. Over 60% of firms have only one board member, and the average board size is 1.61.

Insert Table 2 about here

Table 3 provides a comparison of descriptive statistics between treated and control firms in the second year of operation. The treated firms in our sample have higher assets, equity, and sales compared to control firms. As expected, the average age of board members in treated firms is higher than that of control firms. The owners of treated firms are also older, on average, than the owners of control firms. The age of CEOs are similar in the two groups. Years of education of board members, owners, and CEOs are marginally higher for the control group. The control group contains a higher proportion of single-owner firms (43%) compared to the treated firms (15%). Family ownership of board members and CEOs is higher in the control firms than in the treated firms. Finally, the treated firms have larger boards than do control firms.

Insert Table 3 about here

Table 4 shows the distribution of firms in NACE aggregation categories. It shows that firms in the treated and control groups have similar distributions. Almost a third of the firms in both categories come from the wholesale and retail trades. Construction, business services, and the real estate sector also have substantial representation in the sample.

Insert Table 4 about here

Estimation Strategy

Our study is based on the premise that the death of a board member exogenously removes a stock of human capital from the firm, which allows us to identify the effect of that loss on a firm's performance. This effect will tell us how important a board member was to the firm and whether they are easily replaceable. Therefore, our sample consists of a pool of treated firms, which experience board member death, and a pool of control firms, which do not experience board member deaths.

While death is an exogenous event, there may still be some, albeit weak, correlation with firm performance. For instance, older board members are more likely to die compared to younger board members. We also know that older people in general are wealthier than younger people. Firms with wealthier owners are likely to outperform firms with less wealthy owners up to a certain level (Hvide & Moen, 2010). To the extent that these board members have ownership

stakes in the firms, or are financially backing them, there may be a correlation between board member death and firm performance. We see from the descriptive statistics that the firms in the treated and control groups are not entirely similar. In order to make sure that the two groups are comparable to each other in the analysis sample, we employ coarsened exact matching (Iacus, King, & Porro, 2012). CEM constructs a sample of the treated and control firms that minimizes the multivariate distance between the two categories, thereby giving us a more balanced sample. It also assigns weights to the control firms based on how many treated and control firms there are in each bin, relative to control and treated firms in the entire sample.

We use the second year for each firm so that we have the first full year of operation for all firms in our sample. Then we force exact matches between treated and control firms on year of founding, industry,[11] single/multiple owners, and industry-year adjusted sales and assets quintiles. By including second-year sales and assets quintiles as matching variables, we are essentially matching on lagged dependent variables in addition to other observed covariates. This addresses the concern that firms with older board members—who are more likely to die—are established on a larger scale and, therefore, have higher expected performance than the control firms. More generally, we are ensuring that the treatment and control firms are similar in terms of age, size, industry, and ownership type.

Table 5 shows the imbalance between the treated and control samples based on the selected matching variables before and after implementing CEM. As we can see from the measure of imbalance (multivariate L1 distance), the matching process has significantly reduced the imbalance between the treatment and control firms, particularly with respect to the first three

[11] We use intermediate NACE aggregation (A*38), which aggregates the 88 NACE Rev. 2 divisions into 38 categories.

covariates. After matching, our analysis sample consists of 270 treated firms and 6,130 control firms. Our matching process has discarded 21 treated and 46,035 control firms, resulting in a much more balanced sample.

After the construction of the matched sample, we estimate the following fixed-effects panel model:[12]

$$y_{it} = \alpha_0 + \beta_1 Z + \gamma T_i + \tau_i + \upsilon_i + \varepsilon_{it}$$

In this model, y_{it} represents the outcome variables (log of assets, sales, and employees), and Z represents board-, owner-, and CEO-specific control variables. The variable T_i, which represents the treatment dummy, is 1 for years after a firm experiences board member death and 0 for years before board member death. Its value is 0 for the control firms for all years. The coefficient on T_i, γ, gives us the effect of board member loss on a firm's performance. Additionally, τ_i is time-specific effects (year dummies), υ_i is firm-specific fixed effects, and ε_{it} is idiosyncratic error.

Empirical Results

Table 6 presents the findings on whether a board member is important to a firm on average, and Tables 7, 8, and 9 present the findings on whether certain characteristics make some board members more important than others. The first three columns in Table 6 show the coefficients on the natural log of assets, sales, and employees, with year dummies and firm fixed effects only. Then, we add control variables related to owners and CEOs. The regressions in

[12] Hausman's specification test favored a fixed effects model.

Tables 7, 8, and 9 include the same control variables as in Table 6. The reference group in all tables includes firms that did not experience board member death.

We find a significant effect of board members on asset growth but not on sales. When a firm loses a board member, the firm experiences about 12.3%[13] lower asset growth than a firm that does not experience a board member death. The mean effect on employment is negative 4.8% but is significant at the 0.1 level only.

Insert Table 6 about here

In Table 7, we see the effects of board member loss based on their human capital. We have, in effect, divided the sample into three groups. The reference group includes firms where no board member dies. In the second group, a board member dies, but she does not have above-median human capital in the industry in the relevant year. The final group has firms where a board member with above-median human capital in the industry dies.

Insert Table 7 about here

The first three columns in Table 7 use education years as the indicator of human capital. The final three columns use a combination of education, experience, and board experience as the

[13] A coefficient of -0.131 on log of asset translates to: [exp(-0.131) – 1] = 12.3%.

indicator of human capital. We believe that the latter human capital measure is the best indicator of how valuable a board member is to a firm.

With only education years as our human capital measure, we see a statistically significant negative effect of 16.3% on assets for firms that lost a less qualified board member, but no effect when losing board member with above-industry-median education years. While this seems counterintuitive, it is possibly a result of the fact that owner-board members are marginally less educated than non-owner board members; hence, the effect we capture here is that of ownership. In other words, it is likely that the effect captured by the lower education group is confounded with the effect of ownership. The average ownership of board members with below-median education years is 65.3%, while it is 59% for board members with above-median education years. Therefore, in this context, education years alone is an inadequate measure of human capital. There is also no effect on sales or employment.

In the final three columns, we use education years, experience, and board experience to create a composite human capital variable. Then, we compare the effect of losing a board member with above industry-median human capital to that of losing a below-median board member.[14] The loss of a board member with above-median human capital has negative effects on employment (-9%), but there is no significant effect if the dead board member has below industry-median human capital. The effects on two treated groups are statistically different for employment at the 0.05 significance level. In terms of assets growth, losing a board member with

[14] We also compare the effect of losing a board member whose human capital is the highest on the board where she serves to losing board members whose human capital is not. The findings are similar to those reported here. These regressions are available from the authors.

above industry-median human capital has a negative effect of 15.9% significant at the 0.05 level, but losing a below-median board member has no effect. We find no effect on sales growth.

From this part of the analysis, we conclude that losing board members with high levels of human capital is detrimental to firm performance, whereas losing low-human-capital board members has no significant effect.

In Table 8, we focus on the loss of the chairperson. The results show a significant negative effect on asset (-16.6%) and employment growth (-7.7%) for firms where the chairperson dies (while we do not see a statistically significant effect from the loss of an ordinary board member on employment growth). We also see a negative effect on assets (-9.2%) when ordinary board member dies, but it is only significant at the 0.1 level. However, the difference between the effects experienced by the two treated groups is not statistically significant. This is partial evidence that losing a chairperson has a larger negative effect on firm performance than losing an ordinary board member.

Insert Table 8 about here

Finally, in Table 9, we see that compared to firms that do not lose a board member, the firms that lose a board member who is either an owner, a family member of an owner, or an employee experience negative effects on assets (-14.3%) and employment (-5.6%). For firms that lost an outside board member, neither effect was significant. Again, however, the effects experienced by the two treated groups are not statistically different. This, again, is partial evidence that losing an inside board member has a larger negative effect on firm performance

compared to losing an outside board member. One potential explanation we propose for the existence of the effect due to losing an inside board member but not an outside board member is the grief that the founder may go through as a result of losing a family member. However, we find that losing board members with higher human capital is more detrimental to the firm than losing less capable board members. Assuming that grief is independent of the human capital of the deceased person, this implies that while grief may play some part in explaining the decline in performance, it is unlikely to be the dominant mechanism.

Insert Table 9 about here

Discussion and Conclusion

The research question we posed in this paper was if board members in new firms are important or not, and which characteristics make them more or less important. We are by no means the first to address this question, so our claim to originality is not in the question we ask but rather in the way we proceed to answer it.

We believe that existing empirical work on this question suffers from severe endogeneity problems that our approach minimizes. The problem, in short, is that board members are not randomly allocated to firms, nor do they randomly leave boards. This tends to influence the estimated effects of board member characteristics on performance. For example, good board members may be systematically attracted to firms with higher expected performance, and they

may be likely to leave boards when expected performance takes a turn for the worse. Problems such as these will bias coefficient estimates.

To reduce these problems, we do two things. Firstly, we examine instances where a board member dies. The idea here is that this event is causally unrelated to performance. It occurs randomly in the sense that it does not occur more in firms with higher than lower expected performance. Secondly, to the extent that they exist, we address any systematic differences between firms where board members die compared to firms where board members do not die by implementing coarsened exact matching. In addition, we employ a fixed effects model to estimate the effect of losing a board member, which should account for any differences in the unobserved characteristics of these firms, should such differences exist. We believe we are the first to combine these empirical strategies in research on boards in new firms.

Our findings can be summarized as follows: board members matter, but not unconditionally. On average, the loss of a board member will have a negative effect of about 12.3% on assets and 4.8% on employment compared to firms that do not lose a board member. However, we find no effect on sales. Further, we look at various characteristics of board members to identify which of them are more important.

We find that board members with ownership in the firm matter, while outside board members do not. Losing a board member *with* ownership reduces assets by 15.3% compared to untreated firms and employees by 5.5% relative to untreated firms. Again, the coefficients for sales are not significant.

Next, the loss of a chairperson matters more than the loss of ordinary board members. Losing a chairperson has a negative effect of 16.6% on assets and 7.7% on employees. Losing an

ordinary board member does not have a statistically significant effect on employees, while it does have a negative effect of 9.2% on assets. This effect is only significant at the 0.1 level.

Finally, board members with high human capital matter more than board members with lower human capital. If the board member with the highest human capital dies, the reduction in assets relative to untreated firms is 13.1%, and the reduction in employees is 8.8%. If someone else on the board dies, there are no significant effects on sales or employees, but there is a negative 11.3% effect on assets, significant at the 0.1 level. In sum, the higher the human capital, the bigger the loss relative to comparable, untreated firms.

Although the goal of our paper was to examine the presence of board member effects on firm performance, not to test specific mechanisms, it seems natural to offer some speculation about the mechanism through which these effects might operate. We find that losing board members that have high ability (human capital), strong incentives (ownership), and high authority/custodianship (the chairperson) has a significant effect on firm performance. These traits coincide with the board member duties of control and service/strategy identified in corporate governance literature. For instance, losing a high-ability custodian of the firm might dissuade a firm from making asset investments or hiring new employees in the short run. Both the loss of the human capital of board members to help the firm identify wise investments as well as the loss of h financial backing could be reasons why losing them tends to negatively impact asset and employee growth.

It is slightly puzzling that we do not see any effect on sales. We may offer a few possible reasons why this might be the case, but we are unfortunately unable to offer any definitive answers. The first reason relates to our study, which suffers from a statistical power issue due to a

fairly small number of treated firms. The *t*-statistics in Tables 5 and 6 for sales, which are large but below the statistical threshold for significance at the 0.1 level, hint in that direction.

A second reason could be that the contribution of board members with respect to sales is often largely of a one-off nature. A board member brings her relevant ideas, network, and relational assets to a firm. Once she has transferred them to the firm, they stick with the firm even when the board member no longer exists. A board member that leaves a firm acrimoniously may cut off networks and relationships, but when the board member dies, such ties may remain intact. In our study, we ensure that the CEO of the firm is alive for all firms during the study period. This means that the effect of losing a board member is cushioned to some extent, particularly regarding sales.

The final reason for not observing any effect on sales in our study might be that there is a lag in this effect so that it cannot be observed within the relatively short window we observe in our data. After lagging behind competitors in assets and employees, eventually, a sales decline will follow. An argument against this explanation may be that a sales decline will be equally likely to lead an employee decline as it is to lag it.

Future Research

Most of the existing research on the importance of board members has been conducted on samples of large, mature firms. We cannot necessarily extrapolate the findings of these studies to entrepreneurial firms because the roles performed by board members in large firms (more control, less service) may be significantly different from the roles performed in entrepreneurial firms (less control, more service) and because entrepreneurial firms must endure greater resource scarcity than established firms. In this sense, our study contributes to both the corporate

governance and entrepreneurship literatures. Our goal has been to establish whether board members are important to entrepreneurial firms and the characteristics that make them more or less important. Future research should also explicitly compare the effect of board members on entrepreneurial firms vis-à-vis larger, older firms, which is outside the scope of this paper.

Decomposing the effects of board members on new firms begins by measuring, in a statistically robust manner, whether there are any such effects or not and the broad patterns of variation in these effects. However, we need much more refinement of our understanding of how board members may help new firms. First, we need insight into the precise mechanisms through which board member effects exist. Related to this is the question of identifying the contribution of board members that are one-time and sticky as well as those that require the continued presence of a board member. For instance, the control function is likely to require the board member to be present. However, in new firms, where the owner or owners are proximate to the day-to-day activities of the firm, the control function of board members may not be very important. On the other hand, the service/strategy function may be more valuable, but a large part of this resource may be a one-time contribution for new firms, which will stick even after a board member leaves unless she leaves acrimoniously. In this context, the fact that a board member leaving a firm has little or no measurable effect does not necessarily mean that the board member did not bring value to the firm.

Another research avenue is the supply and demand of board members, outside board members in particular. Outside board members did not matter for performance in our study. The reason may be that new firms are rarely able to attract sufficiently skilled external board members even if they want to; i.e., new firms might face a very limited supply of board members. The reason may also be a failure of demand. New firms may undervalue the potential contribution of

board members and not seek to recruit them or just nominate seat-fillers in the first place. Understanding these issues better may have practical implications for founders that wish to maximize their chances of success as well as for policy makers that seek to stimulate the social benefits of entrepreneurship.

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Appendix A

Portela (2001) proposed a way of multiplicatively combining several skill measures such as education, experience, or unobserved skill into one composite skill measure. The construction process of the composite skill measure is as follows. First, we start with the average education years in the sample. Then, we correct for the relative position of the individual in schooling distribution of the sample.

$$S = mschool * a_{i_{school}}$$

The correction factor $a_{i_{school}}$ is calculated as follows:

$$a_{i_{school}} = 0.5 + \frac{e^{(school_i - mschool)/sschool}}{1 + e^{(school_i - mschool)/sschool}}$$

where $school_i$ is the formal education years of individual *i*, *mschool* is the average education years in the sample and *sschool* is the standard deviation of education years in the sample. This calculation of the correction factor imposes a cumulative logistic distribution on the skill measure. The correction factor ranges from 0.5 to 1.5. For an individual with 0 years of education, the skill level will be half the average schooling years in the sample. For individuals with the maximum years of education (22 years in our sample), the skill level will be 1.5 times the average schooling years, and individuals for whom education years is equal to the average education years in the sample, the correction factor is 1. Imposing a cumulative logistic distribution assumes increasing positive returns of schooling up to a certain point (average education years) and then diminishing positive returns thereafter.

After correcting for schooling, we correct for the relative position of the individual in the general experience distribution and board experience distribution in our sample in the same way we did for schooling:

$$a_{i_{experience}} = 0.5 + \frac{e^{(exper_i - mexper|school)/sexper|school}}{1+e^{exper_i - mexper|school)/sexper|school}},$$

where $exper_i$ is the general experience of individual i, $mexper|school$ is the average experience in the sample for the education years of person i, and $sexper|school$ is the standard deviation of experience in the sample for the relevant number of education years.

$$a_{i_{board\ experience}} = 0.5 + \frac{e^{(BE_i - mBE|school,\ exper)/sBE|school,\ exper}}{1 + e^{(BE_i - mBE|school,\ exper)/sBE|school,\ exper}},$$

where BE_i is the board experience of individual i, $mBE|school, exper$ and $sBE|school,\ exper$ are mean board experience, and the standard deviation of board experience, respectively, in the sample for the relevant number of education years and general experience.

Thus, our final skill index is as follows:

$$S_{i,t} = mschool_t * a_{i_{school}} * a_{i_{experience}} * a_{i_{board\ experience}}.$$

Table 1

Board Composition in the Sample in the Second Year of Operation

Relationship with owner	Frequency	Percent	Cum.
Mother	624	0.95	0.95
Father	1,815	2.75	3.70
Offspring	2,276	3.45	7.15
Sibling	1,955	2.97	10.12
Spouse	5,311	8.06	18.18
Owner	35,507	53.88	72.06
Outsider	18,411	27.94	100.00
Total	65,899	100.00	

Note: The table shows board members in 40,795 firms during the second year of their operation. Since we have ownership data from 2004 onwards only, this sample excludes firms if their second year of operation was before 2004 or after 2011. Out of the 40,795 firms, 36,866 (90%) firms have at least one owner or family member of an owner on the board, and 12,235 (30%) firms have at least one outsider on their board. Outsiders are defined as board members that are neither owners, relatives of owners of the firm with at least a one percent stake, nor employees.

Table 2

Board Composition from the Sample in Second Year of Operation

	Board Size	Frequency	Percent	Cum.
	1	24,693	60.53	60.53
	2	8,826	21.64	82.16
	3	5,813	14.25	96.41
	4	1,239	3.04	99.45
	5	193	0.47	99.92
	6	26	0.06	99.99
	7	3	0.01	100.00
	8	1	0.00	100.00
	9	1	0.00	100.00
Total firms		40,795	100.00	
Mean board size	1.61			
Std. Dev.	0.88			

Table 3

Descriptive Statistics of Matched Sample in the Second Year of Founding

	52,167 control firms Board member is not dead				291 treated firms Board member is dead			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Assets (in thousands)	1,968.53	3,068.07	21.00	29,608.00	2,868.00	4,471.58	25.00	28,020.00
Equity (in thousands)	206.71	547.87	0.00	25,640.00	340.62	997.36	100.00	11,202.00
Employees	2.18	3.66	0.00	71.00	2.43	4.59	0.00	47.00
Sales (in thousands)	2,877.08	4,848.25	0.00	38,827.00	3,253.99	5,103.75	0.00	37,183.00
Avg. age of board members	44.26	9.53	20.00	85.00	52.29	10.71	24.00	85.00
Avg. age of owners	43.97	9.48	9.00	85.00	49.69	10.24	26.00	78.00
Age of CEO	43.70	10.16	20.00	84.00	44.63	10.19	24.00	76.00
Avg. education years of bm	13.64	2.48	0.00	22.00	13.09	2.30	8.00	21.00
Avg. education years of owners	13.61	2.45	0.00	22.00	13.07	2.35	6.00	20.50
Education years of CEO	13.56	2.60	0.00	22.00	13.17	2.45	8.00	21.00
Single owner firm	0.43	0.49	0.00	1.00	0.15	0.36	0.00	1.00
Family ownership of bm	0.87	0.22	0.00	1.00	0.79	0.26	0.08	1.00
Family ownership of CEO	0.87	0.23	0.00	1.00	0.78	0.28	0.08	1.00
Average board tenure	1.04	0.19	1.00	2.00	1.04	0.18	1.00	2.00
Board Size	1.53	0.85	1.00	9.00	2.07	1.12	1.00	9.00

Note: Since we have ownership data from 2004 onwards only, the statistics related to ownership excludes firms whose second year of operation was before 2004 or after 2011.

Table 4

Industry Distribution of Firms in Sample Based on High Level NACE Aggregation (A10)

	Frequency			Proportion		
	Control	Treated	Total	Control	Treated	Total
Agriculture, forestry, and fishing	362	4	366	0.01	0.01	0.01
Manufacturing, mining, quarrying and other industries	3,014	25	3,039	0.06	0.09	0.06
Construction	8,393	40	8,433	0.16	0.14	0.16
Wholesale and retail trade, transportation and storage, accommodation and food services	15,729	89	15,818	0.30	0.31	0.30
Information and communication	2,143	12	2,155	0.04	0.04	0.04
Financial and insurance activities	2,598	16	2,614	0.05	0.05	0.05
Real estate activities	5,450	46	5,496	0.10	0.16	0.10
Professional, scientific, technical, administration and support service activities	9,721	43	9,764	0.19	0.15	0.19
Public administration, defense, education, human health and social work activities	2,777	11	2,788	0.05	0.04	0.05
Other services	1,961	5	1,966	0.04	0.02	0.04
Total	52,148	291	52,439	1.00	1.00	1.00

Table 5

Sample Imbalance Before and After Coarsened Exact Matching

Before matching	
Multivariate L1 distance	0.88245

Univariate imbalance	L1	mean	min	25%	50%	75%	max
Founding year	0.24711	-1.7825	0	-2	-3	-2	0
Industry	0.13905	-0.73548	0	0	0	-1	-1
Single/multiple founders	0.2731	-0.2731	0	0	0	-1	0
Sales quintile	0.08745	0.20213	0	0	0	1	0
Assets quintile	0.07076	0.24315	0	0	0	1	0

After matching		
Number of strata	8,102	
Number of matched strata	243	
	Control	Treated
All	52,167	291
Matched	6,130	270
Unmatched	46,037	21

Multivariate L1 distance	8.349e-15

Univariate imbalance	L1	mean	min	25%	50%	75%	max
Founding year	8.7e-15	2.7e-11	0	0	0	0	0
Industry	8.1e-15	3.3e-13	0	0	0	0	0
Single/multiple founders	1.5e-15	2.1e-15	0	0	0	0	0
Sales quintile	6.7e-15	3.6e-14	0	0	0	0	0
Assets quintile	7.5e-15	3.6e-14	0	0	0	0	0

Table 6

Effect of Board Member Death on Firm Performance

	(1) Assets	(2) Sales	(3) Employees	(4) Assets	(5) Sales	(6) Employees
Board member is dead	-0.0781^{+}	0.0362	-0.0497*	-0.131**	-0.00190	-0.0490^{+}
	(-1.67)	(0.34)	(-1.96)	(-2.76)	(-0.02)	(-1.83)
Avg. education of owners				-0.0644*	-0.134***	-0.0234*
				(-2.29)	(-3.30)	(-2.15)
Largest owner's education				0.0104	0.0366	-0.00818
				(0.53)	(1.29)	(-0.88)
Single owner firm				-0.0777^{+}	-0.143	-0.0620*
				(-1.75)	(-1.62)	(-2.51)
Avg. age of owners				0.0341^{+}	-0.0400	-0.00939
				(1.72)	(-0.97)	(-0.48)
Square of avg. age of owners				-0.000492*	0.000222	0.0000586
				(-2.43)	(0.55)	(0.29)
Family ownership of CEO (%)				-0.0596	-0.0881	-0.0157
				(-0.80)	(-0.58)	(-0.37)
Education of CEO				0.0000619	-0.00000603	0.00861
				(0.00)	(-0.00)	(1.07)
Age of CEO				0.0358^{+}	-0.00658	-0.00516
				(1.96)	(-0.22)	(-0.27)
CEO is a board member				-0.0301	-0.0132	-0.00689
				(-1.41)	(-0.45)	(-0.62)
Square of age of CEO				-0.000371*	0.0000155	0.0000469
				(-2.05)	(0.05)	(0.25)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	48,781	48,728	48,782	44,044	43,994	44,045
overall R^2	0.0239	0.0006	0.0000	0.0163	0.0481	0.0506

t statistics in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7

Effect of Dead Board Member's Characteristics on Firm Performance: Human Capital

Human capital measure	Education years			Edu. years, experience, and board exp.		
	(1) Assets	(2) Sales	(3) Employees	(4) Assets	(5) Sales	(6) Employees
Dead bm has below-median HC in industry	-0.179**	-0.00277	0.0422	-0.0787	0.162	0.00680
	(-3.36)	(-0.03)	(-1.41)	(-1.12)	(1.04)	(0.19)
Dead bm has above-median HC in industry	-0.0588	0.00149	-0.0755	-0.173**	-0.134	-0.0942**
	(0.71)	(0.01)	(-1.43)	(-2.86)	(-1.02)	(-2.58)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	44,044	43,994	44,045	44,044	43,994	44,045
overall R^2	0.0163	0.0481	0.0506	0.0163	0.0482	0.0509

Note: *t* statistics in parentheses, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
All regressions use same control variables as shown in Table 6. Treatment sample restricted to +/- 4 years from board member death.

Table 8

Effect of Dead Board Member's Characteristics on Firm Performance: Chairperson

	(1) Assets	(2) Sales	(3) Employees
Dead bm was not the chairperson	-0.0968^{+} (-1.68)	0.115 (0.81)	-0.0288 (-0.82)
Dead bm was a chairperson	-0.182* (-2.46)	-0.179 (-1.32)	-0.0797* (-2.11)
Year dummies	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
N	44,044	43,994	44,045
overall R^2	0.0163	0.0484	0.0508

Table 9

Effect of Dead Board Member's Characteristics on Firm Performance: Outside Board Member

	(1) Assets	(2) Sales	(3) Employees
Dead bm was outside bm	-0.0460 (-0.54)	0.211 (1.04)	-0.0193 (-0.35)
Dead bm was either owner, family, or employee	-0.155** (-2.86)	-0.0644 (-0.55)	-0.0577^{+} (-1.93)
Year dummies	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
N	44,044	43,994	44,045
overall R^2	0.0163	0.0482	0.0507

Note: *t* statistics in parentheses, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
All regressions use same control variables shown in Table 6. Treatment sample restricted to +/- 4 years from board member death.

Paper II

Immigrant Entrepreneurship: The Liability of Weak Embeddedness and Overcoming It with Native Board Members

Sujit Pandey
NHH Norwegian School of Economics

Abstract

The question of performance differences between immigrant- and native-owned firms is far from settled. One big disadvantage immigrant entrepreneurs have is the lack of embeddedness in the host country's socio-economic structures. We study the performance difference and find that immigrant-owned firms perform worse than native-owned firms. Next, we examine whether native board members can help immigrant entrepreneurs embed themselves in the host country and thereby close the performance deficit. We find evidence that not all native board members can do so, but certain types of board members can.

Keywords: Immigrant entrepreneurship, Board members, Corporate Governance, Human capital, social embeddedness

Introduction

International migration has been rapidly growing over the years. The United Nations' *International Migration Report* shows that significant demographic changes have occurred in North America, Oceania, and Europe as a result of international migration. In addition, the relative ease of immigration across most countries in Europe and its implications for economic migration has been a subject of great debate in recent years. In this context, research into immigrant entrepreneurship, such as this study in which we examine the performance of immigrant entrepreneurs relative to native entrepreneurs, can have profound policy implications.

There are arguments that favor immigrant entrepreneurs outperforming native entrepreneurs and vice versa. Economic migrants are described as tending, on average, to be more able, ambitious, aggressive, entrepreneurial, or otherwise more favorably selected than similar individuals who choose to remain in their place of origin. Hence, they are favorably self-selected to outperform native entrepreneurs (Chiswick, 1999). Constant and Zimmermann (2006) argue that the very act of seeking opportunities in a foreign country and assuming the risks that accompany migration are entrepreneurial. Thus, immigrants are likely to have entrepreneurial/human capital that is superior to that of natives, which should give them an edge in terms of business performance.

There may also be some market-driven advantages for immigrant entrepreneurs in the host country. For instance, the ethnic enclave hypothesis suggests that a community of immigrants in the host country is in itself a distinct economic sector that provides a higher payoff for human capital brought from the home country for both workers and entrepreneurs (Portes & Shafer, 2007). Even outside the enclaves, immigrant entrepreneurs may have

opportunities in sectors such as food and hospitality, where the local population may be attracted by differentiated products, such as ethnic cuisines.

The third source of advantage for immigrant entrepreneurs comes from the relational/social capital in the home country that an immigrant entrepreneur may be able to exploit by either sourcing products from or exporting products to the home country (Brzozowski, Cucculelli, & Surdej, 2014; Miera, 2008).

Another set of arguments claims the advantage is held by native entrepreneurs relative to immigrant entrepreneurs. First, immigrants are not socially embedded in the host country to the extent that natives are.[15] This hinders them from spotting opportunities, accessing resources, and making informed decisions based on all available information. Second, immigrant entrepreneurs tend to be financially less well-off than native entrepreneurs at the time of starting their business. The lack of networks and physical assets in the host country may also lower their ability to secure outside financing. Therefore, they may not be able to establish (or quickly grow) the firm to an efficient scale.

Finally, since the host country labor market may undervalue the human capital of an immigrant, immigrants may more often choose entrepreneurship/self-employment out of necessity rather than pursuing opportunities in the market (Kloosterman et al., 1998). Such subsistence entrepreneurs may not be capable of growing—or motivated to grow—their business beyond the level of income that affords them a decent living. In addition, they may be pursuing business ideas with more limited upside potential. This would drag down the average performance of immigrant entrepreneurs compared to native entrepreneurs.

[15] They lack familiarity with and the ability to navigate the formal and informal institutional environment and endure a relative lack of social capital.

Following these opposing arguments, three possibilities emerge. First, the factors favoring immigrant entrepreneurs are stronger than those that oppose them, and they outperform native entrepreneurs, as Borjas (1986) and Neville, Orser, Riding, and Jung (2014) find. Second, the factors opposing immigrant entrepreneurs overpower those that favor them, and they underperform relative to native entrepreneurs, as Sahin, Nijkamp, and Stough (2011) assert. Finally, the two factors might cancel each other out, and the two sets of entrepreneurs may exhibit similar performance levels, as found by Constant and Zimmermann (2006).

Amidst these theoretically and empirically contradictory findings, we ask and answer two pertinent questions. (1) How do immigrant entrepreneurs perform in comparison to native-born entrepreneurs? (2) Can immigrant entrepreneurs offset their lack of social embeddedness by appointing local board members to or hiring local people for executive positions? While the first question has been asked previously, albeit sparsely and with inconsistent answers, the second question has, to the best of our knowledge, not been studied so far. Furthermore, while most of the immigrant entrepreneurship research to date seems to focus on self-employment, we study privately owned limited liability firms, which represent more serious entrepreneurial endeavors.

Aliaga-Isla and Rialp (2013), in their systematic review of immigrant entrepreneurship, observe that the performance of immigrant firms has not received adequate attention in the literature. Indeed, the majority of studies we reviewed have examined selection into self-employment or performance in specialized contexts such as immigrant enclaves (Constant & Zimmermann, 2006; Ohlsson, Broomé, & Bevelander, 2012; Ndofor & Priem, 2011). This study contributes to immigrant entrepreneurship research by contrasting the performance of immigrant- and native-owned limited liability firms, which typically involve more serious entrepreneurial endeavors, using the rich Norwegian microdata. Equally

importantly, we contribute to the budding literature of corporate governance in small firms by examining the effect of a board member on immigrant firms' performance.

Since immigrant entrepreneurship is sometimes regarded as an alternative way of integrating immigrants into the host country's economy, especially when the labor market is struggling (Hjerm, 2004), this study may have substantive policy implications.

Theory and Hypotheses

The natural starting point in examining the performance of immigrant entrepreneurs vis-à-vis native entrepreneurs is to focus on two crucial questions: (1) Are the two groups different in terms of resource endowments; and (2) Is the business environment more challenging to one group than to the other? Resource-based theory highlights the importance of certain resources in firms' competitiveness, thus serving as an appropriate lens through which to look at the first question. Social embeddedness theory presents a relevant framework to study the second question because it tells us about the importance of relationships between a firm and socio-economic institutions. Social embeddedness theory extends beyond the social capital or network of entrepreneurs, thus making it a more relevant theoretical lens for this paper because, in the context of immigrant entrepreneurship, the distance between firms and socio-economic institutions in a host country is as important a differentiating factor between immigrant and native entrepreneurs as social capital or networks.

Resource-Based Theory

Human/Entrepreneurial capital

For a new venture, the entrepreneur's human capital is one of its most important resources. Entrepreneurs with high human capital usually outperform those with low human capital. Parker (2009, p. 176) points out that "immigrants are better educated and motivated

than natives." In our analysis sample, too, we find evidence of a statistically significant, albeit marginal, difference in higher education years favoring immigrant entrepreneurs compared to native entrepreneurs. We must note that, while making this comparison, we are assuming that the education system in the home and host countries of immigrant entrepreneurs are similar and impart a similar quality of education, which may not always hold true.

Alvarez and Busenitz (2001), in their effort to reconcile resource-based theory and entrepreneurship, propose the incorporation of opportunity-seeking behavior of entrepreneurs as a key resource giving firms a potential competitive advantage. Immigrants, primarily economic migrants, have demonstrated opportunity-seeking behavior by crossing national borders to pursue profitable opportunities. This also indicates a risk-taking nature (Parker, 2009, p. 176). Therefore, the immigrant population tends to be more able, ambitious, and entrepreneurial (Chiswick, 1999; Constant & Zimmermann, 2006). The combination of knowledge/resources from the home country and market needs of the host country can inspire immigrant entrepreneurs to come up with unusual and innovative solutions or simply to exploit arbitrage opportunities.

There may also be cases in which immigrants become necessity entrepreneurs. The labor market in the host country may undervalue the human capital of immigrants, resulting in a penalty in wages or unemployment. Thus, immigrants who believe that their abilities are undervalued, or are unemployed or underemployed, may seek self-employment as a substitute for a salaried job. Such necessity entrepreneurs do not fit the "able, ambitious, and entrepreneurial" characterization we just presented when describing immigrant entrepreneurs. Their motivation for firm creation is subsistence; thus, they may not push for further growth beyond a point that reflects a fair value for their abilities in the labor market, and they may undertake a more limited search for promising entrepreneurial opportunities. This plausible

argument points toward a disproportional presence of necessity entrepreneurs in the population of immigrant entrepreneurs. However, we must be mindful that necessity entrepreneurs also exist in the population of native entrepreneurs. The threshold for being pushed into entrepreneurship out of necessity may, however, be different for natives and immigrants.

Financial capital

Having sufficient financial capital to start a business at a minimally efficient scale is important for firm survival and growth. Hvide and Møen (2010) find that the wealth of entrepreneurs before they start a business has a positive effect on venture performance up to the third quartile; however, it turns negative in the top quartile. This implies that financial constraints have real consequences for new firms. Immigrant entrepreneurs may be disproportionately affected by financial constraints for a number of reasons. First, they have lower income levels in general and will have lower savings to finance a venture on their own. Second, while natives have their family members to chip in financially, first-generation immigrants may not have such sources to depend on. Finally, since immigrants are likely to have smaller stocks of personal wealth, financial institutions may reject their financing requests for lack of collateral (Cavalluzzo & Wolken, 2005). Financial capital, which is valuable but not rare or inimitable, does not necessarily give any firm a sustained competitive advantage. However, for a new venture, it can have significant effects on survival and performance.

Social Embeddedness Theory

> A Polish businessman in Norway usually has neither a network of friends nor even a rather modest social circle at his disposal. His network is in Poland and therefore outside the borders of his business activity. Devoid of its

> support, he is in for a more troublesome start than his Norwegian counterpart, who starts his business in a well-known environment (Chalupa, 2014, p. 74).
>
> It turns out that people with foreign-sounding and last names that are difficult to pronounce for Norwegians are more prone to bankruptcy as company owners and directors (Chalupa, 2014, p. 76).

Social embeddedness refers to the fact that economic activities occur within social structures and that the outcomes of such activities are directly or indirectly influenced by the actors and structures in the society. “Embeddedness refers to the social, cultural, political, and cognitive structuration of decisions in economic contexts” (Beckert, 2003, p. 769). The structures within which a firm is embedded offer resources, opportunities, and challenges. An entrepreneur who is a part of that structure can draw resources, identify and exploit opportunities, and overcome constraints to the extent that the entrepreneur and the environment are congruent (McKeever, Anderson, & Jack, 2014). Conversely, an outsider may struggle to navigate the structural context and exhibit worse performance despite equal or higher human capital compared to her native analog. As such, the ability of an entrepreneur to grasp the socio-economic peculiarities of an industry while making economic decisions will affect the outcome of these decisions. Immigrant entrepreneurs are likely to be less able to perceive and adapt to such variables while making decisions. In line with this argument, empirical findings indicate that social embeddedness affects financial performance in entrepreneurial firms (Uzzi & Gillespie, 2002; Jack & Anderson, 2002). To the extent that a native entrepreneur is better able to assess these variables compared to immigrant entrepreneurs, a native entrepreneur will be making decisions under conditions of risk, while an immigrant entrepreneur will be making decisions under conditions of uncertainty. This

implies that a native entrepreneur will make relatively more favorable decisions than her immigrant counterpart will.

The economic actions of a firm's stakeholders are also shaped by the social sphere of which they are a part. This means that for an immigrant entrepreneur, customers' requirements and preferences, suppliers' conditions and expectations, as well as competitors' behavior may be different in the host country compared to the home country. Inability to bridge such differences and adapt to the host country's social, cultural, political, and cognitive structures will affect the chances of obtaining legitimacy in the host country for immigrant entrepreneurs. This, in turn, will affect performance and the probability of survival.

While the arguments based on social embeddedness theory have so far favored native entrepreneurs, the theory can also provide favorable arguments for immigrant entrepreneurs. On the one hand, immigrants are part of larger social structures in the host country, where they face disadvantages compared to natives. On the other hand, immigrants are also often part of tightly knit enclaves, which "provide information networks, protected markets for ethnic products, and a steady supply of workers" (Parker, 2009, p. 172). The benefits originating from these enclaves to the entrepreneur, however, depend on the size of the enclave, their disposable income, and demand for such products (Parker, 2009).

The prediction by social embeddedness theory about the performance of native versus immigrant entrepreneurs will thus depend on the magnitude of the liability immigrant entrepreneurs experience based on their weak embeddedness in the larger socio-economic structures of the host country, compared to the magnitude of benefits it can extract from the enclaves or home country. Immigrant entrepreneurs with an "enclave strategy" in a relatively small country like Norway may face a low "ceiling." Therefore, social embeddedness theory seems to suggest a net advantage for native entrepreneurs.

Hypothesis 1: On average, native entrepreneurs outperform immigrant entrepreneurs.

Not all immigrant entrepreneurs will have the same degree of deficit regarding social embeddedness compared to natives. Individuals who have lived a substantial period of their lives in the host country will have had opportunities to learn about it and reduce this deficit. The longer immigrants have been in the host country, the greater the chances that they have assimilated into the host country's socio-economic structures.

Hypothesis 2: On average, firms founded by immigrant entrepreneurs who have spent a substantial period of their lives in the host country will perform better than firms founded by immigrant entrepreneurs who have spent less time there.

Although there is a competitive disadvantage for immigrants compared to natives, the magnitude of the disadvantage may vary across the immigrant entrepreneur population based on their human capital endowment. Immigrant entrepreneurs with high human capital will be better able to overcome the liability of weak embeddedness compared to those with low human capital. First, higher education level may improve an entrepreneur's ability to absorb information from the environment and spot opportunities. These could either be opportunities presented by ethnic enclaves or arbitrage opportunities presented by differences between the home and host countries' markets. Second, education may improve the managerial capability of entrepreneurs. Finally, education may signal the quality of the entrepreneur to the stakeholders and thus affect performance (Van der Sluis, Van Praag, & Vijverberg, 2005). These arguments imply a moderating effect of education on the performance differences between immigrants and natives.

Hypothesis 3: The higher the educational level of an immigrant entrepreneur, the less she will underperform a native entrepreneur.

Overcoming disadvantage due to social un-embeddedness

We have argued and hypothesized that the lack of social embeddedness of an immigrant entrepreneur in the host country will hinder performance. An important question, then, is whether this disadvantage can be mitigated somehow. One way of overcoming this disadvantage is to include natives in the firm in some capacity. Immigrant entrepreneurs can tap into these native individuals' understanding of the local socio-economic context as well as their personal ties and networks. One such source of human and social capital that might help immigrant entrepreneurs is a native board member.

The Board Member Role in New Ventures

The corporate governance literature identifies two primary functions of a board member—control and resource provision. The control function of board members relates to keeping the self-serving nature of managers in check and protecting the interests of owners. This argument, rooted in agency theory, presumes that if given the opportunity, management will pursue their self-interests at the expense of the owner's interest. This function may be more relevant in large or public firms where owners may not be able to keep track of the everyday activities in the firm. The firms that constitute our sample—new, single-owner firms—are unlikely to experience such problems since the owner is the manager in the vast majority of cases. Therefore, board members are more important as resource providers, i.e., they perform a service function. One commonly used theory to explain the service function of board members is resource dependency theory.

Zahra and Pearce (1989) succinctly summarize the roles board members play and how those roles affect the financial performance of the firms. The three important service-related roles they list (based on resource dependency theory) are especially relevant to the current discussion. First, board members help firms co-opt external resources by leveraging their

social capital. This could be obtaining credit lines from banks or recommending potential employees. Second, board members play a boundary-spanning role. They "help the firm interface with its general and competitive environment . . . and absorb environmental uncertainty by providing information" (Zahra & Pearce, 1989, p. 297). Finally, firms can leverage the reputational capital of their board members to acquire or enhance organizational legitimacy. Huse and Zattoni (2008) find evidence of board members' roles in helping firms acquire legitimacy during the start-up phase. Similarly, the meta-analysis by Dalton, Daily, Johnson, and Ellstrand (1999) demonstrates that board size is positively correlated with firm performance, which suggests that board members have an important resource-provision role.

As discussed earlier based on social embeddedness theory, immigrant entrepreneurs' weak embeddedness in the socio-economic structures in the host country puts them at a disadvantage compared to native entrepreneurs. The three roles we just discussed are precisely the issues that disproportionately affect them. They may not be able to draw resources from the environment effectively; furthermore, they may not be able to correctly assess intricate interrelationships among various stakeholders and how these may constrain their ability to pursue certain strategies. As outsiders, they may struggle to gain legitimacy, while their strongly embedded local competitors may acquire legitimacy more easily.

Having native board members may, in itself, be a sign of an immigrant entrepreneur's stronger embeddedness in a host country, compared to those that do not have native board members. A formal role in a nascent organization is a commitment that people are likely to make only if they have strong ties with the founder. Therefore, if an immigrant entrepreneur has a native board member, this could be an indicator of the social capital she has accumulated. While this suggests a different mechanism that links the presence of native board members to higher firm performance, both mechanisms predict a positive link to

performance. Therefore, if immigrant firms underperform compared to native firms, as we hypothesized, then having a native board member will reduce the performance gap. On the other hand, if immigrant firms outperform native firms, then having a native board member will further increase the performance gap.

Based on these arguments, we propose the following hypotheses:

Hypothesis 4a: Having a native board member will affect the performance gap between immigrant and native entrepreneurs in the immigrant entrepreneurs' favor.

Hypothesis 4b: Firms founded by immigrant entrepreneurs that have native board members will perform better than firms founded by immigrant entrepreneurs that do not have native board members.

There will, of course, be substantial heterogeneity among native board members. Numerous studies of board composition have shown that certain board members are more valuable than others. A considerable focus has been dedicated to the presence of outside board members (Gabrielsson & Huse, 2005; Calabro & Mussolino, 2013). The meta-analysis by Dalton et al. did not find any conclusive evidence of a link between board independence and firm performance. However, for a new firm, having an outside board member might indicate a higher quality founder, precisely because the founder has demonstrated an ability to recruit an outsider. Furthermore, since insiders (family members and owners) are already incentivized to help the firm succeed even if they do not occupy a board position, having an outsider board member will mean that they have extra resources they can leverage. In our context, this means that an immigrant entrepreneur who has a non-family member as a board member—instead of a native spouse, for example—might have enhanced performance:

Hypothesis 5a: Having a native outside board member will affect the performance gap between immigrant and native firms in immigrant entrepreneurs' favor.

Hypothesis 5b: Firms founded by immigrant entrepreneurs that have native outside board members will perform better than firms founded by immigrant entrepreneurs that do not have native non-family board members.

Finally, we look at one of the important human capital characteristics of native board members that tends to influence their value to immigrant firms—their industry experience. Having knowledge of industry practices and having relationships with important stakeholders within the industry is an especially important resource to access for an immigrant entrepreneur. Zahra and Pearce (1989) explain that "boards which fit the firm's external environment or aid in absorbing uncertainty enhance company performance" (p. 299). Industry experience is a particularly important variable because it is not only a measure of the relevancy of the human capital of a board member but also an indicator of the relevant social capital she may bring to the table. It will help eliminate the competitive disadvantage compared to natives arising from differences in embeddedness. Therefore, we believe that immigrant entrepreneurs who have board members with industry experience will have a competitive advantage.

Hypothesis 6a: Having native board members with industry experience will affect the performance gap between immigrant and native firms in immigrant entrepreneurs' favor.

Hypothesis 6b: Firms founded by immigrant entrepreneurs that have native board members with industry experience will perform better than firms founded by immigrant entrepreneurs that do not have such board members.

Data and Descriptive Statistics

Data Sources

Traditionally, immigrant entrepreneurship research has suffered from a "dearth of statistical data on immigrant population" (Aliaga-Isla & Rialp, 2013, p. 21). One of the strengths of our study is the use of rich Norwegian microdata that has detailed information on all residents in Norway, including the immigrant population, to test our hypothesis. Our variables come from five different registers: (1) *the population register*, which that has detailed demographic variables on the entire population of residents in Norway; (2) *the company register*, which has accounting information for all limited liability firms registered in Norway; (3) *the corporate and business register*, which has information about firm ownership and who occupies the key roles in each firm; (4) *the register for employment relationships*, which has information on the nature and duration of the jobs all individuals have in all firms; and (5) *the education register*, which has detailed information on years, levels, and fields of study on most individuals registered in Norway.

Sample Generation

We exclusively use single-owner firms so that the immigration status of the main decision maker in the firm can be neatly identified. Our sample contains only limited liability firms. Whereas most studies in the immigrant entrepreneurship literature focus on self-employment and sole proprietorships, our focus on limited liability firms looks at more serious entrepreneurial endeavors. This sample also suits us because board members are an integral part of our study, and limited liability firms are required to have a board by law (unlike sole proprietorships).

We start by identifying single-owner firms that started between the years 2004 and 2010. The period was chosen because 2004 is the first year of our ownership data, and we

wanted to look at the first five years of observations for all firms conditional on survival. There is right censoring after the year 2014. There were 40,871 single-owner firms registered between 2004 and 2010. Out of those, 2,429 were owned by immigrants and 38,442 by natives. We exclude firms in which the owners are under 18 and over 67 years of age, the retirement age in Norway, and we only include firms that appear for two years in the database. We impose this restriction to make sure that we have at least one full year's observation for the dependent variables. This also helps us get rid of some special purpose companies that may have been established for a particular transaction. This restriction may, however, add some survivor bias by getting rid of some legitimate firms that are shut down in their first year of operation.

Weeding out shell companies and holding companies is essential to make sure that we are conducting our analysis on firms with real activities. To this end, we impose a set of constraints. First, we remove all firms that do not have at least two years of sales in the first five years. Second, we also remove firms that do not have salaried workers in the firm for at least two out of the first five years. Third, we remove firms that experience any ownership change within the period of study. Finally, we winsorize the data by year on sales, assets, and employee count and remove the top one percent of either of those three categories. The final sample size after imposing these sampling restrictions was 13,386 firms, among which 1,331 were immigrant owned.

"The roles dataset" from the corporate and business register contains information about board members and the firms to which they are linked. We include board members that

are coded as either chairperson, vice-chairperson, or member of the board, as well as deputy board members.[16]

Measures

Dependent variables

The choice of performance measures for new ventures is not always straightforward. Most studies use size and growth measures based on sales and employees (Murphy, Trailer, & Hill, 1996; Davidsson, Delmar, & Wiklund, 2006). The size and growth of assets are also used in several studies (Becker & Hvide, 2017; Davidsson et al., 2006), although Delmar (2006) cautions against using asset measures because they are usually less relevant in non-manufacturing industries. It is also common to use profitability measures such as return on assets or profit margins. Similarly, efficiency and market share have also been used as measures of performance. Sometimes these measures can be misleading indicators of performance, especially for firms that focus on product development in the first several years of their life and then turn to focus on revenue or profitability. The best practice is to use multiple, objective indicators of firm performance because any single indicator cannot fully capture the performance given the diverse nature of businesses (Murphy et al., 1996; Davidsson et al., 2006). Accordingly, we use several indicators of firm performance.

Sales. We take the natural logarithm of the total sales revenue of a firm. In order to make sure that we do not lose years where sales were reported as zero while the firm was still active, we add 10 to the original sales figures before transforming.

[16] We have included deputy board members in the study because, for the purposes of our research question, deputy board members can also be effective in serving as a bridge between an immigrant entrepreneur and the host country's social structures.

Assets size. This variable is the natural logarithm of the total assets value of a firm. As in the case of sales, we add 10 to the original assets value before transforming so that we do not lose observations where assets were reported as zero even though the firm was still active.

Employees. This is the natural logarithm of the number of employees that work in a firm, the founder included. For active firms, we add 1 before transformation to avoid losing observations where the reported employee number is zero.

Full-time equivalent employment days. It is plausible that many of the jobs created by new firms are part-time. This implies that the employee count will not necessarily give an accurate picture of the production activity of the firm. Therefore, we create a variable that measures the equivalent of full-time days of employment generated by firms. Like for the other dependent variables, we use a natural logarithm transformation for this variable.

Equity ratio. As discussed earlier, we believe that immigrant entrepreneurs will face greater financing constraints compared to native entrepreneurs. To confirm this hypothesis, we use an equity ratio, which measures the portion of fixed assets that is covered by equity capital. This variable is also the natural log transformed.

EBITDA margin. We look at the ratio of earnings before interest, tax, and depreciation to total income as a measure of operating profitability.

Explanatory variables

Immigrant status. The statistical agency of Norway—Statistisk Sentralbyrå (SSB)—has defined the following six categories of immigration status: (A) Born in Norway with two Norwegian-born parents, (B) Immigrants, (C) Norwegian born with immigrant parents, (D) Foreign born with one Norwegian-born parent, (E) Norwegian born with one foreign-born parent, and (F) Foreign born with two Norwegian-born parents. We define immigrant

entrepreneurs as those who belong to the second category, i.e., first-generation immigrants. This variable is used to test Hypothesis 1.

Assimilated/Not assimilated entrepreneurs. We assume that an entrepreneur who has spent at least one third of her life in the host country or arrived in the host country aged 13 or younger has been assimilated. Based on this, we create a dummy variable that is coded 0 if the entrepreneur is native, 1 if an assimilated immigrant and 2 if a non-assimilated immigrant. We use this variable to test Hypothesis 2.

Education. Education is measured by the years of formal schooling that entrepreneurs have had. To test Hypothesis 2, we interact quartiles of education years of the entrepreneurs with their immigration status.

Presence of native board member. This variable divides the sample into four categories based on whether a firm has at least one native board member: (1) native-owned firms without a native board member, (2) native-owned firms with native board members, (3) immigrant-owned firms without a native board member, and (4) immigrant-owned firms with a native board member. We are primarily interested in comparing the performance of the fourth group of founders with other groups. This variable tests Hypotheses 3a and 3b.

Presence of non-family, native board members. Like the previous variable, this variable divides the sample into four categories based on whether a firm has at least one none-family, native board member. The variable is coded as (1) for native-owned firms without a non-family, native board member, (2) for native-owned firms with at least one native non-family board member, (3) for immigrant-owned firms without a non-family, native board member, and (4) for immigrant-owned firms with at least one non-family, native board member. This variable tests Hypotheses 4a and 4b.

Presence of native board member with industry experience. This variable categorizes firms into the following four groups. The groups are coded as (1) for native-owned firms without a native board member with industry experience, (2) for native-owned firms with at least one native board member with industry experience, (3) for immigrant-owned firms without a native board member with industry experience, and (4) for immigrant-owned firms with at least one native board member with industry experience. We consider board members who have worked at least two of the past five years in the same three-digit NACE industry as having industry experience.

Control variables

We control for several variables that have been found to affect firm performance in new firms.

Marital status of owner. This is a binary variable taking the value 1 if the entrepreneur is married.

Gender. This is a binary variable taking the value 1 if the entrepreneur is female. Studies have found differences between males and females for a variety of characteristics that can affect entrepreneurial outcomes. For instance, the meta-analysis by Byrnes, Miller, and Schafer (1999) finds that males usually take more risks than females. In entrepreneurship research, many studies find that female entrepreneurs underperform relative to male entrepreneurs (Cooper, Gimeno-Gascon, & Woo, 1991; Du Rietz & Henrekson, 2000; Bardasi, Sabarwal, & Terrell, 2011), which may partly be a result of gender discrimination and partly a result of the type of businesses female entrepreneurs choose to start.

Age, Age squared. These are continuous variables capturing the age of the entrepreneur and its square. The latter accounts for the non-linear effects of age on firm performance, which have been found in previous research.

Education categories. Different fields of education give people different skillsets. Some of these skillsets may be more relevant for innovating, managing, or selling products. For instance, people with education in the natural sciences may create innovative products, while people with business degrees may be better at running an organization. Therefore, we create an education category dummy variable based on the Norwegian Standard Classification of Education (NUS). The variable is coded as (0) General subjects, (1) Humanities and arts, (2) Teacher training and pedagogy, (3) Social sciences and law, (4) Business and administration, (5) Natural sciences, vocational and technical subjects, (6) Health, welfare, and sport, (7) Primary industries, (8) Transport and communications, safety and security, and other services, and (9) Unspecified broad field of education.

Firm age. This is a continuous variable indicating the number of years since firm registration.

Industry. It is highly probable that there are systematic differences in terms of which industries immigrants predominantly choose to enter, compared to natives. Therefore, we control for the industry fixed effects by including three-digit NACE code dummies in all our models.

Region. Industry structures, economic conditions, as well as the demography of residents varies across the five geographic regions in Norway. There are also some policies designed to encourage entrepreneurship in the sparsely populated northern parts of Norway. Therefore, we control for region fixed effects by including region dummies.

Big city. Entrepreneurial opportunities, market characteristics, as well as demographic characteristics in big cities may be different compared to other areas. To account for such differences, we include a binary variable that takes the value 1 if the firm is based in one of the four largest cities in Norway in terms of population.

Year dummies. We include year dummies to control for business cycle effects.

Descriptive Statistics

Table 1 shows the descriptive statistics for the entrepreneurs and firms in our sample based on the region of origin. The sample consists of all firms in the year after registration.

Insert Table 1 about here

With an average age of 44.44 years, native entrepreneurs are older than any group of immigrant entrepreneurs. Among the immigrant entrepreneurs, Eastern Europeans are the youngest group, with an average age of 39.37 years. Western European entrepreneurs have the highest level of education on average, followed by Anglo-Saxons and Nordics. The proportion of married entrepreneurs is highest (63%) in the "Rest of the World" category, which includes Asia, Africa, and Latin/Central America, while the majority of Nordic entrepreneurs are not married. Norwegians and Western Europeans have fewer female entrepreneurs (around 20%). The Rest of the World category has 24% female entrepreneurs, while Eastern Europeans have 23%.

Norwegians owned the firms with the highest capital, and Eastern Europeans owned the firms with the lowest capital. However, the difference between the averages is not substantial because most firms have the minimum required amount of NOK 100,000 (approximately USD 11,800) as capital. In terms of sales, firms founded by Eastern European immigrants, followed by the Rest of the World category, are ahead. Norwegian-owned firms have the highest asset value, while the equity ratio is highest for Anglo-Saxon entrepreneurs and the Rest of the World category, implying either their choice to not seek, or an inability to get, external finances for asset investments.

We measure four different indicators of employment: (1) employee headcount, (2) full-time equivalent employment days, (3) full-time equivalent employment days for non-owner employees, and (4) full-time equivalent employment days for employees that are neither owners nor family members of the owners. For all four of these measures, the Eastern Europeans and the Rest of the World category are clearly ahead, indicating their involvement in mostly labor-intensive industries. The Anglo-Saxon entrepreneurs generate the least employment.

Tables 2 and 3 break down which industries native and immigrant entrepreneurs are involved in. There are some clear differences and, yet, some similarities. Regarding the similarities, Table 2 shows that for both groups of entrepreneurs, "Wholesale and retail trade, transportation and storage, accommodation and food service activities" represents the biggest industry sector, followed by "Professional, scientific, technical, administration and support service activities" and "Construction." Table 3 presents a more granular level. The table shows the top five industry groups (NACE three-digit classification) for native and immigrant entrepreneurs. For immigrant entrepreneurs, restaurant and mobile food service activities constitute over 15% of the firm population.

Insert Table 2 and 3 about here

Table 4 shows the types of board members native- and immigrant-owned firms have. It is not a surprise that native entrepreneurs have a smaller share of non-family board members (34%) compared to immigrant entrepreneurs (45%) because of availability. About 46% of board members for immigrant entrepreneurs are their spouses, while nearly 40% of all board members in native-owned firms are spouses of the owners. Around 26% of board

members in native-owned firms are related by birth, while the number is about 8% for immigrant-owned firms.

Insert Table 4 about here

Empirical Findings

For our main analyses, we run random effects regressions on panel data. Since our main variable of interest, the immigration status of entrepreneurs, is time invariant, we are unable to use fixed effects regression for this study. Therefore, the choice was between random effects and pooled ordinary least square regressions. In order to choose between the two models, we used the Breusch-Pagan Lagrange multiplier (LM) test. The null hypothesis in this test is that there is no statistically significant variance across units (firms in our case). When we implemented this test, the null hypothesis was strongly rejected, implying that there are significant differences across firms in our sample. Therefore, we opted for a random effects model. However, we also ran pooled OLS regressions as robustness checks.

Results

Tables 5 through 13 report the results of the hypothesis tests. In Table 5, we use a binary variable indicating an entrepreneur's immigration status to assess its association with seven different performance indicators. We find evidence that being an immigrant entrepreneur is associated with around 9% lower sales compared to native entrepreneurs. Similarly, immigrant-owned firms have nearly 17% lower assets but still generate similar levels of employment. Their operating profitability is nearly 9% lower compared to native entrepreneurs. Their capital base is around 7% less, and they finance a higher portion (around

12%) of assets by themselves, as evidenced by a higher equity ratio. These figures, together, indicate support for our Hypothesis 1.

Insert Table 5 about here

In Table 6, we present the results for the association between firm performance and how long an entrepreneur has lived in the host country. All native entrepreneurs constitute the reference group. Immigrant entrepreneurs who arrived in the host country at the age of 13 or younger, or those who have spent at least one third of their lives in the host country, are considered assimilated, while others are not. The results indicate that those who have spent substantial time in the host country perform marginally better than those who have not. In terms of sales, the assimilated immigrant-owned firms are similar to native firms, while non-assimilated immigrant-owned firms register less in sales. The non-assimilated immigrants also have lower profitability. However, the non-assimilated do not differ from assimilated immigrants in terms of employment creation and equity ratio. Thus, we have found partial support for Hypothesis 2.

Insert Table 6 about here

Table 7 shows the results of the test for the moderating effect of education on immigrant firms' performance. There is a positive effect of education on immigrant

entrepreneurs up to the third quartile. Up to that quartile, higher education gives them higher sales, assets, employees, employment days created, and a lower equity ratio, which means that they have more of their assets financed from outside sources. Thus, we find evidence to support Hypothesis 3.

Insert Table 7 about here

In Table 8, we present the performance differences between native- and immigrant-owned firms based on whether they have a native board member. The reference group is native entrepreneurs who have at least one native board member in their firm. Surprisingly, native firms that do not have a native board member are the best performers across the board. The immigrant firms that do not have a native board member have worse sales, assets, profitability, and a higher equity ratio. Thus, we reject our Hypothesis 4a, which stated that firms founded by immigrant entrepreneurs that have native board members will perform as well as the firms founded by native entrepreneurs that have native board members. Similarly, the difference in performance between immigrant firms that have native board members compared to those that do not have a native board member is not statistically significant for any performance measures except operating profitability, for which the former group performs worse, and equity ratio, for which the former group has more capital per unit of asset. This means that we reject Hypothesis 4b. Therefore, merely having a native board member is not sufficient for immigrant firms to close the gap with native firms.

Insert Table 8 about here

In Table 9, we show results of testing for Hypotheses 5a and 5b, which concern the performance implications of having an outside native board member for native- and immigrant-owned firms. The reference group is native firms that do not have an outside native board member, which is also the largest group. The results show that having an outside native board member does not imply better performance for either native or immigrant entrepreneurs. The immigrant-owned firms that have an outside native board member are not statistically different from any other groups in terms of sales, assets, and employment generation. This indicates that the immigrant firms perform on a par with native firms that have an outside native board member. However, we do not find that they outperform other categories. Therefore, we do not reject Hypothesis 5a, i.e., immigrant entrepreneurs who have been able to recruit outside board members close the performance gap with similar native entrepreneurs. However, we do not find that the immigrant firms that recruit outside native board members are statistically different from immigrant firms that do not recruit outside native board members. Therefore, we reject Hypothesis 5b.

Insert Table 9 about here

In Table 10, we present the results of testing for Hypotheses 6a and 6b. Here, we look at the relationship between firm performance and whether or not the native and immigrant entrepreneurs have a native board member with industry experience. The reference group consists of native-owned firms that have native board members with industry experience. The results clearly show that both immigrant and native firms that do not have a native board member with industry experience underperform on almost all performance measures. However, the immigrant firms with native board members that have industry experience

perform as well as their native counterparts. Therefore, we do not reject either of these hypotheses.

Insert Table 10 about here

Conclusion and Discussion

In this paper, we tried to answer two related questions. First, we explored if immigrant and native entrepreneurs exhibit any difference in performance. Second, we examined whether an immigrant entrepreneur can take steps to address the performance difference.

We can identify four major findings from this study. First, immigrant entrepreneurs, in general, perform worse compared to native entrepreneurs. Second, immigrant entrepreneurs who have spent substantial time in the host country are able to bridge the performance gap with native entrepreneurs to an extent. Third, immigrants with higher education are better able to bridge the performance gap, except in the top quartile. Finally, immigrant entrepreneurs can bridge the gap with native entrepreneurs by using board members as "linking pins, connecting the firm and its environment" (Zahra & Pearce, 1989, p. 299). However, not all board members are equally effective in doing so. We find evidence that outside native board members and native board members with industry experience in the host country are able to perform this task effectively.

These findings indicate that social embeddedness is indeed valuable for new firms. Immigrant entrepreneurs suffer from a lack of it. They can overcome this deficit in two ways. First, they can learn more about the host country's institutions, industry, markets, etc.,

themselves and build networks. Our finding that immigrants who have lived longer in the host country reduce the performance gap with native entrepreneurs indicates that immigrants can embed themselves in socio-economic institutions of the host country over time. Second, they can benefit from the presence of native board members who know the social-economic structure of the industry well.

Our study design does not enable us to identify the actual mechanism through which the use of board members helps immigrant-owned firms. We cannot rule out a selection effect whereby the immigrant entrepreneurs who are able to recruit native board members with industry experience are systematically more embedded ex ante. However, even if we hypothetically accept that the entire effect is due to the selection, the story of social embeddedness and its effect on firm performance still holds true. Most likely, both selection effects (more embedded entrepreneurs are able to recruit native board members with industry experienced) and treatment effects (native board members with industry experience help immigrant entrepreneurs embed a firm into the socio-economic structures of the host country) exist.

Future Research

Although we find circumstantial evidence for it, we cannot make any causal claim regarding the effect of the social (un-)embeddedness of immigrant entrepreneurs on their performance. We see that immigrant-owned firms that recruit certain types of board members are able to bridge performance gaps with their native counterparts, but we cannot claim that the mechanism through which this gap is bridged is alleviating immigrant-owned firms' social un-embeddedness. Our study design and available variables do not allow us to make such claims. Future research can look into this mechanism in detail. Perhaps a qualitative or a mixed method research approach is better suited to explore the mechanism.

It would also be interesting to investigate if, like board members, immigrant entrepreneurs can use native executives or native co-founders to help overcome their lack of embeddedness in the host country.

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Table 1

Descriptive Statistics for Entrepreneurs and Firms in Sample Based on the Region of Origin

	Norwegians		Nordics		West. Europeans		East. Europeans		Eng. Speakers		Others	
Variables	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Entrepreneur's age	44.44	9.33	42.74	8.86	43.87	8.66	39.37	8.20	43.64	9.47	39.77	8.73
Entrepreneur's education	13.71	2.60	14.29	2.90	15.07	3.00	14.13	2.69	14.52	3.00	13.16	3.50
Entrepreneur married (0/1)	0.53	0.50	0.48	0.50	0.51	0.50	0.59	0.49	0.53	0.50	0.63	0.48
Entrepreneur's gender	0.20	0.40	0.22	0.42	0.20	0.40	0.23	0.42	0.21	0.41	0.24	0.43
Capital (natural log transformed)	4.78	0.45	4.71	0.37	4.73	0.38	4.71	0.34	4.76	0.46	4.72	0.37
Sales (natural log transformed)	7.20	1.50	7.19	1.60	7.01	1.48	7.59	1.29	7.09	1.61	7.49	1.45
Assets (natural log transformed)	6.79	1.08	6.71	1.18	6.69	1.07	6.61	1.04	6.74	1.20	6.67	1.10
Equity ratio (Equity/Assets)	0.27	0.85	0.29	0.69	0.26	0.60	0.29	0.55	0.33	0.82	0.32	0.90
Number of employees	2.30	2.70	2.30	2.80	1.90	2.20	3.60	3.70	2.00	2.60	3.20	3.10
FTE employment days	565	720	572	781	464	614	1,023	1,227	479	660	752	835
FTE days for non-owner	351	658	364	726	268	547	799	1,153	295	599	552	771
FTE days for non-owner, non-family	302	617	320	706	225	534	718	1,111	253	568	454	708
Count	10,108		605		265		245		318		629	

Table 2

Industry Distribution based on High Level NACE Aggregation (A10) (Year 2010)

		Natives	Immigrants	Total
1	Agriculture, forestry and fishing	0.6 %	0.5 %	0.6 %
2	Manufacturing, mining and quarrying and other industry	4.5 %	4.1 %	4.5 %
3	Construction	20.4 %	17.9 %	20.2 %
4	Wholesale and retail trade, transportation and storage, accommodation and food service activities	25.9 %	37.5 %	27.0 %
5	Information and communication	4.9 %	2.5 %	4.7 %
6	Financial and insurance activities	2.2 %	0.5 %	2.1 %
7	Real estate activities*	4.4 %	2.2 %	4.2 %
8	Professional, scientific, technical, administration and support service activities	24.2 %	21.7 %	24.0 %
9	Public administration, defense, education, human health and social work activities	8.7 %	10.6 %	8.9 %
10	Other services	4.2 %	2.5 %	4.0 %
Total		100%	100%	100%

Table 3

Top 5 Industry Groups (NACE 3-Digit Classification) (Year 2010)

	Code	Industry description	Frequency
Native-owned firms	711	Architectural and engineering activities and related technical consultancy	7.4 %
	412	Construction of residential and non-residential buildings	6.9 %
	702	Management consultancy activities	5.4 %
	477	Retail sale of other goods in specialized stores	4.4 %
	432	Electrical, plumbing and other construction installation activities	4.2 %
Immigrant-owned firms	561	Restaurants and mobile food service activities	15.2 %
	412	Construction of residential and non-residential buildings	7.0 %
	862	Medical and dental practice activities	7.0 %
	711	Architectural and engineering activities and related technical consultancy	6.7 %
	812	Cleaning activities	5.6 %

Table 4: Board composition

Relation with BM	Native	Immigrant	Total
Mother	3.6 %	0.7 %	3.4 %
Father	7.5 %	1.1 %	7.0 %
Offspring	8.5 %	5.1 %	8.2 %
Sibling	6.5 %	1.5 %	6.0 %
Spouse	39.8 %	46.0 %	40.3 %
Non-family	34.2 %	45.5 %	35.2 %
Total	100.0 %	100.0 %	100.0 %

	Has board member	Does not have board member	Total
Native-owned firm	88.7 %	11.3 %	100 %
Immigrant-owned firm	43.6 %	56.4 %	100 %
Total	84.4 %	15.6 %	100 %

Firms with non-owner native board members at age 2

	Has board member	Does not have board member	Total
Native-owned firm	22.8 %	77.2 %	100 %
Immigrant-owned firm	17.0 %	83.0 %	100 %
Total	22.2 %	77.8 %	100 %

Firms with non-owner, non-family native board members at age 2

	Has board member	Does not have board member	Total
Native owned firm	8.9 %	91.1 %	100 %
Immigrant owned firm	4.8 %	95.2 %	100 %
Total	8.5 %	91.5 %	100 %

Firms with non-owner, industry-experienced native board members at age 2

Table 5

Performance Differences Between Immigrant- and Native-Owned Firms

	(1) Sales	(2) Assets	(3) Employees	(4) Employment days	(5) EBITDA margin	(6) Equity ratio
Entrepreneur is immigrant	-0.0903*	-0.183***	0.0133	0.0300	-0.0883*	0.115***
	(-2.07)	(-5.21)	(0.73)	(0.56)	(-1.98)	(3.36)
Entrepreneur is married	0.0853***	0.0362*	0.0552***	0.167***	0.0327	-0.0457**
	(4.09)	(2.38)	(7.14)	(6.66)	(1.23)	(-2.93)
Entrepreneur is female	-0.208***	-0.354***	0.0141	0.130***	-0.121*	0.293***
	(-6.66)	(-13.66)	(1.10)	(3.37)	(-2.33)	(11.40)
Entrepreneur's age	0.0990***	0.0522***	0.0204***	0.0711***	0.0160	-0.0525***
	(10.64)	(7.34)	(5.65)	(6.17)	(1.53)	(-7.35)
Square of entrepreneur's age	-0.00112***	-0.000545***	-0.000233***	-0.000783***	-0.000210^{+}	0.000557***
	(-10.90)	(-6.85)	(-5.92)	(-6.23)	(-1.80)	(6.96)
Entrepreneur's edu. years	-0.0274***	0.0129*	-0.00855***	-0.0193*	-0.00895	-0.0139**
	(-4.02)	(2.41)	(-3.52)	(-2.40)	(-0.89)	(-2.61)
Firm age	0.140***	0.103***	0.0803***	0.242***	-0.0379**	-0.0818***
	(18.76)	(18.96)	(28.10)	(27.05)	(-3.16)	(-15.16)
Firm is in a top-4 city	0.00868	0.00248	-0.0141	-0.0561	-0.0295	-0.0159
	(0.29)	(0.11)	(-1.22)	(-1.54)	(-0.86)	(-0.69)
_cons	5.344***	6.178***	0.981***	4.029***	-0.356	-1.084***
	(11.65)	(22.47)	(6.16)	(8.82)	(-1.32)	(-3.50)
Education categories (nine)	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry (3-digit NACE) dummies	Yes	Yes	Yes	Yes	Yes	Yes
r2_o	0.236	0.150	0.289	0.166	0.006	0.106
N	53,634	53,651	53,659	53,659	51,780	53,651

Notes:

- *t* statistics in parentheses.
- $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
- Errors clustered at firm level.

Table 6

Effect of the Length of Residence in the Host Country for Immigrant-Owned Firms' Performance

	(1) Sales	(2) Assets	(3) Employees	(4) Employment days	(5) EBITDA margin	(6) Equity ratio
Entrepreneur has assimilated	-0.0675	-0.177***	0.0138	0.0374	-0.0752	0.102*
	(-1.32)	(-4.31)	(0.65)	(0.60)	(-1.42)	(2.57)
Entrepreneur has not assimilated	-0.132*	-0.195***	0.0125	0.0165	-0.113^{+}	0.138**
	(-2.11)	(-4.23)	(0.46)	(0.21)	(-1.93)	(3.01)
Entrepreneur is married	0.0852***	0.0362*	0.0552***	0.167***	0.0326	-0.0457**
	(4.09)	(2.38)	(7.13)	(6.66)	(1.22)	(-2.93)
Entrepreneur is female	-0.208***	-0.353***	0.0141	0.130***	-0.120*	0.292***
	(-6.64)	(-13.64)	(1.10)	(3.37)	(-2.32)	(11.39)
Entrepreneur's age	0.0988***	0.0521***	0.0204***	0.0710***	0.0160	-0.0523***
	(10.63)	(7.32)	(5.65)	(6.17)	(1.52)	(-7.33)
Square of entrepreneur's age	-0.00112***	-0.000544***	-0.000232***	-0.000782***	-0.000210^{+}	0.000556***
	(-10.89)	(-6.84)	(-5.92)	(-6.23)	(-1.79)	(6.95)
Entrepreneur's edu. years	-0.0272***	0.0129*	-0.00855***	-0.0193*	-0.00885	-0.0140**
	(-4.00)	(2.41)	(-3.52)	(-2.39)	(-0.88)	(-2.62)
Firm age	0.140***	0.103***	0.0803***	0.242***	-0.0380**	-0.0817***
	(18.71)	(18.95)	(28.10)	(27.03)	(-3.17)	(-15.14)
Firm is in a top-4 city	0.00822	0.00236	-0.0142	-0.0563	-0.0298	-0.0157
	(0.28)	(0.10)	(-1.22)	(-1.54)	(-0.87)	(-0.68)
_cons	5.350***	6.180***	0.981***	4.031***	-0.353	-1.088***
	(11.67)	(22.48)	(6.16)	(8.82)	(-1.31)	(-3.52)
Education categories (nine)	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry (3-digit NACE) dummies	Yes	Yes	Yes	Yes	Yes	Yes
r2_o	0.236	0.150	0.289	0.166	0.006	0.106
N	53,634	53,651	53,659	53,659	51,780	53,651

Notes:

- *t* statistics in parentheses.
- $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
- Errors clustered at firm level.
- Baseline group is native-owned firms. An immigrant is considered to have assimilated if she has spent at least one third of her life in the host country or was aged less than 14 years when she arrived in the host country.

Table 7
Moderating Effect of Education on Performance of Immigrant and Native-Owned Firms

	(1) Sales	(2) Assets	(3) Employees	(4) Employment days	(5) EBITDA margin	(6) Equity ratio
Entrepreneur is Immigrant	-0.219***	-0.242***	-0.00805	0.0408	-0.0261	0.145**
	(-3.29)	(-4.54)	(-0.28)	(0.53)	(-0.57)	(2.79)
Second edu. quartile	-0.0505*	-0.00526	-0.0247***	-0.0822**	-0.0252	-0.000975
	(-2.33)	(-0.44)	(-3.33)	(-3.25)	(-0.83)	(-0.08)
Third edu. quartile	-0.139**	-0.0251	-0.0421*	-0.0994+	-0.0347	0.0327
	(-2.96)	(-0.66)	(-2.34)	(-1.75)	(-0.62)	(0.87)
Fourth edu. quartile	-0.104	0.0666	-0.0706*	-0.109	-0.110	-0.0779
	(-1.41)	(1.10)	(-2.58)	(-1.23)	(-0.89)	(-1.30)
Immigrant X 2nd quartile	0.169+	0.112+	0.0252	0.0561	-0.140	-0.0961
	(1.84)	(1.91)	(0.67)	(0.55)	(-1.20)	(-1.60)
Immigrant X 3rd quartile	0.348***	0.164*	0.109*	0.229+	0.00179	-0.153+
	(3.55)	(1.98)	(2.39)	(1.84)	(0.03)	(-1.83)
Immigrant X 4th quartile	0.152	0.0419	-0.0142	-0.250*	-0.175	0.0506
	(1.44)	(0.50)	(-0.34)	(-1.96)	(-1.27)	(0.58)
Entrepreneur is married	0.0866***	0.0366*	0.0555***	0.166***	0.0324	-0.0458**
	(4.15)	(2.41)	(7.17)	(6.65)	(1.20)	(-2.94)
Entrepreneur is female	-0.211***	-0.354***	0.0131	0.129***	-0.122*	0.292***
	(-6.75)	(-13.67)	(1.02)	(3.35)	(-2.33)	(11.41)
Entrepreneur's age	0.0973***	0.0524***	0.0191***	0.0674***	0.0149	-0.0530***
	(10.41)	(7.33)	(5.28)	(5.84)	(1.41)	(-7.40)
Square of entrepreneur's age	-0.00110***	-0.000550***	-0.000218***	-0.000742***	-0.000196	0.000565***
	(-10.66)	(-6.87)	(-5.52)	(-5.89)	(-1.64)	(7.03)
Entrepreneur's edu. years	-0.0166	0.00389	0.000176	-0.00291	0.00692	-0.00490
	(-1.41)	(0.42)	(0.04)	(-0.21)	(0.50)	(-0.54)
Firm age	0.135***	0.103***	0.0777***	0.233***	-0.0416**	-0.0827***
	(16.93)	(18.35)	(26.22)	(24.87)	(-3.04)	(-14.75)
Firm is in a top-4 city	0.0103	0.00209	-0.0137	-0.0577	-0.0296	-0.0149
	(0.35)	(0.09)	(-1.18)	(-1.58)	(-0.86)	(-0.65)
_cons	5.294***	6.276***	0.926***	3.962***	-0.494+	-1.169***
	(11.39)	(21.97)	(5.65)	(8.41)	(-1.89)	(-3.67)
Education categories (nine)	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry (3-digit NACE) dummies	Yes	Yes	Yes	Yes	Yes	Yes

r2_o	0.237	0.151	0.290	0.167	0.006	0.107
N	53,634	53,651	53,659	53,659	51,780	53,651

Notes:

- *t* statistics in parentheses.
- $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
- Errors clustered at firm level.

Table 8

Native and Immigrant Firms with or without Non-Owner Native Board Member

		(1) Sales	(2) Assets	(3) Employees	(4) Employment days	(5) EBITDA margin	(6) Equity ratio
Immigrant founder	Native board member						
No	No	0.221***	0.0271	0.0562***	0.205***	0.00673	-0.0406
		(5.59)	(1.10)	(3.94)	(4.28)	(0.14)	(-1.62)
Yes	No	-0.0376	-0.137**	0.0326	0.0822	-0.0208	0.0500
		(-0.66)	(-2.86)	(1.21)	(1.14)	(-0.57)	(1.08)
Yes	Yes	-0.103+	-0.228***	0.00378	0.0149	-0.158*	0.178***
		(-1.73)	(-4.49)	(0.14)	(0.20)	(-2.19)	(3.59)
Entrepreneur is married		0.0818***	0.0351*	0.0543***	0.163***	0.0306	-0.0441**
		(3.91)	(2.31)	(6.98)	(6.51)	(1.14)	(-2.82)
Entrepreneur is female		-0.206***	-0.352***	0.0148	0.132***	-0.119*	0.291***
		(-6.59)	(-13.59)	(1.15)	(3.42)	(-2.29)	(11.32)
Entrepreneur's age		0.0991***	0.0523***	0.0204***	0.0711***	0.0162	-0.0526***
		(10.65)	(7.34)	(5.65)	(6.17)	(1.55)	(-7.36)
Square of entrepreneur's age		-0.00112***	-0.000545***	-0.000232***	-0.000783***	-0.000212+	0.000557***
		(-10.89)	(-6.85)	(-5.91)	(-6.23)	(-1.81)	(6.96)
Entrepreneur's edu. years		-0.0282***	0.0129*	-0.00874***	-0.0201*	-0.00885	-0.0138**
		(-4.13)	(2.40)	(-3.59)	(-2.49)	(-0.88)	(-2.60)
Firm age		0.139***	0.103***	0.0801***	0.241***	-0.0378**	-0.0817***
		(18.61)	(18.96)	(28.02)	(26.94)	(-3.16)	(-15.15)
Firm is in a top-4 city		0.00767	0.00190	-0.0145	-0.0571	-0.0305	-0.0151
		(0.26)	(0.08)	(-1.24)	(-1.56)	(-0.89)	(-0.65)
cons		5.223***	6.156***	0.950***	3.918***	-0.373	-1.052***
		(11.38)	(22.36)	(5.97)	(8.57)	(-1.36)	(-3.40)
Education categories (nine)		Yes	Yes	Yes	Yes	Yes	Yes
Region dummies		Yes	Yes	Yes	Yes	Yes	Yes
Year dummies		Yes	Yes	Yes	Yes	Yes	Yes
Industry (3-digit NACE) dummies		Yes	Yes	Yes	Yes	Yes	Yes
r2_o		0.235	0.150	0.289	0.166	0.006	0.106
N		53,634	53,651	53,659	53,659	51,780	53,651

Notes:

- *t* statistics in parentheses.

- $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
- Errors clustered at firm level.
- Baseline group is native-owned firms with a non-owner native board member.

Table 9

Native and Immigrant Firms with or without Non-Family Native Board Member

		(1) Sales	(2) Assets	(3) Employees	(4) Employment days	(5) EBITDA margin	(6) Equity ratio
Immigrant founder	Native non-family bm						
No	Yes	-0.0522*	-0.0340^{+}	0.00261	-0.00821	0.00975	0.0405*
		(-1.98)	(-1.75)	(0.25)	(-0.25)	(0.30)	(2.07)
Yes	No	-0.113*	-0.201***	0.00561	0.0310	-0.0519	0.129***
		(-2.33)	(-5.00)	(0.27)	(0.52)	(-1.30)	(3.31)
Yes	Yes	-0.0522	-0.143	0.0533	0.0147	-0.249^{+}	0.103
		(-0.49)	(-1.38)	(0.96)	(0.11)	(-1.72)	(1.03)
Entrepreneur is married		0.0802***	0.0339*	0.0559***	0.166***	0.0315	-0.0425**
		(3.77)	(2.20)	(7.08)	(6.51)	(1.13)	(-2.68)
Entrepreneur is female		-0.209***	-0.354***	0.0138	0.130***	-0.120*	0.293***
		(-6.67)	(-13.67)	(1.08)	(3.37)	(-2.31)	(11.41)
Entrepreneur's age		0.0996***	0.0525***	0.0204***	0.0712***	0.0160	-0.0528***
		(10.70)	(7.37)	(5.63)	(6.17)	(1.51)	(-7.40)
Square of entrepreneur's age		-0.00112***	-0.000548***	-0.000232***	-0.000784***	-0.000209^{+}	0.000561***
		(-10.95)	(-6.89)	(-5.90)	(-6.23)	(-1.77)	(7.01)
Entrepreneur's edu. years		-0.0275***	0.0128*	-0.00853***	-0.0194*	-0.00896	-0.0138**
		(-4.04)	(2.40)	(-3.51)	(-2.40)	(-0.90)	(-2.59)
Firm age		0.140***	0.103***	0.0803***	0.242***	-0.0379**	-0.0818***
		(18.75)	(18.97)	(28.10)	(27.05)	(-3.17)	(-15.16)
Firm is in a top 4 city		0.0107	0.00352	-0.0143	-0.0558	-0.0295	-0.0173
		(0.36)	(0.15)	(-1.23)	(-1.53)	(-0.87)	(-0.75)
_cons		5.333***	6.173***	0.982***	4.027***	-0.356	-1.077***
		(11.63)	(22.47)	(6.17)	(8.81)	(-1.31)	(-3.48)
Education categories (nine)		Yes	Yes	Yes	Yes	Yes	Yes
Region dummies		Yes	Yes	Yes	Yes	Yes	Yes
Year dummies		Yes	Yes	Yes	Yes	Yes	Yes
Industry (3-digit NACE) dummies		Yes	Yes	Yes	Yes	Yes	Yes
r2_o		0.236	0.150	0.289	0.166	0.006	0.106
N		53,634	53,651	53,659	53,659	51,780	53,651

Notes:

- *t* statistics in parentheses.

- $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
- Errors clustered at firm level.
- Baseline group is native-owned firms without a non-family native board member.

Table 10

Native and Immigrant Firms with or without Non-Family Native Board Member with Industry Experience

		(1) Sales	(2) Assets	(3) Employees	(4) Employment days	(5) EBITDA margin	(6) Equity ratio
Immigrant founder	Native bm with industry exper.						
No	No	-0.301***	-0.147***	-0.160***	-0.548***	0.0685	0.146***
		(-10.49)	(-7.73)	(-13.30)	(-15.71)	(0.81)	(7.24)
Yes	No	-0.383***	-0.324***	-0.138***	-0.497***	-0.0380	0.252***
		(-7.43)	(-8.18)	(-6.38)	(-8.01)	(-0.43)	(6.43)
Yes	Yes	0.0542	-0.148+	0.0257	0.226	0.113	0.115
		(0.41)	(-1.69)	(0.45)	(1.47)	(1.20)	(1.28)
Entrepreneur is married		0.0843***	0.0358*	0.0550***	0.165***	0.0332	-0.0453**
		(4.06)	(2.36)	(7.20)	(6.67)	(1.25)	(-2.91)
Entrepreneur is female		-0.205***	-0.352***	0.0156	0.136***	-0.121*	0.291***
		(-6.60)	(-13.66)	(1.23)	(3.56)	(-2.35)	(11.39)
Entrepreneur's age		0.0989***	0.0521***	0.0201***	0.0706***	0.0159	-0.0524***
		(10.70)	(7.35)	(5.63)	(6.21)	(1.52)	(-7.37)
Square of entrepreneur's age		-0.00112***	-0.000545***	-0.000230***	-0.000784***	-0.000208+	0.000558***
		(-11.00)	(-6.88)	(-5.96)	(-6.33)	(-1.77)	(7.00)
Entrepreneur's edu. years		-0.0268***	0.0131*	-0.00833***	-0.0183*	-0.00882	-0.0141**
		(-3.95)	(2.46)	(-3.48)	(-2.30)	(-0.88)	(-2.65)
Firm age		0.135***	0.101***	0.0780***	0.234***	-0.0372**	-0.0796***
		(18.14)	(18.57)	(27.56)	(26.29)	(-3.16)	(-14.77)
Firm is in a top-4 city		0.0117	0.00392	-0.0128	-0.0510	-0.0298	-0.0174
		(0.40)	(0.17)	(-1.12)	(-1.42)	(-0.87)	(-0.76)
_cons		5.616***	6.314***	1.134***	4.530***	-0.416	-1.217***
		(12.49)	(23.14)	(7.44)	(10.30)	(-1.46)	(-3.99)
Education categories (nine)		Yes	Yes	Yes	Yes	Yes	Yes
Region dummies		Yes	Yes	Yes	Yes	Yes	Yes
Year dummies		Yes	Yes	Yes	Yes	Yes	Yes
Industry (3-digit NACE) dummies		Yes	Yes	Yes	Yes	Yes	Yes
r2_o		0.242	0.155	0.305	0.181	0.006	0.111
N		53,634	53,651	53,659	53,659	51,780	53,651

Notes:

- *t* statistics in parentheses.

- $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
- Errors clustered at firm level.
- Baseline group is native-owned firms with a native board member possessing industry experience.

Paper III

Human Capital Accumulation in New Ventures: The Role of Founders vs. Early Employees

Sujit Pandey
NHH Norwegian School of Economics

Lasse B. Lien
NHH Norwegian School of Economics

Eirik S. Knudsen
NHH Norwegian School of Economics

Bram Timmermans
NHH Norwegian School of Economics

Abstract

Attracting human capital of competitive quality is a challenge for most new ventures. Existing research emphasizes the role of founders in attracting new employees. In this paper, we extend the focus to also include how the quality of a firm's early hires, affect the quality of subsequent hires. Using rich Norwegian micro-data, we compare and contrast the influence of the human capital of the founder and the first employee, on the human capital of the second employee. We find that, on average, the influence of the first employee is comparable to that of the founder. The influence is stronger in the low end of the human capital distribution, and when the first and second employees share occupational backgrounds. We also find a declining marginal effect of the first employee's human capital as founder human capital increases, and vice versa. This implies that human capital of the founder and the first employee are not mutually reinforcing.

Keywords: Human capital accumulation, New ventures, Signaling, Networks

Introduction

It is a widely established fact that most new ventures start small and remain small over their lifespan (Aldrich and Ruef, 2006). For these ventures, recruitment is not a topic of concern, given that they are created as a vehicle for a self-employed individual to conduct his or her activities. For new ventures that have even modest ambitions for growth, it is a different story. Entrepreneurs have to engage in practices that allow them to search, identify and select prospective employees that (hopefully) contribute positively to the value creation and -capture by their young firm. Attracting employees is difficult, and attracting high quality employees is even more challenging. The ability to attract workers of sufficient quality is nevertheless crucial for future success, since human capital is well documented as a key driver for the survival and growth of new ventures (e.g. Unger, Rauch, Frese, & Rosenbusch, 2011; Baptista, Karaöz, & Mendonça, 2014; Hernández-Carrión et al., 2016). Additionally, the ability to attract sufficiently qualified workers might also affect the likelihood of accumulating other resources.

Still, recruitment practices for entrepreneurs tend to be characterized as unprofessional, unstructured, informal and opportunistic, and new ventures are generally not regarded as attractive places to work. They lack the legitimacy of more established firms, they offer lower job security (Geroski, 1995; Litwin and Phan, 2013), pay lower wages[17] (Brixy, Kohaut and Schnabel, 2007, Ouimet & Zarutskie, 2014), and they offer less non-pay benefits (Schnabel et al., 2011). So, under these conditions, how can new ventures attract employees of competitive quality? Existing research emphasizes two aspects. Signals that the entrepreneurs can send about his or her abilities (Chapman et al., 2005; Rynes, Bertz and Gerhart, 1991), and/or by relying on

[17] While there have been several studies finding that new firms pay less than established firms, a recent study by Burton, Dahl and Sorenson (2018) find that, after controlling for employee characteristics, new firms pay wage premium after taking away firm size effects.

social- or professional networks (Leung, Zhang, Wong, & Foo, 2006). Both place the founder at center stage.

This focus on the founder in research on new venture emergence and performance is understandable. However, from the perspective of human capital accumulation, this is also a somewhat narrow perspective, since once an entrepreneur has started hiring, recruitment decisions are likely to be influenced by both founders *and* early employees (Montgomery, 1991; Hensvik and Skans, 2013). By also considering early employees, two additional aspects come into play. First, prospective employees have little or no performance history available when assessing the quality of an entrepreneurial firm, and need to rely on other, often fuzzy signals. While the experience, skill-set and education of the founder may be a good signal of entrepreneurial skills, judgment, and the quality of the business idea (Matusik, George, & Heeley, 2008), it is not obvious that the founder(s) is the best signal for prospective employees about what it is like to work for the firm. In fact, the human capital of a new venture's early hires – which reveals which types of employees the firm employs, who a prospective employee will work with if s/he joins the firm, etc. – may for many prospective employees be a more direct and relevant signal than the human capital of the founder(s). Second, early employees increase the size of the firm's available network, and the higher the human capital quality of the new venture's early employees, the higher the quality of the human capital in this extended network will tend to be. From this it follows that the early hire(s) should have an important effect on the quality of subsequent hires.

The purpose of this paper is to extend the focus in research on human capital accumulation in entrepreneurial firms, from an exclusive focus on the founder to also include how the quality of a firm's early hires, affect the quality of subsequent hires. More specifically,

we focus on the very first stage of this process, by empirically examining i) the relative impact of the quality of the first employee and the founder, on the quality of second employee's human capital, ii) whether this varies between the high- and low end quartiles of the labor market, iii) the importance of overlap in job category and industry background for the relative impact of the founder and the first employee, and iv) whether the founder and the first employee's human capital are complements or substitutes in terms of attracting a high quality second employee. Focusing on the first and second employee allows us to create clear indicators of the role of founders vs. early (first) employees on the quality of subsequent (second) employees.

We test our hypotheses on privately owned new ventures that were established in Norway in the period 2004-2015, that have hired at least two employees. The Norwegian employer-employee matched dataset we use in this paper has detailed information on firms as well as all individuals associated with the firms, such as founders and employees. This richness makes it an attractive dataset to study human capital accumulation in new ventures. To capture the human capital quality of the founder, first employee and second employee, we combine both observable (education and work experience) and unobservable dimensions of human capital (person fixed effects) to form a composite human capital index. As a robustness test we also perform our analyses using more traditional measures of human capital quality, such as education and experience.

From our analyses, a number of interesting insights emerge. First, we find that the human capital of the first employee is, overall, equally (or more) important than that of the founder. Second, we find (admittedly somewhat weak) evidence that the importance of the first employee's human capital is strongest in the lower quartiles of the labor market, while the founder's human capital becomes more important in the top quartile. Third, we find that the first

employee's impact increases if there is overlap in job categories. Somewhat surprisingly, we do not find the same pattern for the impact of the founder. Fourth and finally, we find a negative interaction effect between the human capital of the founder and that of the first employee, which indicates that the signal of quality and networks of the founder and early employees seem to be substitutes rather than complements.

Our findings contribute to both research and practice. We contribute to research on entrepreneurship by examining an overlooked aspect of the initial stages of human capital accumulation, specifically how the early hiring events by an entrepreneur affect subsequent hiring events. Given the special role ascribed to human capital accumulation for firm survival, performance and growth, we believe that understanding the path dependencies created by early hiring events is of considerable importance. We also contribute to research on strategic human capital more generally, by adding more resolution to the early stages of human capital accumulation in a firm, a period when this process both highly critical and particularly challenging. For practice, our findings emphasize the importance of early employees for a firm's later efforts to accumulate human capital. A better understanding of how the initial hiring decision creates path-dependencies that either improve or constrain subsequent hiring, should be of use to the founders that make these decisions, and to those that provide advice or funding to them.

The remainder of this paper is structured as follows. In the next section we elaborate on existing knowledge about the labor market for new ventures and the challenges entrepreneurs face in recruiting. In addition, we develop the hypotheses that form the center of our empirical analysis. Following the hypotheses, we present our empirical setting and methodological strategy.

Next, we present our findings and conclude with a discussion and some final reflections on our findings.

Human Capital and Entrepreneurial Firms

Labor Market for New Ventures

Research on human capital and entrepreneurship has offered convincing empirical evidence that there is a positive relation between the quality of human capital and the long-term performance of new ventures. Such positive effects are observed for the quality of the founder's human capital (Eisenhardt & Schoonhoven, 1990; Feeser & Willard, 1990; Vesper, 1990; Cooper et al. 1994; Vanaelst et al., 2006; Roberts, Klepper, & Hayward, 2011; Baptista et al., 2014), but notably also for the quality of the human capital of early employees (Coad, Nielsen and Timmermans, 2017; Geroski, Mata and Portugal, 2010). Such strong performance effects can be explained by the fact that the human capital of a new venture usually makes up a substantial share of its total assets (Coad et al., 2017). The indirect performance effects of human capital may also be large, via the ability of a new venture to accumulate and acquire additional productive resources – including additional human capital.

To attract high quality human capital, entrepreneurs have to maneuver in complex and informationally opaque labor markets. The essential function of the labor market is to match employees and employers, and in a perfectly functioning labor market the quality of a firm is matched to the quality of a worker (Becker, 1973; Chade, Eeckhout and Smith, 2018). However, real life labor markets are riddled with demand- and supply side frictions that reduce the efficiency of this matching process (Campbell, Coff, & Kryscynski, 2012). These frictions arise among other things because the knowledge and other characteristics embodied in employees can be tacit, causally ambiguous, firm specific, and socially complex (Coff, 1997), and because

employees have intent, aspirations and preferences that do not necessarily coincide with those of a hiring firm (Ehrhart and Ziegert, 2005; van Prooijen and Ellemers, 2015). Such features of human capital increase the challenges faced by a hiring firm when it is assessing the "true" value of a potential employee.

On the positive side, frictions arising from asymmetric information and other adjustment costs associated with identifying-, dissolving- and establishing new matches implies that firms may end up hiring "better" employees than the quality of their firm should imply (Campbell, Coff, & Kryscynski, 2012; Mackey, Molloy & Morris, 2014; Mortensen and Pissarides, 1999). This opens up for a rent potential by acquiring resources for less than they are worth (Barney, 1986). On the negative side, labor market frictions implies that firms may instead end up recruiting human capital of "lower" quality than the quality of the firm should imply, leading to competitive disadvantage.

Besides these general labor market frictions, entrepreneurial firms face a number of specific disadvantages while recruiting new employees. On the demand side, new ventures have less time, money and resources available for human capital search, which increases the challenges related to identifying the "right" employees (Cardon & Stevens, 2004). On the supply side, a job offer from a newly established venture is more difficult for potential candidates to evaluate. Information about the viability of the firm, its future HR-policies, its management practices, its culture, its strategy, its reward policies, and so on, will be more uncertain than in older and more established firms. In addition, new ventures have smaller stocks of assets (Leung et al., 2006), pay lower wages (Ouimet & Zarutskie, 2014), they have little or no performance history to show for themselves, and last but not least a higher risk of failure (Geroski, 1995). All

this implies that new ventures face extra challenges in recruiting from the labor market, and that they are perceived as more risky employers in the eyes of potential recruits.

Alleviating Labor Market Frictions

Contrary to established firms, new ventures typically do not have formalized human resource practices to handle these frictions; nevertheless, they can attempt to reduce this handicap through signaling. Entrepreneurs can attempt to send signals that indicate the quality of the firm and thus appear more attractive for higher quality employees (Chapman et al., 2005). Due to the lack of a long track record and the inherently uncertain nature of establishing and growing a successful business, there are limits to which signals can be used and their effectiveness. One signal both entrepreneurs and prospective employees can send is the quality of their human capital (Bublitz, Nielsen, Noseleit and Timmermans, 2018). This can be through formal qualifications and experience, such as what might be conveyed through a CV. Prospective future employees are also likely to interact directly with existing organizational members, both the founder(s) and early employees, during a hiring process. This direct interaction makes the signal quality stemming from a new venture's existing human capital both clearer and more visible for prospective candidates (Connelly, Certo, Ireland and Reutzel, 2011).

Moreover, entrepreneurs can recruit from their preexisting social- or professional networks (Leung et al., 2006). From the new venture's perspective, recruiting from existing networks has the additional benefit that it will have prior information about the potential employees, without having to go through an extensive search and screening process. This alleviates the problems of asymmetric information that new ventures face in the labor market. For prospective employees, this will also be beneficial, because they will have prior information about the individual(s) running the firm, and can better assess the quality of the firm than if they

had to rely on general information about the firm, and other, often fuzzy, signals about its quality (Connelly et al., 2011; Spence, 1973).

While relying on social- and professional networks for recruitment may counter some of the disadvantages faced by new ventures, it also implies that the quality of a firm's existing human capital stock will be positively correlated with the quality of new hires. One reason to expect a positive correlation is due to assortative matching and the subsequent homophily of networks (McPherson et al. 2001). In our context, this means that individuals with high human capital will tend to have networks comprised of other individuals with high human capital, and individuals with low human capital will tend to have networks of other people with low human capital. If recruiting is mainly done through networks, assortative matching and homophily predicts a positive correlation between the human capital of people within the firm, and the outside pool of candidates they are recruiting from.

Founders, Early employees and Subsequent Hires.

In line with the arguments presented above, research has documented a positive relationship between the quality of the founder's human capital, and the quality of the human capital (s)he hires (Rocha, van Praag, Folta and Carneiro, 2018). However, beyond the first hiring event, recruitment is often a shared responsibility between founders and the early employees (Aldrich and Ruef, 2006). This shared responsibility has largely been ignored in the literature on human capital accumulation in new ventures. Our goal is to investigate more explicitly the role the quality of early employees play, and the potential consequences early recruitment decisions have for future hiring events.

In very beginning it is obvious that the key network utilized for recruitment purposes will be that of the founder, and that the founder's human capital will serve as the prime signal of firm

quality. But as soon as the first employee has been hired, it seems equally likely that the first employee will start to play a role as the firm tries to recruit additional employees. The first employee adds to the network that can be used to recruit new candidates, and he/she also adds additional resolution to the signals prospective employees can use to assess the quality of the new venture and the attractiveness of being employed there. Based on the above reasoning, we formulate the following as our baseline hypothesis:

> *H1: The human capital quality of the founder and the first employee are both positive predictors of the human capital quality of the second employee.*

Next, we turn to investigate the relative impact of the human capital of the founder and the first employee. Different industries and different business models require different levels of human capital to compete. Trivially, if you are launching a cleaning business or a consultancy, you are hiring from different strata. Depending on which strata of the labor market the firm targets, the relative importance of the signal from the founder versus that of early employees might differ.

In the high end of the labor market, candidates might be more inclined to focus on the quality of the founder. The reason is that employees from the high end are likely to have their financial outcomes more closely tied to the success of the firm. They are more likely to receive ownership and more likely to be offered bonuses and other kinds of variable pay (Balkin and Swift, 2006). The founder's experience, skill-set and education is a signal of entrepreneurial skills, judgment and the quality of the business idea (Matusik, George, & Heeley, 2008), and the founder also has considerably higher influence over the future success of the firm than the first employee. This leads to our second hypothesis:

H2: In the top quartile of the labor market, the founder's human capital is a stronger predictor of the human capital of the second employee than the human capital of the first employee.

In the low end of the quality distribution of the labor market we expect the opposite. Subsequent hires are more likely to identify with early employees. Contrary to high-end employees, such employees are more likely to be wage earners with a considerably smaller "upside" if the new ventures succeeds. Instead of joining the new venture based on an evaluation of expected future performance, such employees are more likely to care about recommendations by others in the employee role, and the human capital of those in the role closest to their own. This means that the human capital of the first employee provides a stronger and more aligned signal about the factors most important to them, such as what it is like to work for the firm, which type of employees it hires, and who a prospective employee will work with if s/he joins the firm. Another important reason is that the network of the first employee may consist of more relevant candidates than that of the founder if recruitment is done in a strata that is different from that of the founder. If, for example, the founder of a startup in construction has a finance background, but seeks to hire carpenters, the network of the first carpenter that is hired is more likely to be populated by other carpenters than the network of the founder. While there undoubtedly can be exceptions to this, it makes intuitive sense that this is more likely to be true in the low-end of the labor market, than in the high end. This leads to our third hypothesis:

H3: In the bottom quartile of the labor market, the first employee's human capital is a stronger predictor of the human capital of the second employee than the human capital of the founder.

If the second employee shares job category or occupation with either the founder or the first employee, this increases the probability that the candidate has been recruited from the network of that individual, and also that the information asymmetry is low compared to alternative network relations, such as online social networks or more peripheral business networks. Furthermore, it also indicates that the signal value from his or her human capital will be particularly high, even in cases where the second employee is not a member of that person's network. We therefore expect that job category overlap will increase the impact of the human capital, whether it applies to the founder or the first employee. This leads to our fourth and fifth hypotheses:

H4: Overlap between the job category of the founder and the second employee, makes the human capital of the former a stronger predictor of the human capital of the latter.

H5: Overlap between the job category of the first and second employee, makes the human capital of the former a stronger predictor of the human capital of the latter.

The incremental effects of job category overlap are presumably highest in the high end of the labor market. The reason is simply that high level human capital is harder for a new venture to attract, since they are likely to have better outside options. In the high end, the advantages of recruiting from a network where information asymmetries are low and signal value is high, are supposedly higher than in the low end. This leads to the following hypothesis:

H6: The positive impact of job category overlap is higher if the firm is recruiting in the top quartile of the labor market

A natural extension is to ask whether the human capital of the founder and the first employee are mutually reinforcing in terms of attracting a better second employee, or if the effect

of one tends to crowd out the effect of the other. Put differently, whether signals and information that can be obtained through the network of the founders and early employees are substitutes or complements in terms of attracting a second employee. The main argument for expecting them to be complements is that if both the founder and the first employee have high (low) quality human capital, this would represent converging signals that the firm is of high (low) quality, and subsequently impact which level of human capital the firm is able to attract. This predicts a positive interaction effect between the founder and the first employee's human capital.

The argument for expecting them to be substitutes is that the firm might rely on the network most relevant to the position they seek to fill. Sometimes this may be that of the founder, and sometimes it may be that of the first employee. If one network and one signal is more relevant than the other, this would weaken the impact of the other. The human capital of the founder and first employee will then be substitutes, and we would expect to see a negative interaction effect. We are not able to derive a clear expectation on this from theoretical reasoning alone; hence, we post these as alternative hypotheses:

> *H7a: There is a positive interaction effect between the human capital of the founder and the first employee, on the human capital of the second employee.*
>
> *H7b: There is a negative interaction effect between the human capital of the founder and the first employee, on the human capital of the second employee.*

Data and Methods

Data and Sample

To test our hypotheses, we rely on Norwegian employer-employee matched registry data, and construct a sample of privately owned, limited liability firms established in Norway between

2004 and 2014. More specifically, we combine data from five different government registries – the education register, the income register, the ownership register, the employer-employee relationship register, and the population register. By law, these registries include all individuals and firms in Norway, and they can be merged by a person identifier and/or a firm identifier. These registries contain numerous variables that provide information about the human capital of individuals, their family relationships, labor market history, and detailed information on the firms they are associated with, either as founders or employees.

Our initial population consists of firms registered in Norway between 2004 and 2014. To construct our final sample, we place eight restrictions on the firms/individuals in our sample. First, we only include firms with a single owner to more clearly identify the individual who has the role of the founder. Second, in order to clearly identify the roles of first- and second employee, we only include firms that hired only one person in each of its first two hiring events. Third, we only include firms where the first two hiring events were separated by at least six months, to ensure that they actually were separate hiring events (e.g., not different starting dates from a common hiring event). Fourth, we require the first employee to remain employed in the firm for at least three months after the second employee joins the firm, to make sure that the second employee is not a replacement for the first employee. Fifth, we require that the founder, the first- and the second employee – are at least 18 years old. In sum, these restrictions give us a clean setup of one founder, one first employee and one second employee. Sixth, we only include individuals where we have at least two years of wage data, which allows us to construct a more sophisticated measure of human capital (explained in detail below). Seventh, we remove all firms that have a job-identifier code associated with multiple firms, to ensure that these firms are not simply existing firms that have been re-registered. For example, if a person is working in a sole-

proprietorship firm, which is re-registered as a limited liability firm, the job-identifier remains the same, but the firm identifier changes. We remove all such instances. Eight, and finally, we also remove all firms where the first employee's recruitment date predates the firm registration date by more than a month. For example, if a firm is registered on 30th November 2010, we include it as new firm only if it has hired employees no earlier than 1st November 2010. It is normal for firms to be operational several months in advance of formal "registration date" in our data. Therefore, it is a reasonable assumption to make that a firm that has hired its first employee a month in advance of its formal registration is still a new firm.

After implementing these constraints, we have 1,057 firms in our sample. The effective sample is somewhat lower in various analyses due to missing values on control variables.

Independent Variables

Human capital in entrepreneurship research has usually been measured in terms of investment in education and work experience (Marvel, Davis and Sproul, 2016). However, these measures do not give a complete estimate of the quality of a person's human capital. There can be substantial variation among individuals with the same education and experience in terms of the value they can add to a firm. In labor economics, a number of scholars have used person fixed effects from wage equations as a measure of worker quality (Abowd, Kramarz and Margolis, 1999; Combes, Duranton and Gobillon, 2008; Iranzo, Schivardi and Tosetti, 2008), arguing that the unobserved heterogeneity captured by the person fixed effects is a better measure of productivity.

We believe that readily observable human capital measures such as education and experience do function as signals of quality, but also that a complete human capital measure

needs to capture both observable and unobservable (by researchers) quality dimensions. To approach such a measure, we follow Portela (2001) and Abowd et al (1999), and multiplicatively combine both observable (education and work experience) and unobservable dimensions of human capital (person fixed effects) to form a composite human capital index. Essentially, we take the baseline skill level, which is the average schooling in the population and apply three corrections to account for an individual's position in the distribution of schooling, experience and unobserved quality. The formalization is presented in equation (1).

$$S_{i,t} = mschool_t * a_{i_{school}} * a_{i_{experience}} * a_{i_{unobservable}} \quad (1)$$

Here, *S* denotes the skills of person *i* at time *t*, $mschool_t$ is the average years of education in the population, $a_{i,t_{school}}$ is a person's actual position in the distribution of schooling, $a_{i_{experience}}$ is a person's experience given the years of schooling, and $a_{i_{unobservable}}$ is a person's position in the distribution of unobserved quality given the years of schooling and years of experience.

To calculate $a_{i,t_{school}}$ and $a_{i_{experience}}$ we follow Portela (2001), and the formalizations are presented in equation (2) and (3) below:

$$a_{i_{school}} = 0.5 + \frac{e^{(school_i - mschool)/sschool}}{1+e^{(school_i - mschool)/sschool}} \quad (2)$$

$$a_{i_{experience}} = 0.5 + \frac{e^{(experience_i - mexperience|school_i)/sexperience,school_i}}{1+e^{(experience_i - mexperience|school_i)/sexperience,school_i}}$$

(3)

Where, $school_i$, $mschool$ and $sschool$ are the years of education for individual *i*, the average years of education in the population and the standard deviation of years of education in

the population, respectively. Similarly, $experience_i$[18], $mexperience|school$ and $sexperience, school_i$ are years of experience in labor market for individual i, the average years of experience in the population given $school_i$ and standard deviation of years of experience in the population given $school_i$ respectively.

To arrive at $a_{i_{unobservable}}$, we first estimate each individual's unobserved skill following Guimaraes and Portugal's (2010) approach to capture unobserved productivity based on each individual's labor market history. Log of hourly wage is regressed on age, age squared, job tenure, job tenure squared, years of education and year dummies as controls, along with worker- and firm fixed effects. The worker fixed effect is then used to calculate the correction factor as follows (4):

$$a_{i_{unobservable}} = 0.5 + \frac{e^{(FE_i - mFE|school_i, experience_i)/sFE|school_i, experience_i}}{1+e^{(FE_i - mFE|school_i, experience_i)/sFE|school_i, experience_i}} \qquad (4)$$

Where, FE_i, $mFE|school_i, experience_i$ and $sFE|school_i, experience_i$ are worker fixed effect derived from the wage equation, average worker fixed effects among workers with $school_i$ and $experience_i$, and standard deviation of worker fixed effects among workers with $school_i$ and $experience_i$, respectively.

After the composite human capital quality measure is constructed, we demean the measure by industry and occupation. This serves two functions. First, it helps us take out industry and occupation related effects. Second, it helps us overcome multicollinearity, since the sorting

[18] Experience is calculated as potential experience after highest education degree attained i.e. potential experience = age – (6 + years of education)

mechanism in labor markets results in substantial correlation between the quality of founders and employees.

Finally, we use the composite index of human capital quality to create two independent- and one dependent variable. Our independent variables are the *human capital*$_{FOUNDER}$ and *human capital*$_{FIRST}$ that measure the human capital quality of the founder and the first employee, respectively, while *human capital*$_{SECOND}$ measures the quality of the second employee and serves as our dependent variable.

As a robustness test, we also test our hypotheses using *years of education*, and *years of education and experience* as alternative measures of human capital quality. The first of these two simply captures the number of years of higher education of the founder/first employee/second employee, while the latter is a composite variable constructed in the manner explained above, but where unobserved skill is not included.

Moderator variables

We use *Occupation Similarity*[19] as a moderator variable in one of our models. It is measured by two dummy variables – one measures similarity between the founder and the second employee and the other between the first employee and the second employee. The variables takes the value 1 if the first two digits of the seven digit International Standard Classification of Occupations - ISCO 08 are the same, and 0 if they differ.

Control variables

[19] For occupation similarity, we use previous job/firm of the first and second employees while we use current occupation/firm for founder. The different treatment of employees and founders is for the following reason: Recruitments take some time even after firm founding. On top of it, it is plausible that the founder spends some time exploring the industry in which she eventually starts a firm. In cases where founder's current occupation is unavailable, we use the last available occupation.

We use a total of seven control variables in our models. *Gender* is a dummy variable where males are the reference group. We include this because there is some evidence of differences in the nature and performance of ventures established by male and female entrepreneurs, although the sources of such differences (e.g., individual or institutional) can be debated (Hughes et al., 2012).

Family member of the founder is a dummy variable that takes the value 1 if the first employee is a close relative (parent, sibling, spouse or child) of the founder, and 0 otherwise. We include this because regular recruitment considerations may be less applicable if the candidate is a family member of the founder, and the second employee may interpret the quality signal from the first employee differently, if she/he is a relative of the founder.

Immigrant is based on the "standard for immigration" categorization, which has six immigration categories based on the place of birth of parents. We recode it into a dummy variable where immigration status is 1 for all founders/first employees born outside Norway, and 0 for those born in Norway. We include this control because a large literature on immigrant entrepreneurship finds that immigrant and native entrepreneurs are different on average (e.g. Farlie, 2008; Kerr, 2008; Hunt, 2011; Kerr and Kerr, 2016). Immigrant entrepreneurs may be engaged in different activities that require different skill levels compared to native entrepreneurs, even within same industry group. Furthermore, biases may exist in judging the human capital of immigrants. For instance, an education degree from another country may be either under- or overvalued in the host country.

We use two measures that capture the education of the founder/first employee, *business education* and *science education*. Both measures are dummy variables based on the Norwegian Standard Classification of Education, which categorize educations using a six-digit code. The

second digit of this code denotes the broad field of education, in which group 4 relates to "Business and administration" and group 5 relates to "Natural sciences, vocational and technical subjects.

Although we have demeaned our human capital measures by industry and occupation groups, we use two additional industry controls that we think are relevant in determining the quality of the employees hired. The first is the *industry skill ratio*, which is measured as the proportion of employees in an industry that have at least 15 years of education. We calculated this ratio by aggregating the education years for all employees in each industry group (2-digit NACE code), per year. The second industry control we use is *industry labor intensity*. It is first measured at the firm level as the ratio between payroll expenses and tangible assets, and then aggregated at the industry group level (2-digit NACE code), per year.

Analysis and Results

Table 1 presents descriptive statistics from our sample. From this table, we see that the founders have the highest human capital quality on average in our sample (mean of 15.64), followed by the first- (mean 13.14) and the second employee (mean 12.52). In terms of occupational similarity, we see that about 54 percent of the second employees have the same occupational code as the first employee, but only 28 percent of the second employees share occupational code with the founder. This by itself indicates that the social network of the first employee may often contain more relevant candidates than that of the founder. Furthermore, our sample contains 17 percent female founders, and 41 percent female first employees. About 28 percent of the first employees are close relatives of the founder. The share of immigrant founders and first employees are 19 and 13 percent respectively. Founders with science and technical education background form 36 percent of the sample, while those with a business background

only constitute 14 percent. Even among the first employees, the proportion of science educated individuals is substantially higher than it is for business.

(INSERT TABLE 1 HERE)

Hypothesis 1 stated that the human capital of both the founder and the first employee are positive predictors of the human capital of the second employee. To test this, we use OLS regressions with *human capital*$_{FOUNDER}$ and *human capital*$_{FIRST}$ as our independent variables, and *human capital*$_{SECOND}$ as our dependent variable. The results from this regression are presented in Model 1 in Table 2. From Table 2, we see that the human capital quality of both the founder and the first employee are positively signed, and that both coefficients are statistically significant ($p<0.001$). Since the skill indices are centered within industry-occupation groups, the coefficients represent effects within such groups. We find that a unit increase in *human capital*$_{FIRST}$ is associated with a 0.146 unit increase in *human capital*$_{SECOND}$. Similarly, a unit increase in *human capital*$_{FOUNDER}$ is associated with a 0.141 unit increase in *human capital*$_{SECOND}$. Thus we find support for Hypothesis 1.

(INSERT TABLE 2 HERE)

Hypothesis 2 predicted that the impact of the human capital of the founder was stronger in the high end of the labor market, while Hypothesis 3 predicted that the human capital of the first employee was stronger in the low end of the market. First, and interestingly, we see from Model 1 that the effect size of the human capital of the founder and first employee are remarkably similar (0.146 vs 0.141), and the difference between the two is not statistically significant. To test H2 and H3, we conduct quartile regressions (cfr. Model 2, Table 2). From Table 2, we see that the relationship between *human capital*$_{FIRST}$ and *human capital*$_{SECOND}$ is slightly stronger than the

relationship between *human capital*$_{FIRST}$ and *human capital*$_{FOUNDER}$ in the bottom quartile (0.129 vs 0.108). This flips in the mid quartile, with *human capital*$_{FOUNDER}$ becoming a slightly better predictor of *human capital*$_{SECOND}$ (0.150 vs 0.162). In the top quartile, *human capital*$_{FOUNDER}$ clearly seems to be a better predictor of *human capital*$_{SECOND}$ (0.0980 vs 0.179). Notably, *human capital*$_{FIRST}$ is not significant at conventional levels in the top quartile ($p<0.1$), while *human capital*$_{FOUNDER}$ is ($p<0.001$). The clear divergence in patterns in the top and bottom quartiles indicates that there are indeed differences in these relationships at different ends of the distribution. However, the difference between the predictive capacities of *human capital*$_{FOUNDER}$ and *human capital*$_{FIRST}$ are not statistically significant in any of the quartiles. Therefore, we can only claim weak support for H2 and H3.

H4 and H5 predicted that the effect of the founder and first employee's human capital would be stronger when there is an overlap in job category/occupation, while H6 predicted that this effect would be the strongest in the high end of the human capital quality distribution of second employees. To test this, we include interaction terms between the human capital of the founder/first employee, and occupation overlap dummies, respectively. The results using occupation overlap as a moderator are presented in Table 3. Based on the OLS (Model 4) results, occupation similarity does not moderate the relationship between *human capital*$_{SECOND}$ and *human capital*$_{FIRST}$ or *human capital*$_{FOUNDER}$. However, when we plot the marginal effects of *human capital*$_{FOUNDER}$ and *human capital*$_{FIRST}$ on *human capital*$_{SECOND}$, we notice that occupation similarity does affect the relationships. In the first graph of Figure 1, we see that the *human capital*$_{FOUNDER}$ can predict *human capital*$_{SECOND}$ when the two come from different occupational backgrounds as indicated by narrow confidence interval that do not contain the null value. On the contrary, when they come from same occupational backgrounds, the confidence intervals are

wide, and include the null value, indicating lack of a statistically significant relationship. This is surprising, but a plausible explanation for this may be the relatively small sample size of firms (around 28 percent of 712 firms) where founders and second employees share the same occupational backgrounds, leading to wider confidence intervals. With this result, we do not find evidence for H4, which claimed that an overlap between the occupation of the founder and the second employee would make the founder a stronger predictor of the human capital of the second employee.

The second graph in Figure 1 shows that *human capital*$_{FIRST}$ has some predictive capacity over *human capital*$_{SECOND}$ (i.e., the confidence interval does not contain the null value) when both employees share occupational background. However, when they come from different occupational backgrounds, the predictive capacity is lost. This lends credence to H5, that overlap between the job category/occupation of the first and the second employee has a positive impact on the predictive capacity of the human capital of the first employee on that of the second employee.

(INSERT TABLE 3 AND FIGURE 1 HERE)

H6 predicted that the positive effects of job category overlap would be stronger in the high end of the labor market. We examine this by testing the abovementioned interaction terms in quartile regressions. Model 4 in Table 3 shows results for the test of H6. Figures 2 and 3 plot the relationships of interest to us. Figure 2 shows that the test fails to find support for our prediction, since the marginal effect is not higher in the top quartile when the first- and second employee share occupational background. However, Figure 2, like Figure 1, shows that *human capital*$_{FIRST}$ has predictive capacity for *human capital*$_{SECOND}$ when the two come from same background but not otherwise. Similarly, in the case of the relationship between *human capital*$_{FOUNDER}$ and

human capital$_{SECOND}$, occupation similarity is not significantly different at different ends of the distribution, as seen from both Table 4 and Figure 3. However, we do see an upward divergence from the median to the top quartile when they have the same occupational background. Again, perhaps because of small number of firms where founder and second employee have the same occupational backgrounds, the confidence intervals are quite wide leading to statistically insignificant differences. As such, we cannot claim support for H6. In line with the results from Table 2, the human capital of the founder seems to be quite important in the high end of the labor market, irrespective of whether there is overlap in occupation or industry experience or not, since neither subgroup contain the null within their confidence intervals - as seen in Figure 3.

Finally, we move to the interaction effect between the quality of the founder and first employee, on the quality of the second employee. Here, the theoretical predictions were less clear, which made us suggest two opposing hypotheses (7a and 7b) regarding the sign of the interaction effect between the human capital quality of the founder and the first employee. Model 5 in Table 4 adds an interaction term between the human capital quality of the founder and the first employee to the original specification. Compared to Model 1 in Table 2, we see that adding the interaction term increases the adjusted R^2 of the model from 0.108 to 0.1133, and that the interaction term is negatively signed (-0.0145) and statistically significant ($p<0.05$). This supports H7b, and suggest that the human capital of the founder and the first employee are substitutes. Model 6 in Table 4 includes the interaction term in quantile regressions. It is evident from the results of the quantile regression that the interaction effect between *human capital*$_{FOUNDER}$ and *human capital*$_{FIRST}$ on *human capital*$_{SECOND}$ is primarily driven by observations in the upper quartiles, and it does not exist in the bottom quartile.

The coefficients for *human capital*$_{FOUNDER}$ and *human capital*$_{FIRST}$ changes slightly upon inclusion of the interaction term, and so does the interpretation of the coefficients. The coefficient of 0.165 for *human capital*$_{FIRST}$ is a measure of the increase in the human capital of the second employee, when the human capital of the first employee increases by one unit, in a firm where the founder has average human capital within the relevant industry-occupation group. Notably, after adding the interaction term, *human capital*$_{FIRST}$ becomes more important in the bottom quartile (0.157 with the interaction term included vs 0.129 without it) while *human capital*$_{FOUNDER}$ is only significant at 10 percent level.

Finally, we run a number of robustness checks with alternative measures of human capital quality. More specifically, we use *education years* and *education x experience* as our measures of human capital quality, and the results are provided in Table 5 in the Appendix. From the table in Appendix A, we see that main effects of the *human capital*$_{FOUNDER}$ and *human capital*$_{FIRST}$ are consistent with the results from using the composite measure of human capital, but we also note that adjusted R^2 and R^2 decreases. We also see that the negative interaction effect between our two independent variables are not present when using these somewhat cruder measures. All in all, this builds confidence in our results, but it also indicates that our preferred measure of human capital quality captures more of the "true" human capital quality of the individuals in our sample.

Conclusion and Limitations

Our paper aligns with findings in the matching and sorting literature (Guricano and Hubbard, 2007; Baptista, Lima and Preto, 2013) in that the human capital quality of the founder is a predictor of subsequent hires. Our paper extends these finding by demonstrating that the human capital quality of early hires also matters. More specifically, the first employee also acts as a signal and a network extension that affects subsequent hires, in our case the second

employee. On average, the effect is comparable to that of the founder. A perspective on human capital that moves beyond the characteristics of the founder is thus relevant to understand human capital accumulation in new ventures, and - we presume - ultimately their performance. Early hiring decisions have consequences for who will be hired at later stages. This means that founders should be aware of the path dependencies created by their first hiring decisions.

The effect of founders and employees may manifest themselves differently. We find evidence, albeit a weak one, that the magnitude of the relationship between founder/first employee human capital and second employee human capital seems to differ on opposite ends of quality distribution. The founder exerts greater influence in the top quartile, while the effect of the first employee is largest in the bottom quartile. Although the differences were not consistently significant, the trend lines suggests that founder quality is a more important determinant in the higher end of the quality distribution, while first employee quality is more important in the lower end. This pattern is in line with our theoretical reasoning. When hiring important employees, i.e. those in top quartile, founders may turn to their network for people they know and can trust. Furthermore, employees from the high end are likely to have their financial outcomes tied closer to the success of the firm than employees from the low end. Since, founder's human capital serves as a signal of the quality of the firm and it's prospects, the high end second employees may put extra emphasis on the quality of the founder, resulting in a higher correlation between the two. In case of the low end employees - who are more likely to be wage earners with limited upside tied to firm performance - the human capital of existing employees in the firm provide a relevant benchmark for things that may be important to them. Additionally, the founder can look into the network of existing employees to hire candidates who may be less important/strategic to firm, i.e. those that belong to low end of quality distribution.

Our empirical findings also demonstrate that the relationship is more prominent if the first and second employees share the same occupational background. It is easier for the second employee to read the first employee's human capital as a signal if they have same occupation. For example, a software programmer may be better able to assess the quality of an existing employee if that employee is also a software programmer, as opposed to a salesperson. It is also more likely that people who share occupational background are members of each other's network, and that the network of the first employee is used to recruit the second employee.

Finally, we tested whether the human capital of the founder and first employee are mutually reinforcing. We find a declining marginal effect of the first employee's human capital as founder human capital increases, and vice versa. This implies that human capital of the founder and the first employee are not mutually reinforcing, and instead serve as substitutes of one another in determining the quality of the second employee. Examining this from a signaling perspective, the declining marginal effect is an indication that the signal from the first employee is more prominent if the founder is less qualified, and vice versa. We also found that this effect is stronger in the high end of the labor market. Thus, founders with lower levels of human capital can alleviate this shortcoming if they are able to attract qualified individuals to join as early members of the organization. Inferior founders who are able to hire a high quality first employee, due to luck or labor market frictions, can strategically use the first employee as a signal of the quality of firm or as a network node, and thus improve her outcome in later hiring events. Consequently, the characteristics of the founder is somewhat less deterministic than normally assumed.

Despite these findings, limitations remain. First, we identify a relationship between the human capital of the founder and early hires on the ability to attract high quality later hires;

however, we are unable to establish any causal relationships. There might also be alternative explanations for these correlations that we are unable to rule out. Correlations may be driven by anchoring effects, whereby the founder learns about her rank among employers and adjusts her expectations based on first employee's human capital. Second, it is also possible that the correlations between the first and second employee is spurious, because the business model chosen by the founder dictates what kind of employees are required to implement it. This could create correlation between the human capital of the first and second employee, without the existence of a causal link between them. For example, if a highly educated and experienced person starts a company that provides cleaning services, the quality of employees (who will primarily be cleaners) will be more correlated amongst themselves rather than with the founder. Still, the first cleaner may not have a causal effect on the hiring of the second cleaner.

Third, the ability to recruit high skilled employees is not only determined by the human capital in the new venture. A new venture might wish to recruit a high quality employee, but resource constraints limits the ability to do so. Well-funded startups might be able to recruit high human capital individuals in both of the first two hiring events, while poorly funded startups might have to settle for lower human capital in both events. This may also cause a spurious correlation between the human capital of the first and second employee.

It is likely that one or more of the alternative mechanisms we outlined here are at play when a young firm hires. Future research might attempt to quantify their effects, and also to parse out the relative importance of signaling vs. recruiting from networks – which we have lumped together. It would also be interesting to examine how the effects of early employees evolve over an increasing number of hiring rounds. We have examined round 1 and 2, but what will happen in

round 3? Or 4? And so on. There seems to be ample room for scholarship examining the path dependencies in human capital accumulation in entrepreneurial firms.

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Table 1: Descriptive Statistics

Variable	Observations	Mean	S.D.	Min	0.25	Mdn	0.75	Max
Human capital of founder	1406	15.64	5.02	4.41	12.15	15.13	18.1	34.89
Human capital of first employee	1366	13.14	4.11	3.24	10.23	12.77	15.58	34.77
Human capital of second employee	1282	12.52	4.12	4.27	9.54	12.05	14.86	30.23
Same occupation between first and second employee	2018	0.54	0.5	0	0	1	1	1
Same occupation between founder and second employee	1952	0.28	0.45	0	0	0	1	1
Female founder	2007	0.17	0.38	0	0	0	0	1
Female first employee	2018	0.41	0.49	0	0	0	1	1
First employee related to founder	2018	0.28	0.45	0	0	0	1	1
Founder is immigrant	2018	0.19	0.4	0	0	0	0	1
First employee is immigrant	2010	0.13	0.34	0	0	0	0	1
First employee has business education	2018	0.14	0.35	0	0	0	0	1
Founder has business education	2018	0.14	0.35	0	0	0	0	1
First employee has science/technical education	2018	0.25	0.43	0	0	0	0	1
Founder has science/technical education	2018	0.36	0.48	0	0	0	1	1

Table 2

Model Specification	Ordinary Least Squares	Quantile Regressions		
Dependent Variable	Human Capital$_{SECOND}$	Human Capital$_{SECOND}$		
	Model 1	Model 2		
		Q25	Q50	Q75
Independent Variables				
Human Capital$_{FOUNDER}$	0.141***	0.108*	0.162***	0.179***
	(4.13)	(2.12)	(3.80)	(4.00)
Human Capital$_{FIRST}$	0.146***	0.129*	0.150**	0.0980+
	(3.74)	(2.53)	(3.15)	(1.78)
Control Variables				
First and second employee have same occupation	-0.139	0.629	-0.0678	-0.156
	(-0.46)	(1.56)	(-0.16)	(-0.38)
Founder second employee have same occupation	-0.568+	-0.147	-0.800	-0.568
	(-1.66)	(-0.37)	(-1.63)	(-1.33)
Founder is female	-0.690+	-0.821	-0.653	-0.828
	(-1.73)	(-1.46)	(-1.20)	(-1.39)
First employee is female	0.815*	0.568	0.858+	0.407
	(2.17)	(1.34)	(1.80)	(0.80)
First employee related to founder	-0.824*	0.237	-0.878+	-1.122*
	(-2.25)	(0.50)	(-1.94)	(-2.35)
First employee is immigrant	0.985	-0.498	0.758	0.786
	(1.45)	(-0.49)	(0.98)	(0.65)
Founder in immigrant	-0.180	0.884	-0.253	-0.376
	(-0.20)	(0.73)	(-0.18)	(-0.28)
First employee has management education	0.827+	0.0557	0.317	1.648*
	(1.71)	(0.10)	(0.47)	(2.30)

Founder has management education	-0.159	0.373	-0.166	-1.073
	(-0.35)	(0.62)	(-0.31)	(-1.30)
First employee has science education	0.489	-0.0808	0.339	0.177
	(1.37)	(-0.17)	(0.77)	(0.37)
Founder has science education	-0.584+	-0.248	-0.362	-0.764^{+}
	(-1.70)	(-0.60)	(-0.81)	(-1.65)
Industry skill ratio	-3.701**	-6.085***	-2.834	-1.721
	(-3.06)	(-4.24)	(-1.55)	(-0.94)
Industry labor intensity	-0.00582+	-0.00215	-0.00677^{+}	-0.00571
	(-1.93)	(-0.35)	(-1.73)	(-1.18)
Constant	0.287	-2.055^{+}	-0.0950	2.421*
	(0.35)	(-1.90)	(-0.10)	(2.07)
Year fixed effects included	Yes	Yes	Yes	Yes
Industry-occupation fixed effects included	Yes	Yes	Yes	Yes
N	712	712	712	712
R^2	0.1385	0.0773	0.0865	0.0986
adj. R^2	0.1084			

Table 3

Model Specification	OLS	Quantile Regression		
Dependent Variable	Human Capital$_{SECOND}$	Human Capital$_{SECOND}$		
	Model 3	Model 4		
		Q25	Q50	Q75
Independent Variables				
Human Capital$_{FOUNDER}$	0.145***	0.0864	0.155***	0.158***
	(3.93)	(1.48)	(3.31)	(3.73)
Founder and Second Employee from Same Occupation	-0.489	-0.155	-0.612	-0.844^{+}
	(-1.36)	(-0.38)	(-1.26)	(-1.88)
Occupation Similarity x Human Capital$_{FOUNDER}$	-0.0293	0.00474	-0.0228	0.191
	(-0.32)	(0.04)	(-0.20)	(1.38)
Human Capital$_{FIRST}$	0.116*	0.0946	0.103	0.0363
	(1.98)	(1.30)	(1.37)	(0.54)
First and Second Employee from Same Occupation	-0.174	0.656	-0.211	-0.230
	(-0.57)	(1.60)	(-0.47)	(-0.59)
Occupation similarity x Human Capital$_{FIRST}$	0.0704	0.0865	0.113	0.141
	(0.93)	(0.84)	(1.11)	(1.39)
Control Variables				
Founder is female	-0.690^{+}	-0.722	-0.726	-0.782
	(-1.73)	(-1.26)	(-1.37)	(-1.39)
First employee is female	0.796*	0.556	0.821^{+}	0.524
	(2.13)	(1.27)	(1.68)	(1.10)
First employee related to founder	-0.837*	0.0651	-0.888^{+}	-1.337**
	(-2.29)	(0.14)	(-1.93)	(-2.91)
First employee is immigrant	1.003	-0.484	0.905	0.814
	(1.45)	(-0.44)	(1.15)	(0.74)

Founder in immigrant	-0.199	0.736	-0.721	0.0527
	(-0.22)	(0.59)	(-0.52)	(0.04)
First employee has management education	0.837^{+}	0.166	0.345	1.418*
	(1.73)	(0.29)	(0.51)	(2.11)
Founder has management education	-0.159	0.160	-0.307	-0.796
	(-0.35)	(0.27)	(-0.56)	(-1.08)
First employee has science education	0.489	-0.0428	0.290	0.346
	(1.37)	(-0.09)	(0.65)	(0.76)
Founder has science education	-0.597^{+}	-0.355	-0.468	-0.677
	(-1.74)	(-0.83)	(-1.06)	(-1.53)
Industry skill ratio	-3.677**	-5.533***	-2.752	-1.836
	(-3.04)	(-3.70)	(-1.50)	(-1.10)
Industry labor intensity	-0.00562^{+}	-0.00424	-0.00737^{+}	-0.00522
	(-1.90)	(-0.66)	(-1.86)	(-1.17)
Constant	0.295	-1.967^{+}	-0.0142	2.044^{+}
	(0.36)	(-1.77)	(-0.01)	(1.80)
Year fixed effects included	Yes	Yes	Yes	Yes
Industry-occupation fixed effects included	Yes	Yes	Yes	Yes
N	712	712	712	712
R^2	0.1399	0.0783	0.0881	0.1055
adj. R^2	0.1072			

t statistics in parentheses
$^{+}$ $p < 0.10$, * $p < .05$, ** $p < 0.01$, *** $p < 0.001$

Table 4:

Model Specification	OLS	Quantile Regression		
Dependent Variable	Human Capital$_{SECOND}$	Human Capital$_{SECOND}$		
	Model 5	Model 6		
		Q25	Q50	Q75
Independent Variables				
Human Capital$_{FOUNDER}$	0.146***	0.0929^{+}	0.171***	0.169***
	(4.27)	(1.84)	(4.11)	(4.22)
Human Capital$_{FIRST}$	0.165***	0.157**	0.171***	0.0932^{+}
	(4.29)	(3.19)	(3.81)	(1.79)
Human Capital$_{FIRST}$ X Human Capital$_{FOUNDER}$	-0.0145*	-0.0153	-0.0168*	-0.0186*
	(-2.07)	(-1.38)	(-2.22)	(-2.10)
Control Variables				
First and second employee have same occupation	-0.115	0.586	0.0108	-0.0507
	(-0.38)	(1.44)	(0.03)	(-0.13)
Founder and second employee have same occupation	-0.581+	-0.259	-0.697	-0.494
	(-1.71)	(-0.64)	(-1.49)	(-1.17)
Founder is female	-0.636	-0.863	-0.525	-0.787
	(-1.59)	(-1.56)	(-0.98)	(-1.34)
First employee is female	0.821*	0.679	0.869^{+}	0.571
	(2.19)	(1.56)	(1.77)	(1.15)
First employee related to founder	-0.833*	-0.123	-0.938*	-1.089*
	(-2.27)	(-0.26)	(-2.09)	(-2.31)
First employee is immigrant	0.933	-0.134	0.790	0.869
	(1.40)	(-0.13)	(1.05)	(0.79)
Founder in immigrant	-0.232	0.615	-0.417	-0.974
	(-0.27)	(0.50)	(-0.33)	(-0.78)
First employee has management education	0.829+	0.151	0.326	1.804*

	(1.72)	(0.27)	(0.51)	(2.35)
Founder has management education	-0.242	0.0761	-0.469	-1.010
	(-0.53)	(0.13)	(-0.86)	(-1.21)
First employee has science education	0.482	0.162	0.371	0.370
	(1.36)	(0.35)	(0.83)	(0.78)
Founder has science education	-0.639+	-0.507	-0.429	-0.844^{+}
	(-1.86)	(-1.20)	(-0.96)	(-1.82)
Industry skill ratio	-3.683**	-6.026***	-2.193	-2.174
	(-3.06)	(-4.11)	(-1.18)	(-1.29)
Industry labor intensity	-0.00599*	-0.00297	-0.00782*	-0.00530
	(-2.00)	(-0.51)	(-2.15)	(-1.06)
Constant	0.248	-1.686	-0.428	2.220^{+}
	(0.30)	(-1.55)	(-0.44)	(1.81)
Year fixed effects included	Yes	Yes	Yes	Yes
Industry-occupation fixed effects included	Yes	Yes	Yes	Yes
N	712	712	712	712
R^2	0.1445	0.0849	0.0985	0.1091
Adj. R^2	0.1133			

Figure 1

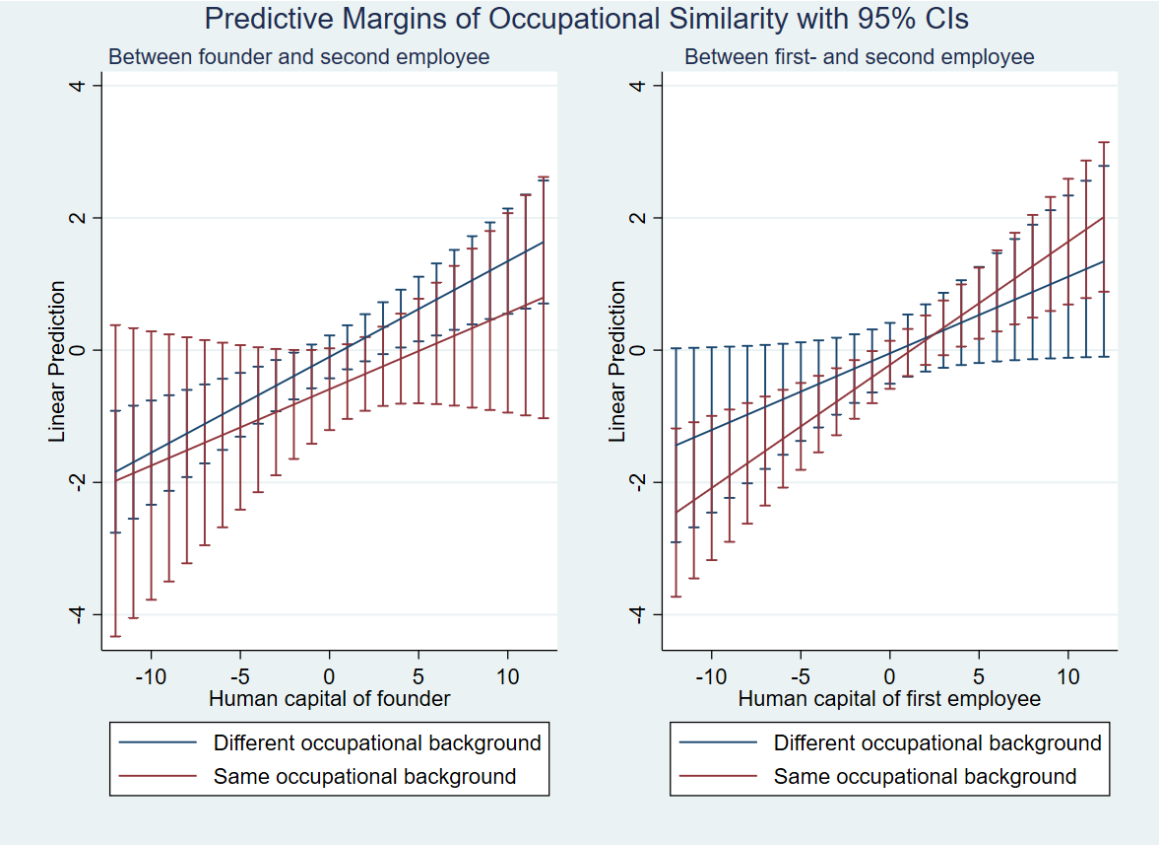


Figure 2

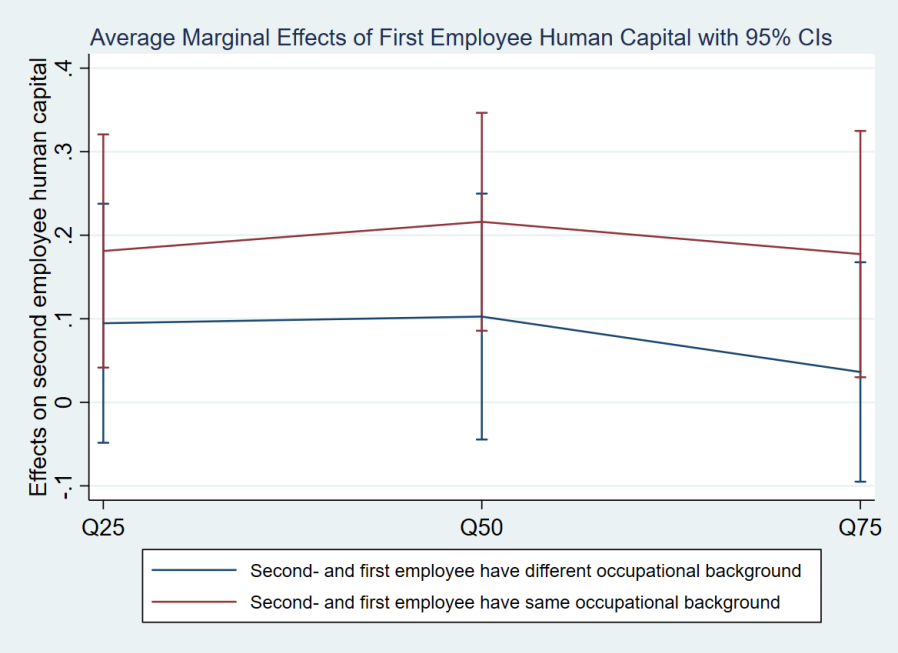
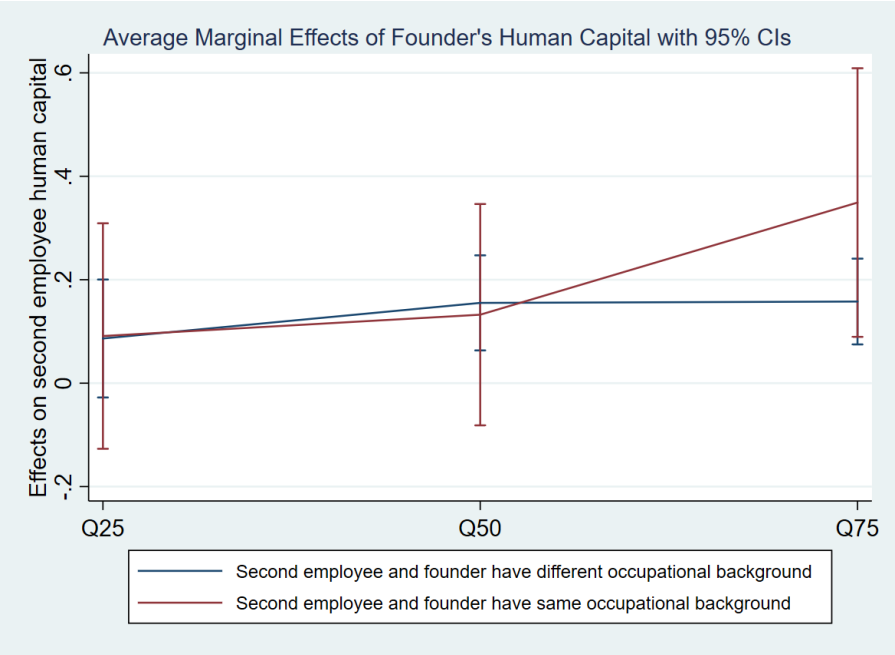


Figure 3


Average Marginal Effects of Founder's Human Capital with 95% CIs
Effects on second employee human capital
-.2
0
.2
.4
.6
Q25
Q50
Q75
Second employee and founder have different occupational background
Second employee and founder have same occupational background

APPENDIX A: Alternative measures of human capital (Robustness Check)
Table 5

Model Specification	OLS			
Human Capital Measure	Edu years	Edu years	Edu years X Experience	Edu years X Experience
Independent Variables				
First employee skill	0.0789*	0.0790*	0.132***	0.133***
	(2.35)	(2.37)	(4.53)	(4.57)
Founder skill	0.128***	0.129***	0.102***	0.101***
	(4.22)	(4.27)	(3.79)	(3.77)
Founder X First employee skill		0.0124		-0.00229
		(0.89)		(-0.25)
Control Variables				
First and second employee have same occupation	-0.0476	-0.0473	-0.103	-0.104
	(-0.39)	(-0.39)	(-0.62)	(-0.63)
Founder second employee have same occupation	-0.380**	-0.380**	-0.757***	-0.756***
	(-3.04)	(-3.03)	(-4.43)	(-4.42)
Founder is female	-0.143	-0.149	0.0471	0.0472
	(-0.84)	(-0.87)	(0.21)	(0.21)
First employee is female	0.166	0.171	0.326+	0.325+
	(1.17)	(1.21)	(1.74)	(1.74)
First employee related to founder	-0.0667	-0.0712	-0.391*	-0.391*
	(-0.48)	(-0.51)	(-2.13)	(-2.13)
First employee is immigrant	0.310	0.321	0.570+	0.569+
	(1.38)	(1.43)	(1.90)	(1.90)
Founder in immigrant	-0.471+	-0.477+	-0.0587	-0.0582
	(-1.70)	(-1.73)	(-0.17)	(-0.17)
First employee has management education	0.0963	0.100	0.395	0.393
	(0.53)	(0.55)	(1.60)	(1.60)
Founder has management education	-0.0810	-0.0731	-0.133	-0.135
	(-0.46)	(-0.41)	(-0.55)	(-0.55)
First employee has science education	-0.0755	-0.0752	-0.0455	-0.0456
	(-0.51)	(-0.50)	(-0.23)	(-0.24)
Founder has science education	-0.145	-0.138	-0.291	-0.294
	(-1.06)	(-1.00)	(-1.63)	(-1.64)

Industry skill ratio	-0.389	-0.416	-1.171^{+}	-1.157+
	(-0.81)	(-0.87)	(-1.83)	(-1.81)
Industry labor intensity	-0.00376*	-0.00386*	-0.000532	-0.000551
	(-2.24)	(-2.31)	(-0.23)	(-0.24)
Constant	0.182	0.174	-0.647	-0.647
	(0.55)	(0.52)	(-1.44)	(-1.44)
Year fixed effects included	Yes	Yes	Yes	Yes
Industry-occupation fixed effects included	Yes	Yes	Yes	Yes
N	1663	1663	1662	1662
R^2	0.0407	0.0415	0.0625	0.0626
adj. R^2	0.0261	0.0263	0.0482	0.0476