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Gender diversity in founding teams and hiring

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Abstract

This paper examines the gender gap in entrepreneurship and hiring among new ventures in the first year in Norway, using register data from 2004 to 2013. The study compares the roles and gender of founders and early-stage hiring. The main findings are that female CEOs, both owner and non-owner, are more likely to hire at least one employee, but they hire fewer employees and more part-time workers than male CEOs. Moreover, we tend to find patterns of assortative matching. We discuss the implications of our results on the relationship between gender diversity and the hiring in new ventures

Keywords:

gender differences, work arrangements, entrepreneurship, register data

JEL Classification

M12, M13, M14, J23

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Introduction

Innovation is widely viewed as a central driver of economic growth (e.g., Romer 1990, Aghion & Howitt 1992) and newly founded ventures is guaranteed for men and women. However, statistics on new venture activity shows that it is dominated by men and even more so among high-potential/high-growth new ventures (Guzman & Kacperczyk, 2019). What is surprising is that the gender gap is large in most countries. For illustration, studies find that only 10-15 percent of founders of high-potential start-ups are women in the US (Brush et al., 2014) and even less, 10 percent, among venture-backed start-ups (Gompers & Wang, 2017). Among the startups covered by Crunchbase, less than 6 percent are founded by women only, and not more than 15 percent have at least one woman among the founders (Lassébie et al., 2019). In Norway, one of the most gender equal countries in the world according to the World Economic Forum ranking, 48% of the active labour market participants are female compared to only 20 percent of founders of private limited corporations¹ and only 25 percent of entrepreneurs (Berglann et al., 2011; Markussen & Røed, 2017; Raknerud & Rønsen, 2014; Halvorsen and Raknerud, 2020). Norway is among those countries with lowest female participation when it comes to entrepreneurship (Halabisky & Shymanski, 2023).²

Our understanding of why there exist large gender gaps in successful entrepreneurship remains limited, and at what stage these arise. Are women disadvantaged at founding a new venture, during the first year after foundation that sets important initial conditions for economic growth, or are differences widening during the life cycle of the new venture? Existing research has mostly investigated the explanation that the gender gap is due to differences in human capital, particular prior work experience, and due to financial capital. Some studies have found that

¹ Source: <https://www.ssb.no/virksomheter-foretak-og-regnskap/statistikker/Etablerere>.

² Percentages of women vary somewhat but remain low depending on whether all self-employed, entrepreneurs, business owners (Global Entrepreneurship Monitor (2017)), any start-ups or high-growth start-ups are counted (Lassébie et al., 2019).

women are less successful entrepreneurs because they often have less prior work experience in a similar business or family business (Fairlie & Robb, 2009, Dahl & Reichstein 2007; Rocha et al., 2016) and are less likely trained in STEM fields (Sauer & Wiesemeyer, 2018). Financial capital is a key determinant of success specifically during the early stages. Some evidence suggests that founding teams with at least one woman are less likely to receive funding and if then they receive less (see Lassébie et al. (2019) for a summary). Sauer & Wilson (2016) show that personal inheritance which is a quasi-exogenous windfall gain in wealth increases the propensity to start a business for single women causally. This is strong evidence of liquidity constraints that prevent single women from becoming entrepreneurs. They also show that self-employment induces self-selection problems, and accurate measurement is crucial whether an individual has founded a business.

In this study, we focus on another key determinant for the success of new ventures: hiring and employment growth immediately after foundation. So far, the literature has paid much less attention to this margin of success and gender differences that can potentially explain the relatively lower likelihood of female entrepreneurship to succeed. Investigating this is not a straightforward task as it requires a dataset that accurately identifies new ventures, the founders behind these new ventures, and the transition from non-employer to employer. This also includes inaccuracies in the measurement of exact timing of first registering a venture and the sequence of the events, as well as the founding team versus the complete hires during the first year. Many datasets have caveats observing the founding status of a new business, measure whether it is an active or only passive business with no activity and the recruiting employees to the new venture (Azouley et al., 2020). We address these measurement challenges by extracting merged register data on all newly founded, active ventures extracted from the Norwegian population employer-employee matched register dataset and observe recruitment from detailed employment statistics.

Using the population of newly founded ventures, we investigate as the main outcome the hiring success of new ventures, and our key variables describe the founding team regarding ownership and gender. In extension, we also measure aspects of corporate governance. Particularly, we define the founding teams as consisting of the CEO and the owner, whether it is a family business and whether the new venture has an external board director on the board of directors. External board members, in addition to the CEO, may enhance the supervisory function of the board and provide access to an external recruitment network, including referrals.³ We contribute to the literature by: (i) being able to accurately observe during the first year the sequence of founding a new venture and hiring process over time addressing selection and measurement error problems; and (ii) documenting direct evidence on the relationship between the female share among the founders and the outcome of hiring at the extensive margin as well as the intensive margin. We exploit the hours of work of employee contracts as well as the number of new hires during the first year to quantify these. In supplementary analyses, we take account of the demographic characteristics of those who are hired and that are potentially correlated with hours of work, that is part-time work.

The novel results we present contribute to the overall literature predicting that more diverse teams generate differential, potentially more efficient outcomes increased hiring can result in higher survival probability of new ventures, higher-growth and innovative potential of the economy. Particularly, results contribute descriptive evidence on whether gender diversity in founding teams affects employment growth in the immediate start phase and opens the black box of who hires who.

The article begins in Section 2 with a comprehensive overview of the existing literature that explains gender differences in entrepreneurship. Then, we discuss the gender gap in resource

³ We focus on new ventures that choose the organisation form private limited corporation (“AS” or “Aksjeselskap” in the Norwegian terminology). In the section institutions we explain the details regarding requirements regarding capital and board, etc.

mobilization when becoming an entrepreneur. Section 3 describes the data and main variables. We describe how we extract the timing of formation of the start-up and the founding team, as well as hiring. Section 4 presents descriptive statistics. Section 5 presents the results. Section 6 concludes.

Gender Gap and Entrepreneurship

International statistics shows that among entrepreneurs, women are underrepresented, and this holds over time and across countries (OECD, 2023). The gap is found among start-ups, small businesses and self-employed, all subsumed as entrepreneurs in statistics. It is also evident at different stages of the entrepreneurial lifecycle, including entry, growth, and exit.

Gender differences in entrepreneurship can be explained by several factors. The first factor is the perpetuation of gender stereotypes related to traits, attitudes, preferences towards entrepreneurship, and motives for establishing a startup. Studies have shown that women are more risk averse (Fossen, 2012; Caliendo et al., 2015; Nyakudya et al., 2018), less willing to compete (Bönte & Piegeler, 2013), have lower preferences for entrepreneurship (Blanchflower et al., 2001; Grilo & Irigoyen, 2006; Verheul et al., 2012), have higher fear of failure (Shahriar, 2018; Simmons et al., 2019), lower entrepreneurial self-efficacy (Jennings et al., 2023), and growth ambition (Thébaud, 2015; Devine et al., 2019; Elam et al., 2019; Darnihamedani & Terjesen, 2020) than men. These differences not only account for the observed differences in entering entrepreneurship, but also explain differences in longevity in entrepreneurship (Fossen, 2012) and the gender differences in the probability to transition becoming serial entrepreneurs (Nielsen & Sarasvathy, 2014; Simmons et al., 2019).

A second factor pertains to gender differences related to educational choices and the segregated nature of labour markets. The entrepreneurship literature emphasizes a premium on startups in STEM disciplines due to their linkage with scientific knowledge. Given that women are

underrepresented in these fields, the disparity inherently contributes to the gender gap in entrepreneurship (Dilli & Weterhuis, 2018). The uneven distribution of male and female workers across hierarchical levels, occupations, and industries results in varied exposures. This, in turn, influences entrepreneurship as it shapes beliefs, fosters the accumulation of relevant entrepreneurial skills, and determines exposure to potential entrepreneurial opportunities (Tonoyan et al., 2020).

Gender differences in support and networking constitute a third factor. Research has established the relationship between the quality of social capital and entry into entrepreneurship (e.g., Davidson & Honig, 2003). Furthermore, the composition and structure of the networks that entrepreneurs are part of as well as their roles and the dynamics of their interactions within these networks affect their ability to connect with influential individuals and acquire necessary resources (Stuart & Sørensen, 2003). Female entrepreneurs face challenges not only in accessing entrepreneurial networks (McAdams et al., 2019), but networks they are part of are also different from networks the average male entrepreneur is part of (Manolova et al 2007), and are often of lower quality (Neumeyer et al., 2019).

A somewhat surprising finding is the growing evidence that entrepreneurs have more flexibility in their work arrangements that may be a pull factor for mothers into entrepreneurship. In a recent study, Fontenay (2024) finds that in response to a policy extending paid leave in Belgium mothers were more likely to exit dependent employment and enter self-employment. The authors suggest that mothers may seek more flexible work arrangements as self-employed.

Another related factor is the importance of female mentors and role models, and the scarcity or even lack thereof. Female entrepreneurs, by challenging gender stereotypes, inspire and guide aspiring women in their field (Byrne et al., 2019). Studies show women employed by female entrepreneurs are more likely to start their ventures (Rocha and Van Praag, 2020). Germann et al. (2023) found that Ugandan female entrepreneurs with female mentors achieved higher sales

and profits. Consequently, women's entrepreneurial rates and access to finance and networks diminish without female mentorship. Peer effects are a significant influence in entrepreneurship, where new ventures by neighbors, colleagues, and classmates inspire others to follow suit (Nanda and Sørensen, 2010; Field et al., 2016). These effects tend to be stronger within same-sex peer groups (Bosma et al., 2012; Markussen & Røed, 2017). A lower number of female peers has demonstrated to decrease entrepreneurship rates among women and their likelihood of taking business loans (Markussen & Røed, 2017; Field et al., 2016).

Gender Gap in Resource Mobilization

The abilities to mobilize resources, a defining characteristic of successful entrepreneurs (Stevenson & Jarillo 2007), is heavily influenced by factors that drive gender disparities. Persistent stereotypes that relate entrepreneurship to masculinity, gender differences in educational and career histories, gender biases in support and networks, and traditional patterns where women are main carers of children and gendered specialization in household work persists significantly and contributes to women's lower capacity to mobilize resources than others. Yet, resources are crucial for entrepreneurial entry, growth, and success, and therefore it is another area where gender differences manifest significantly, underscoring the broader challenges faced by female entrepreneurs in today's business landscape.

Arguably most attention has been dedicated to investigating the gender gap when it comes to mobilizing financial resources and it might be regarded as a stylized fact that women are disadvantaged compared to their male peers (Gicheva & Link, 2015; Kanze et al 2018; Guzman & Kacperczyk, 2019). Given the gender gaps in entrepreneurial wealth (McGrath et al., 2022) and initial financing (Verheul & Thurik, 2001; Fairlie & Robb, 2009), the disadvantaged position to mobilize external finance is even more pressing. When it comes to sources of external financing, we observe gaps in obtaining bank loans and credit (Buttner & Rose, 1988;

Thebaud & Sharkey 2016; Morrazoni & Sy 2022), and if they manage to obtain this form of financing it is often at higher interest rates (Brana, 2013). Female entrepreneurs also tend to be disadvantaged in obtaining venture capital (Alsos et al., 2006; Orser et al., 2006; Lins & Lutz, 2016), and even if they succeed, they struggle to secure additional funding rounds (Snellman & Solal, 2023). We also observe gender gaps in open funding initiatives like crowdfunding (Greenberg & Mollick, 2017).

Empirical evidence demonstrates that female entrepreneurs are valued lower and valued as less capable (Thebaud, 2015; Sauer & Wiesemeyer 2018) compared to their male peers. They are also evaluated using different valuation criteria (Snellman & Solal, 2023). Other motives refer to a lack of credit track record and less physical and reputational collateral (Klapper & Parker, 2011). Being backed by female investors does not seem to be a solution, as evidence suggests that female-backed female entrepreneurs face difficulties in raising additional rounds of financing (Snellman & Solal, 2023). Previous entrepreneurial experience and higher level of education are factors that increase the probability of women to seek equity funding (Carter et al., 2003).

The factors driving the existence and persistence of the gender gap in entrepreneurship are expected to also impact female entrepreneurs' decisions regarding whether to hire and grow in terms of employment, whom to hire, when to hire, how many to hire, and who to hire. Additionally, access to funding is crucial for entrepreneurs, as it enables investment in activities that turn ideas into reality, including the acquisition of necessary capital resources (Evans & Leighton, 1989; Stuart & Sorenson, 2003; Sauer & Wilson, 2016). A significant portion of these investments often involves recruiting personnel and creating jobs (Henley, 2005); hence, paying wage cost. The financial disadvantages faced by women only exacerbate these challenges.

The scarce existing empirical evidence suggests significant gender differences in hiring practices among startups. Fairlie and Miranda (2017), analyzing U.S. data, discovered that

female-owned startups are 10 percentage points less likely to hire their first employees. Similar findings were observed by Coad et al. (2017) in Danish register data and Caliendo et al. (2022) through the German Socio-Economic Panel. Bublitz et al. (2018), analyzing both German and Danish register data, found that male entrepreneurs are more likely to hire more workers across all qualification levels in Denmark, but these findings were not replicated in the German context. Additionally, Henley (2005) showed that self-employed women create significantly fewer jobs. An early study by Burke et al. (2002) explicitly addressing gender in entrepreneurial hiring, revealed distinct differences: post-compulsory education influences positively male entrepreneurs' hiring decisions, whereas it does not for female entrepreneurs. Moreover, for female entrepreneurs, having children appears to decrease the likelihood of job creation.

When it comes to hiring, the focus is not only on who is doing the hiring but also on who is being hired. For potential employees, joining a startup might represent one of several options, which could include working for more established companies (Coad et al. 2017; Fackler et al. 2019), or even reevaluating their current employment status. Due to the inherent uncertainties of new ventures, Bhidé (2000) suggests that those attracted to startups often have limited outside options or face marginalization in the broader labour market. Supporting this view, Nyström (2012) found in Sweden that immigrants and newcomers to the labour market are more likely, while women are less likely, to be hired by new firms. Similarly, Ouimet & Zarutskie (2014) observed in the U.S. that young firms tend to hire younger workers disproportionately. Coad et al. (2017) demonstrated, using Danish register data, that employees in new firms are often less educated, unemployed, or had lower incomes in the year before being hired. While specific insights on the gender dimension in this context are limited, there are some noteworthy exceptions. For instance, Weber & Zulehner (2010) showed that the presence of women among the first employees, that often means that they were part of the founding team, leads to the hiring of relatively more women in subsequent hiring. This is in line with other findings

regarding hiring in established firms, where women are more likely to hire other women (Bossler et al., 2020), and promote women (Kunze and Miller, 2017) and links to processes of assortative matching in labour markets (Becker 1971).

Despite the difficulties of startups in attracting workers (Nyström, 2021) and the costs associated with initial hiring (Coad et al., 2017), the first hiring decisions are often critical for the success and survival of start-ups (Geroski et al., 2010; Koch et al. 2013; Fackler et al. 2019; Choi et al. 2022). While there is a growing body of literature on job creation and the hiring of initial human capital in entrepreneurship (Coad et al, 2017; Fairlie & Miranda, 2017; Caliendo et al., 2022), this review reveals that the exploration of gender differences in this context has not been extensively researched, and the findings that do exist are of a general nature and do not take a specific gender perspective on hiring and job creation.

However, understanding early hiring practices within female-led new ventures could be a key factor in furthering our understanding of why the proportion of women engaging in entrepreneurship and their success rates as entrepreneurs remain relatively low. In our study, we investigate the effect of the gender of the CEO on the hiring process during the very early phase, the first year. Our question is whether the gender of the CEO at the founding stage of a new venture is related the subsequent hiring pattern at the intensive and extensive margin. In addition, we present estimates on the interacted effects of the gender of the CEO and whether the newly recruited has children which relates to the previously reviewed literature.

Data and Sample

To test our research questions, we use the population of startup firms extracted from the Norwegian register data. Particularly, we merged several registers containing individual and establishment level information. Our starting point was the enterprise registry, which enabled us to identify all new ventures with a unique anonymized organisation number in Norway from

2004 to 2013. We focus on this period due to information constraints. Specifically, detailed information on CEO identification is unavailable prior to 2004, and data on hiring practices for these firms is missing beyond 2013, a point we will revisit shortly.

Identifying genuine new ventures is not a straightforward task. Solely relying on the first registration date would inadvertently include already established firms that, due to various events, were assigned a new registration number. These events could include changes in ownership, major-reorganizations, mergers or acquisitions, splitting up existing organizational units, or the establishment of a subsidiary. To ensure that we only use new ventures, we impose several restrictions to ensure we eliminate these other events and identify genuinely newly established firms. From the firm register, we limit our sample to private limited corporations (“AS” or "aksjeselskap" in Norwegian) with a valid registration date that does not precede the first date we observe this establishment identifier in the register. We include only firms that are not owned by a foreign entity or have an already established firm owning 50 percent or more of the new venture. Ownership is determined by merging the establishment register with the shareholder register. We also exclude all instances where ownership cannot be identified.

By utilizing the employer-employee register, we applied additional restrictions concerning employee characteristics. Firstly, we drop ventures where an employee was registered as employed already before the firm’s foundation date. Secondly, we excluded all new ventures that had 50 or more employees in their founding year.⁴ Thirdly, for new registrations with 10 to 50 employees, we removed all firms where 50 percent or more of the employees came from the same previous employer, as this could indicate a corporate spinoff or re-organization rather than a genuinely new venture.

⁴ A manual inspection of the Norwegian firm register, the Brønnøysund register, showed that none of the new registrations with at least 50 employees in the year of founding were genuinely new ventures.

We also implemented a minimum activity requirement for these new ventures, requiring them to have been registered as active in both the first and second year since foundation, and to have demonstrated non-zero payroll costs or sales. Additionally, we applied industry restrictions, excluding new registrations in the primary sectors and public sector industries, which also encompass utility services. Furthermore, we excluded new registrations in industries primarily established to act as investment vehicles, including financial intermediaries and sectors focused on buying, selling, renting, and operating real estate. Lastly, we removed membership organizations, sectors involving activities of households and domestic personnel, and extraterritorial organizations and bodies. After imposing this set of restrictions, we were left with a sample of 59,910 newly registered ventures, or startups, with at least one employee during the first year after foundation followed until 2013.

Identifying Owners, CEOs, Boards Members, and Employees

After selecting the sample of new ventures, we proceeded to link individual owners, CEOs, and board members along with their demographic characteristics to the new ventures. To identify owners, we once again relied on the shareholder database, defining an individual as an owner if they held at least a 10 percent ownership stake in the new venture. Having identified the owners, we merged our dataset with the Norwegian board-member database, which includes information on board members as well as registered CEOs of the ventures. We excluded new ventures where a CEO could not be identified ($n=7,513$)⁵ and ventures with more than one identified CEO ($n=114$), resulting in a sample of 52,283. Due to missing observations on CEO characteristics as well as the empirical strategy to include narrowly defined geographies and industries, we lose an additional 927 observations.

⁵ While more than 12.5 percent of the sample of new ventures fall into this category, these ventures are considerably less likely to hire, with only 16.7 percent employing at least one person. Moreover, they hire an average of 0.62 employees, equating to 0.41 full-time equivalents.

Using the employee-employer linked database, we can identify the employees that joined the startup in the 12 months after the registration of the new venture including the full-time equivalent (FTE) of their position so we can identify if the person works full- or parttime. This database provides us with information on the exact date when an employee joined; however, this data is only available until 2014. In total we identified 46,346 employees hired during the first year since foundation of 14,126 firms. Only one of the new ventures in our sample hired 323 employees in the first year. 257 workers were hired in the first hiring wave in the fourth month, which raises the suspicion that this hiring is the result of a restructuring. Subsequently, we removed this one firm from our sample. All other ventures recruit between 0 and 82.⁶ Our final sample thus consists of 51,354 firms and 46,023 individuals that are hired.

Besides identifying the roles an individual holds in the new ventures, the unique personal identifier also enabled us to merge individual-level characteristics, including demographic information, family status and ties, labour market status in the year prior to founding, and data on income and wealth. Utilizing this information, we constructed the main variables for our analysis. For the firm-level analysis, we developed several hiring characteristics as our main dependent variables. Firstly, we created a dummy variable to indicate whether the firm hires, the total number of workers they hire, and the total full-time equivalent (FTE) they have hired in the first 12 months. As our main set of independent variables, we developed four sets of variables indicating male owner CEOs, female owner CEOs, male non-owner CEOs, and female non-owner CEOs.

Beyond the main variables, we also developed measures for founding team size and gender diversity of the founding team. First, we created a measure indicating the size of the founding teams by a metric that only includes the CEO and the owners. Additionally, we created a

⁶ The average new venture hires 0.89 employees, but conditional on hiring the average increases to 3.25 employees (see Table 2).

measure of the number of women on the board and among the owners, here we exclude the female CEO. We also created a dummy variable to indicate whether the new venture is a family firm, defined by the presence of a family relationship among the owners, or between the CEO or board members and at least one of the owners. Furthermore, we utilized the family tie indicator to identify if any of the early joining employees were related to any of the owners.

We also recognize the importance of financial resources and the human capital characteristics of the founding team as determinants for hiring. For this reason, we included a measure of the amount of financial resources available to the new ventures by calculating the monetary sum of equity and debt. Due to the skewed distribution of this sum, we applied the natural logarithm to this measure. To measure human capital, we created a dummy variable indicating whether the CEO had a tertiary level education or higher. Additionally, we use variables for the age and Norwegian citizenship of the CEO. We also introduced several control variables into our analysis. For industry controls, we utilized the four-digit NACE rev.2 industry codes. Moreover, for regional controls for location of the venture, we created dummy variables representing 91 economic regions (Gundersen & Jukvam, 2013).

Empirical Approach

Although we interpret our results as descriptive correlations, our study design follows the timing of events method to reduce biases through contaminating factors affecting hiring and the members of the founding team, and their demographics. We carefully identify new ventures as described and identify the founding team as it is formed at the founding time of the start-up. After the new venture is registered, we observe hiring during the first twelve months. Given the timing of these two events, we broadly can exclude that who is hired during the first year is affecting the founding team. Since the founding team has been first formed, it is interesting to analyse whether the start-up firm is hiring and who is hired during the first year. The first year can be instrumental for survival of the firm which is why it is interesting to analyse this phase.

Since we have data on employment spells from employment statistics, we can accurately observe the start calendar date of an employment contract in any of our start-up firms in our sample.

For illustration, we specify a linear regression model where the main outcome is measuring hiring as a binary outcome. We estimate the regression by ordinary least squares as well as by probit estimation and present mostly estimates from the probit estimation method:

$$\begin{aligned}
 Hire_{jt} = & \alpha + \beta_1 * CEO * Owner * Female_{jit} + \beta_2 * CEO * Non - Owner_{jit} + \beta_3 * CEO \\
 & * Non - Owner * Female_{jit} * + \beta_4 * X_i + \beta_5 F_{jt} + \beta_6 Ind_j + \beta_7 * region_j \\
 & + u_{jit}
 \end{aligned}$$

Where j indexes the new venture and t the time period, t=2004,..., 2013. Hiring is measured either as a binary variable, to hire (=1) or not (zero), or number of (full-time equivalent) hired persons in the first year. The key explanatory variables are those describing the composition of the board with respect to the roles and gender in the founding team. The reference group are male CEOs who are also the owner, and the variables included are whether the CEO is owner and female, CEO and non-owner, CEO and non-owner and female. In addition, we include a dummy variable for whether at least one (two) member(s) are female among the owners and the board of directors (bod) excluding the CEO. In addition, we control for individual-varying characteristics of the CEO that is educational level, age, and Norwegian citizenship. We also control for time-varying characteristics describing the venture that are the sum of equity and debt (in logarithmic form), and the characteristics of the founding team that is number of members, whether it is a family firm. Crucial we control for rich set of dummy variables for industry (four-digit level) and economic region. Therefore, our estimates can be interpreted as the differential effect of a female member in the founding team distinguished by role, holding

constant individual and venture characteristics including industry. This means that differential effects are not driven by the strong gender segregation across industries.

Descriptive statistics on our sample

In Table 1, we present an overview of how new ventures are distributed over the years. We observe that 3,359 to 4,339 new ventures were founded per year over the period 2004 to 2010. A noticeable increase in the number of startups happens in 2011, with an even larger increase in 2012 and 2013. This increase happens in the same year as a change in capital requirements for establishing a new firm. In 2011 it was decreased from 100,000 NOK to 30,000 NOK for private limited corporations.⁷

INSERT TABLE 1 AROUND HERE

In Table 2, we present descriptive statistics at the firm level for our sample of all ventures, and ventures that hire at least one employee during the first year since foundation. Most firms do not hire during the first year, but a bit less than a third does. On average, firms hire 0.90 employees in their first year, with an average full-time equivalent (FTE) of 0.70. Conditional on hiring, the average number of employees hired is 3.26, with an FTE of 2.56. Just over 18 percent of new ventures have a female CEO. Although the proportion of new ventures with a female CEO is lower compared to those with male CEOs, the share of new ventures that hire at least one worker is significantly higher for those led by female CEOs. Furthermore, we observe that the average size of the founding team, consisting of the CEO and the owners, is slightly larger among new ventures that hire. Firms that hire have also a large-sum of equity and debt at the mean. 36.8 percent of CEOs have tertiary education, yet this share is lower among CEOs of new ventures that hire. New ventures that hire also tend to have slightly younger CEOs and are

⁷ When one considers the ability or decision of a new venture to hire as a signal its quality, one might argue that the average quality of new ventures has declined due to the reduced capital requirements.

more likely to have CEOs who are not Norwegian citizens. 29.3 percent of all firms in our sample are family firms, and the share is the same among firms that hire.

There are also clear differences between male and female CEOs. Female CEOs are on average 2 years younger and higher educated. They have less combined equity and debt. They are part of a larger founding team and to a larger extent part of a new venture this is classified as a family firm. As we already showed in Table 2, female CEOs are more likely to hire. It appears from the descriptives in Table 3, that women are more likely to hire other women, and less likely to hire men. Female CEOs appear also to hire fewer FTE.

INSERT TABLE 2 AROUND HERE

INSERT TABLE 3 AROUND HERE

Estimation Results

In Table 4, we present our first results of the firm-level analysis. Model 1 estimates a probit model where the outcome variable is a binary variable indicating whether the new venture hired at least one employee in the 12 months following the startup's registration or not; Model 2 displays for the same outcome and model specification the marginal effects predicted at the mean. The analysis shows that non-owner CEOs are more likely to hire compared to their owner-CEO counterparts, suggesting that the appointment of a non-owner CEO may indicate the board's growth ambitions. Within these categories, female CEOs are more likely to hire than male CEOs. Specifically, the hiring rate for ventures led by female CEO owners is 3.18 percentage points higher than the male CEO owner baseline.

For male non-owner CEOs, the hiring rate is 1.2 percentage points higher, while for female non-owner CEOs, the difference is approximately 9.1 percentage points. Interestingly, having women in top positions other than CEO decreases the likelihood of hiring. Looking at the other control variables that we have included in the specification, it is observed that new ventures

with larger founding teams are more likely to hire, whereas family firms are less likely to. More financial capital is positively associated with the likelihood of hiring. Further analysis of CEO characteristics reveals that Norwegian CEOs, those with higher education, and older individuals are less likely to expand their workforce from zero to at least one employee.

In Model 3, we shifted the focus of the dependent variable from general hiring practices to the specific hiring of non-family members, with Model 4 presenting the marginal effects predicted at the mean. As we have already shown in Table 1, approximately 9 percent of firms-hire staff exclusively employ family members. The insights from Model 3 suggest that the tendency to hire family members is more common among new ventures led by owner-CEOs, irrespective of their gender. Although the sizes of the coefficients differ, a significant observation is that male non-owner CEOs demonstrate a higher propensity to hire when compared to their owner-CEO counterparts.

INSERT TABLE 4 AROUND HERE

Hence, a first result is that hiring differs between ventures led by an owner or not-owner CEO and depending on the gender of the CEO. We continue our investigation to determine if there are differences in the genders composition of the employees who are being hired. To do this, we changed the binary dependent variable from “Hire” to “Hire Women” and “Hire Men”. For ease of presentation, the main coefficients from this regression are plotted in Figure 1 and are compared as a baseline with the coefficients from Model 1; the full table is available in the appendix of the paper.

The figure reveals significant differences in hiring practices related to gender. Female CEOs are more likely to hire women than men. Moreover, while female non-owner CEOs are more likely to hire men compared to male owner-CEOs, female owner-CEOs are less likely to hire men in the first 12 months after founding. Note that these results do not reflect gender

segregation in labour markets regarding industries since our estimates are conditional on industries and hence can be interpreted as within industries. In addition, as in all the models, we controlled for founding year and region.

INSERT FIGURE 1 AROUND HERE

Thus, the empirical evidence clearly points in the direction that female CEOs in new ventures are more likely to hire compared to their male counterpart, and that assortative matching takes place when hiring occurs. We now extend our analysis to look at the number of employees who are being hired, both as a total number of employees but also in terms of full-time equivalent.

INSERT TABLE 5 AROUND HERE

The findings regarding hiring differences by ownership and gender change when we look at determinants of total number of employees hired (see Table 5). We estimate the same specification but now by a linear regression model due to the continuous nature of the outcome variable. Linear estimation of Model 5 shows that while non-owner CEOs are more likely to hire than CEOs who are also owners, and do hire more, there are no significant differences between female owner-CEOs and their male owner-CEO counterparts. However, female non-owner CEOs still appear to hire more workers. These patterns are robust when we use change the dependent variable from employment count to employment measured in full-time equivalent workers (see Model 7). Conditional upon hiring at least one worker, the pattern shifts “in favor” of hiring by male CEOs.⁸ Hence, male CEOs are more likely to hire more when they hire than female CEOs; hence to grow the business. Both Model 6 and Model 8 demonstrate that female owner-CEOs hire fewer employees and a lower number of full-time equivalents. Thus, while women are indeed more likely to hire, they tend to recruit fewer employees beyond the first one, and there is an indication that these employees are more likely to be part-time

⁸ Additionally, we also see that the education variable changes the sign.

workers (we return to this in the following section). This is at least what we find for during the first year of the new venture. When considering the gender of employees hired (see Figure 2), the findings from Figure 1 regarding assortative matching are confirmed: female CEOs tend to hire more women—not necessarily in terms of full-time equivalents—than men, and fewer men compared to their male CEO fellows.

INSERT FIGURE 2 ABOUT HERE

Characteristics of the employees

While we see a difference in hiring between female and male CEOs, we will explore differences among those who are being hired, particularly focusing on differences between male and female hires. In Table 6, we present individual level characteristics of 42,603 employees that are hired⁹, just over 40 percent of the hires are female. When it comes to calculation of full time equivalent, these hires have a contract with an average of 0.776 FTE, which runs just short of a four-day work week, but men work well over 4 days, while women work 3.5 days on average. When making a distinction between full-time and part-time workers more than half of the women being hired work under part-time contracts, which we defined as a contract for less than 30 hours a week. As we already established in the previous section, CEOs hire a larger share of females while male CEOs are more likely to hire men. Other differences we observe are that female hires are younger on average, are more likely to be in family with a person in the founding team and more likely to be hired into a family firm. The share of men among immigrants is higher.

INSERT TABLE 6 ABOUT HERE

In Table 7 and Table 8 we turn our attention to FTE calculation and part-time employment status respectively to get some indication on what is driving how many hours a worker is hired

⁹ The number is lower compared to our total number of 46,023 hires due to missing observation for marital status.

for in the new venture. Across the models in Table 7, female hires work 10 percentage points less compared to male hires, which corresponds to half a workday per week on average less. In Table 8 we also demonstrate that women are significantly more likely to be employed as a part-time employee, i.e. 13 percent points more (See Model 13). In addition, as the results in Table 5 indicated, those who are hired by female CEOs work fewer hours. Workers hired by women work additional 2 hours less compared to the male owner CEO baseline (see Table 7) and are significantly more likely to be hired as parttime workers (above 5 percent points more). The interaction effects presented in Model 10, demonstrate that non-owner CEO hire women for more hours compared to owner-CEOs.

What might be worth noting is the fact that hires with children work more in our sample of startups compared to hires without children (0,78 hours per child and 2 hours if the child is below 6 years) and are less likely to be part-time workers. Even more so, it appears that women with children work more compared to males with children across all ages, only offset slightly if they have children below the age of 6.

INSERT TABLE 7 AROUND HERE

Discussion

Previous research has extensively documented the pervasive gender gap in entrepreneurship, highlighting that women are less likely than men to enter and succeed in entrepreneurship (OECD, 2023). This gap is often attributed to structural barriers that women face when establishing and running their new venture, where most research has concentrated on gender disparities in early-stage mobilization of financial capital (Gicheva & Link, 2015; Kanze et al 2018; Guzman & Kacperczyk, 2019). This study extends this literature by exploring gender dynamics at a different, yet equally critical, phase: the hiring during the first year of a new venture's operation. By addressing the gender gap at this early stage, we assess the relative

impact of gender diversity within founding teams—specifically the roles of CEO, owner, and board members—on hiring outcomes.

We have used high quality merged employer-employee matched register data to generate a data set containing the population of new ventures, where we can observe the sequence of events of registering the new venture and the founding team, and afterwards hiring. We have carefully defined new ventures and can exclude other reasons why as if new ventures appear in registers, including re-organisations and change of ownership where one would observe the same employees and leadership in a firm.

Our evidence is contributing with new empirical evidence to a sparse literature on whether a new venture is expanding the input factor labour and who is hiring during the first year of a new venture and the impact of gendered entrepreneurial behaviour using high quality population register data. We find that female CEOs are more likely to hire at least one employee during the first year, which contrasts previous findings that women are less likely to recruit a first employee (Fairlie et al. 2017; Coad et al., 2017; Caliendo et al. 2022). However, our findings adjusting for hours of work or converting number of workers into full-time adjusted employee contracts is consistent with the finding that male entrepreneurs recruit more workers (Henley, 2005; Burke et al. 2002).

A closer look at hiring practices reveals that the lower rate of hiring by female entrepreneurs can be attributed to the fact that they hire fewer men, as female entrepreneurs are more likely to hire female employees. Thus, we observe distinct assortative matching patterns among these entrepreneurs. The question remains open on what drives these matching patterns. On the one side selection might be at play, female CEOs do not select men and/or male employees do not want to work for female CEOs. Alternatively, despite controlling for industry, gender segregation in selecting industries might drive some of the results. To illustrate, retail in clothing is an industry with relatively high rates of hiring. At the same time, this is a sector with

relatively more women CEOs, and an underrepresentation of male employees; especially in clothing stores that specialize in female garments.

Our evidence is also contributing to the literature with novel evidence on the characteristics of who is being hired. Among the first employees, there is a lower representation of females at 41 percent. However, this figure is higher compared to previous studies (Coad et al., 2017). Female workers, however, work significantly fewer hours—nearly a full working day less—which also means that they are more likely to be employed part-time. Additionally, female CEOs tend to hire workers for fewer hours and are more likely to hire part-time employees. Thus overall, female CEOs are more likely to expand their business by hiring part-time female employees. This nuanced perspective underscores the complexity of the gender gap, suggesting that while women are actively engaging in entrepreneurship, their ventures' growth and employment patterns differ markedly from those led by men.

An additional finding that contradicts commonly held beliefs is the fact that women with children work more hours compared to female employees without children. A potential explanation is that working for a startup offers flexibility that established employers cannot match.

Conclusions

In this study, we have exploited Norwegian employer-employee matched data for the period 2004 to 2013 to analyse hiring practices during the first year of operation in new ventures, focusing specifically on the impact of gender diversity within founding teams. Our research reveals that teams with a female CEO are more likely to make hires during the first year, often involving fewer working hours and a higher likelihood of offering part-time positions compared to hires made by male CEOs. This suggests that female-led new ventures may offer more flexible working conditions, potentially allowing employees to better coordinate work with

personal life, an aspect that could be particularly appealing to women, especially those with children.

The findings are robust across various industry sectors and remain significant after adjusting for a variety of venture characteristics, such as team size, whether the business is family-owned, and regional and yearly variations. Investigating recruiting behaviour of new ventures and differential effects of gender of the CEO is important for shedding new light on the understanding of how new ventures perform during the first year of activity, and whether women forming a new venture perform equal, worse, or better than men. The main body of research on new ventures has focused on capital acquisition during the first year through loans or equity and the effect on success showing that women are more credit constrained that may prevent them to become an entrepreneur and if so, be as successful as men.

Overall, this study contributes to the understanding of gender diversity in founding team and sets the stage for further inquiries into how these dynamics influence broader economic and societal outcomes. As such, it highlights the importance of considering gender when developing policies and practices intended to support entrepreneurship.

Limitations and future research

This study is not without its limitations. While robust, the reliance on Norwegian data limits the generalizability of findings to other contexts, particularly in less gender-equal countries, where gender-based entrepreneurial and subsequent hiring behaviours may differ. Future research could address this issue by replicating this study in other geographic contexts. Additionally, focusing solely on the first year does not capture the long-term implications of early hiring decisions. Future studies could explore these implications in terms of survival and growth, including the recruitment of workers.

In this study we make use on the sequence of events to partly capture possible causal relations between gender. Nevertheless, precisely establishing causality between the gender composition of founding teams and hiring outcomes remains complex, with potential underlying unmeasured variables affecting the observed relationships. Thus, Further research is needed to understand the causal mechanisms behind gender-difference in hiring decisions and their eventual impact on new venture performance.

Finally, although assortative hiring patterns were observed, the underlying motivations and mechanisms remain unexplored. For these reasons, future research should delve deeper into the causes of the gender differences observed. For example, studies could investigate whether these hiring patterns are a strategic choice or a consequence of external pressures, labor market selection, and/or financial constraints.

References

- Aghion, P., & Howitt, P. (2017). Some thoughts on capital accumulation, innovation, and growth. *Annals of Economics and Statistics/Annales d'Économie et de Statistique*, (125/126), 57-78.
- Alsos, G. A., Isaksen, E. J., & Ljunggren, E. (2006). New venture financing and subsequent business growth in men–and women–led businesses. *Entrepreneurship Theory and Practice*, 30(5), 667-686.
- Becker, G. S. (1971). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago press.
- Bhide, A. (2000). *The origin and evolution of new businesses*. Oxford University Press, USA.
- Blanchflower, D. G., Oswald, A., & Stutzer, A. (2001). Latent entrepreneurship across nations. *European Economic Review*, 45(4-6), 680-691.
- Bönte, W., & Piegeler, M. (2013). Gender gap in latent and nascent entrepreneurship: driven by competitiveness. *Small Business Economics*, 41, 961-987.
- Bosma, N., Hessels, J., Schutjens, V., Van Praag, M., & Verheul, I. (2012). Entrepreneurship and role models. *Journal of Economic Psychology*, 33(2), 410-424.
- Bosler, M., Mosthaf, A., & Schank, T. (2020). Are female managers more likely to hire more female managers? Evidence from Germany. *ILR Review*, 73(3), 676-704.

- Brana, S. (2013). Microcredit: an answer to the gender problem in funding? *Small Business Economics*, 40, 87-100.
- Brush, C. G., de Bruin, A., & Welter, F. (2014). *Advancing theory development in venture creation: signposts for understanding gender*. In *Women's Entrepreneurship in the 21st Century* (pp. 11-31). Edward Elgar Publishing.
- Burke, A. E., Fitzroy, F. R., & Nolan, M. A. (2002). Self-employment wealth and job creation: The roles of gender, non-pecuniary motivation and entrepreneurial ability. *Small Business Economics*, 19, 255-270.
- Caliendo, M., Fossen, F. M., & Kritikos, A. S. (2022). Personality characteristics and the decision to hire. *Industrial and Corporate Change*, 31(3), 736-761.
- Caliendo, M., Fossen, F. M., Kritikos, A., & Wetter, M. (2015). The gender gap in entrepreneurship: Not just a matter of personality. *CESifo Economic Studies*, 61(1), 202-238.
- Carter, N., Brush, C., Greene, P., Gatewood, E., & Hart, M. (2003). Women entrepreneurs who break through to equity financing: the influence of human, social and financial capital. *Venture Capital: an International Journal of Entrepreneurial Finance*, 5(1), 1-28.
- Coad, A., Nielsen, K., & Timmermans, B. (2017). My first employee: an empirical investigation. *Small Business Economics*, 48, 25-45.
- Dahl, M. S., & Reichstein, T. (2007). Are you experienced? Prior experience and the survival of new organizations. *Industry and Innovation*, 14(5), 497-511.
- Darnihamedani, P., & Terjesen, S. (2022). Male and female entrepreneurs' employment growth ambitions: The contingent role of regulatory efficiency. *Small Business Economics*, 58(1), 185-204..
- Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing*, 18(3), 301-331.
- Devine, R. A., Molina-Sieiro, G., Holmes Jr., R. M., & Terjesen, S. A. (2019). Female-Led high-growth: Examining the role of human and financial resource management. *Journal of Small Business Management*, 57(1), 81-109.
- Dilli, S., & Westerhuis, G. (2018). How institutions and gender differences in education shape entrepreneurial activity: a cross-national perspective. *Small Business Economics*, 51, 371-392.
- Elam, A. B., Brush, C. G., Greene, P. G., Baumer, B., Dean, M., Heavlow, R., & Global Entrepreneurship Research Association. (2019). *Women's entrepreneurship report 2018/2019*.
- Evans, D. S., & Leighton, L. S. (1989). Why do smaller firms pay less? *Journal of Human Resources*, 299-318.
- Evans, D. S., & Jovanovic, B. (1989). An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy*, 97(4), 808-827.

- Fackler, D., Fuchs, M., Hölscher, L., & Schnabel, C. (2019). Do start-ups provide employment opportunities for disadvantaged workers? *ILR Review*, 72(5), 1123-1148.
- Fairlie, R. W., & Miranda, J. (2017). Taking the leap: The determinants of entrepreneurs hiring their first employee. *Journal of Economics & Management Strategy*, 26(1), 3-34.
- Fairlie, R. W., & Robb, A. M. (2009). Gender differences in business performance: evidence from the Characteristics of Business Owners survey. *Small Business Economics*, 33, 375-395.
- Field, E., Jayachandran, S., Pande, R., & Rigol, N. (2016). Friendship at work: Can peer effects catalyze female entrepreneurship? *American Economic Journal: Economic Policy*, 8(2), 125-153.
- Fossen, F. M. (2012). Gender differences in entrepreneurial choice and risk aversion—a decomposition based on a microeconomic model. *Applied Economics*, 44(14), 1795-1812.
- Fontenay, S. (2024): How can paid maternity leave boost female self-employment?, *Journal of Human Resources*, forthcoming.
- Germann, F., Anderson, S. J., Chintagunta, P. K., & Vilcassim, N. (2023). Frontiers: Breaking the Glass Ceiling: Empowering Female Entrepreneurs Through Female Mentors. *Marketing Science*, 43(2), 244-253.
- Geroski, P. A., Mata, J., & Portugal, P. (2010). Founding conditions and the survival of new firms. *Strategic Management Journal*, 31(5), 510-529.
- Gicheva, D., & Link, A. N. (2015). The gender gap in federal and private support for entrepreneurship. *Small Business Economics*, 45, 729-733.
- Gompers, P. A., & Wang, S. Q. (2017). *Diversity in innovation* (No. w23082). National Bureau of Economic Research.
- Greenberg, J., & Mollick, E. (2017). Activist choice homophily and the crowdfunding of female founders. *Administrative Science Quarterly*, 62(2), 341-374.
- Grilo, I., & Irigoyen, J. M. (2006). Entrepreneurship in the EU: to wish and not to be. *Small Business Economics*, 26, 305-318.
- Gundersen, F. & Jukvam, D. (2013) *Inndelinger i senterstruktur, sentralitet og BA regioner*. NIBR-rapport 2013-1
- Guzman, J., & Kacperczyk, A. O. (2019). Gender gap in entrepreneurship. *Research Policy*, 48(7), 1666-1680.
- Halabisky, D. & Shymanski, H. (2023), "Gender gaps in entrepreneurship remain", in *Joining Forces for Gender Equality: What is Holding us Back?*, OECD Publishing, Paris,
- Halvorsen, E., & Raknerud, A. (2020). Er familiesituasjonen en barriere for kvinnelig entreprenørskap? *Magma*, 23(3), 58-65.
- Henley, A. (2005). Job creation by the self-employed: The roles of entrepreneurial and financial capital. *Small Business Economics*, 25, 175-196.

- Jennings, J. E., Rahman, Z., & Dempsey, D. (2023). Challenging what we think we know: Theory and evidence for questioning common beliefs about the gender gap in entrepreneurial confidence. *Entrepreneurship Theory and Practice*, 47(2), 369-397.
- Koch, A., Späth, J., & Strotmann, H. (2013). The role of employees for post-entry firm growth. *Small Business Economics*, 41, 733-755.
- Kunze, A., & Miller, A. R. (2017). Women helping women? Evidence from private sector data on workplace hierarchies. *Review of Economics and Statistics*, 99(5), 769-775.
- Lassébie, J., Sakha, S., Kozluk, T., Menon, C., Breschi, S., & Johnstone N. (2019). *Levelling the playing field: Dissecting the gender gap in the funding of start-ups*. OECD Science, Technology and Industry Policy Papers, No. 73, OECD Publishing, Paris, <https://doi.org/10.1787/7ddddd07-en>.
- Lins, E., & Lutz, E. (2016). Bridging the gender funding gap: do female entrepreneurs have equal access to venture capital? *International Journal of Entrepreneurship and Small Business*, 27(2-3), 347-365.
- Manolova, T. S., Carter, N. M., Manev, I. M., & Gyoshev, B. S. (2007). The differential effect of men and women entrepreneurs' human capital and networking on growth expectancies in Bulgaria. *Entrepreneurship theory and practice*, 31(3), 407-426.
- Markussen, S., & Røed, K. (2017). The gender gap in entrepreneurship—The role of peer effects. *Journal of Economic Behavior & Organization*, 134, 356-373.
- McAdam, M., Harrison, R. T., & Leitch, C. M. (2019). Stories from the field: Women's networking as gender capital in entrepreneurial ecosystems. *Small Business Economics*, 53, 459-474.
- McGrath, P. J., Chen, T., & Nerkar, A. (2022). Pipes, prisms, and patent sales: How personal wealth expands and contracts the gender gap in entrepreneurship. *Strategic Entrepreneurship Journal*, 16(2), 355-380.
- Morazzoni, M., & Sy, A. (2022). Female entrepreneurship, financial frictions and capital misallocation in the US. *Journal of Monetary Economics*, 129, 93-118.
- Nanda, R., & Sørensen, J. B. (2010). Workplace peers and entrepreneurship. *Management Science*, 56(7), 1116-1126.
- Neumeyer, X., Santos, S. C., Caetano, A., & Kalbfleisch, P. (2019). Entrepreneurship ecosystems and women entrepreneurs: A social capital and network approach. *Small Business Economics*, 53, 475-489.
- Nyakudya, F. W., Simba, A., & Herrington, M. (2018). Entrepreneurship, gender gap and developing economies: the case of post-apartheid South Africa. *Journal of Small Business & Entrepreneurship*, 30(4), 293-324.

- Nyström, K. (2012, September). *Entrepreneurial employees: Are they different from independent entrepreneurs*. In Research Network Debate. Swed. Entrep. Forum (Vol. 10, pp. 1-12).
- Nyström, K. (2021). Working for an entrepreneur: heaven or hell?. *Small Business Economics*, 56, 919-931.
- OECD (2023). *Joining Forces for Gender Equality: What is Holding us Back?*, OECD Publishing, Paris, <https://doi.org/10.1787/67d48024-en>.
- Ouimet, P., & Zarutskie, R. (2014). Who works for startups? The relation between firm age, employee age, and growth. *Journal of Financial Economics*, 112(3), 386-407.
- Orser, B. J., Riding, A. L., & Manley, K. (2006). Women entrepreneurs and financial capital. *Entrepreneurship Theory and practice*, 30(5), 643-665.
- Rocha, V., & Van Praag, M. (2020). Mind the gap: The role of gender in entrepreneurial career choice and social influence by founders. *Strategic Management Journal*, 41(5), 841-866.
- Rocha, V., Van Praag, M., Folta, T. B., & Carneiro, A. J. M. (2016). *Entrepreneurial choices of initial human capital endowments and new venture success*.
- Romer, P. M. (1990). Endogenous technological change. *Journal of political Economy*, 98(5, Part 2), S71-S102.
- Sauer, R. M., & Wiesemeyer, K. H. (2018). Entrepreneurship and gender: differential access to finance and divergent business value. *Oxford Review of Economic Policy*, 34(4), 584-596.
- Sauer, R. M., & Wilson, T. (2016). The rise of female entrepreneurs: New evidence on gender differences in liquidity constraints. *European Economic Review*, 86, 73-86.
- Shahriar, A. Z. M. (2018). Gender differences in entrepreneurial propensity: Evidence from matrilineal and patriarchal societies. *Journal of Business Venturing*, 33(6), 762-779.
- Simmons, S. A., Wiklund, J., Levie, J., Bradley, S. W., & Sunny, S. A. (2019). Gender gaps and reentry into entrepreneurial ecosystems after business failure. *Small Business Economics*, 53, 517-531.
- Snellman, K., & Solal, I. (2023). Does investor gender matter for the success of female entrepreneurs? Gender homophily and the stigma of incompetence in entrepreneurial finance. *Organization Science*, 34(2), 680-699.
- Stevenson, H. H., & Jarillo, J. C. (2007). A paradigm of entrepreneurship: Entrepreneurial management. In *Entrepreneurship: Concepts, Theory and Perspective* (pp. 155-170). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Stuart, T., & Sorenson, O. (2003). The geography of opportunity: spatial heterogeneity in founding rates and the performance of biotechnology firms. *Research Policy*, 32(2), 229-253.

Thébaud, S. (2015). Business as plan B: Institutional foundations of gender inequality in entrepreneurship across 24 industrialized countries. *Administrative Science Quarterly*, 60(4), 671-711.

Thébaud, S., & Sharkey, A. J. (2016). Unequal hard times: The influence of the great recession on gender bias in entrepreneurial financing. *Sociological Science*, 3, 1-31.

Tonoyan, V., Strohmeier, R., & Jennings, J. E. (2020). Gender gaps in perceived start-up ease: Implications of sex-based labor market segregation for entrepreneurship across 22 European countries. *Administrative Science Quarterly*, 65(1), 181-225.

Verheul, I., & Thurik, R. (2001). Start-up capital: " does gender matter?" *Small Business Economics*, 16, 329-346.

Verheul, I., Thurik, R., Grilo, I., & Van der Zwan, P. (2012). Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality. *Journal of Economic Psychology*, 33(2), 325-341.

Weber, A., & Zulehner, C. (2010). Female hires and the success of start-up firms. *American Economic Review*, 100(2), 358-361.

Table 1: New ventures per year

Year	New ventures		
	All ventures	Ventures that hire	<i>% that hire</i>
2004	3,359	1,125	33.5 %
2005	4,090	1,195	29.2 %
2006	4,339	1,232	28.4 %
2007	4,812	1,380	28.7 %
2008	4,281	1,244	29.1 %
2009	3,604	1,151	31.9 %
2010	4,021	1,270	31.6 %
2011	5,161	1,473	28.5 %
2012	9,289	2,190	23.6 %
2013	8,398	1,866	22.2 %
Total	51,354	14,125	27.5 %

Table 2: Firm level descriptives

Variable	New Ventures			
	all (n=51,354)		that hire (n=14,126)	
	Mean	SD	Mean	SD
Hiring	0.275	0.447		
Hiring (no family)	0.253	0.435	0.919	0.272
Hiring women	0.148	0.355	0.538	0.499
Hiring men	0.196	0.400	0.713	0.453
Total # hires	0.896	2.583	3.258	4.070
Total # women hire	0.356	1.276	1.293	2.169
Total # men hire	0.540	1.888	1.964	3.187
Total FTE hires	0.704	2.173	2.563	3.523
Total FTE women hire	0.231	0.861	0.840	1.478
Total FTE men hire	0.474	1.759	1.722	3.016
Female owner CEO	0.165	0.371	0.200	0.400
Female non-owner CEO	0.019	0.135	0.027	0.163
Male non-owner CEO	0.059	0.236	0.065	0.246
Male owner CEO	0.758	0.428	0.708	0.455
Tertiary education CEO	0.372	0.483	0.301	0.458
Age CEO	42.235	10.584	40.572	9.910
Norwegian citizen CEO	0.944	0.230	0.930	0.256
Sum equity and debt (log)	6.235	1.472	6.797	1.198
1 woman among owners and BoD (excl CEO)	0.203	0.403	0.203	0.402
2+ women among owners and BoD (excl CEO)	0.025	0.157	0.027	0.161
Founding team size	1.778	0.867	1.843	0.883
Family firm	0.293	0.455	0.294	0.456

Table 3: Descriptives and t-test on male and female CEOs

	Male CEO (n=41,949)	Female CEO (n=9,405)	t-value
Age	42.65	40.37	18.97
Norwegian citizen	0.94	0.94	0.74
Tertiary education	0.36	0.43	-14.13
Sum equity and debt (ln)	6.28	6.05	13.65
Founding team size	1.77	1.81	-4.14
Family firm	0.26	0.43	-32.70
Hire	0.26	0.34	-16.08
Hire men	0.21	0.13	18.29
Hire women	0.11	0.29	-42.21
Total hires	0.87	1.00	-4.50
Total hires men	0.60	0.28	14.92
Total hire women	0.27	0.73	-31.46
FTE hires	0.71	0.64	3.02
FTE hires men	0.53	0.21	15.95
FTE hires women	0.19	0.43	-25.03

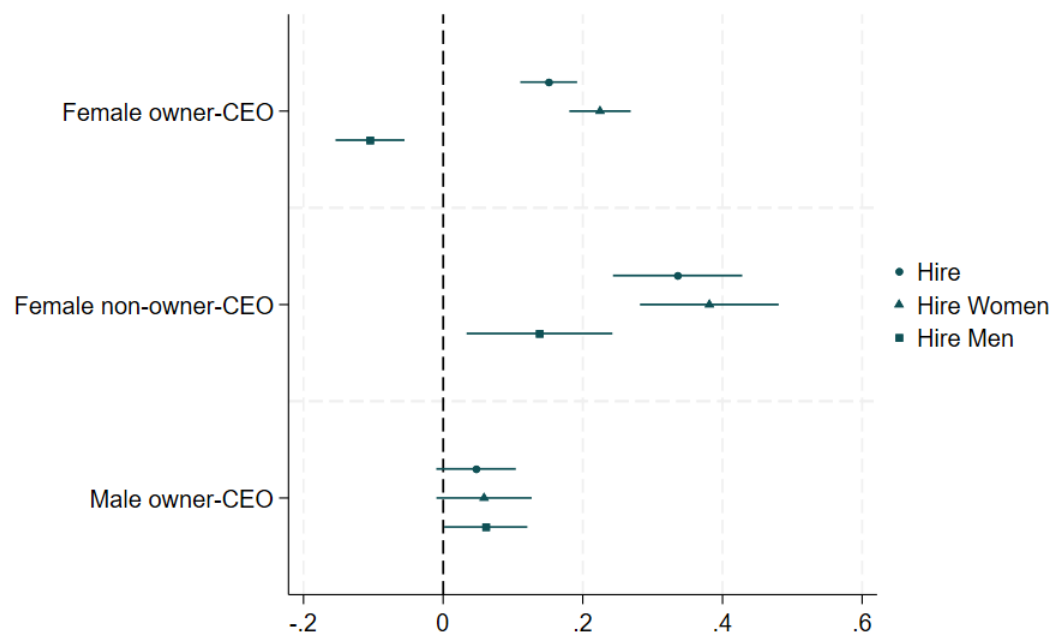
Table 4: Firm-level probit analysis on the likelihood of hiring

	Model 1		Model 2		Model 3		Model 4	
	Hiring		Hiring		Hiring, no family		Hiring, no family	
	Probit		Probit (me)		Probit		Probit (me)	
	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.
Female owner CEO	0.141***	(0.021)	0.038	(0.006)	0.118***	(0.021)	0.029	(0.005)
Female non-owner CEO	0.318***	(0.047)	0.085	(0.013)	0.325***	(0.048)	0.082	(0.012)
Male non-owner CEO	0.056 ⁺	(0.029)	0.015	(0.008)	0.072*	(0.030)	0.018	(0.008)
Tertiary education CEO	-0.070**	(0.016)	-0.019	(0.004)	-0.059*	(0.016)	-0.015	(0.004)
Age CEO	-0.008***	(0.001)	-0.002	(0.000)	-0.009***	(0.001)	-0.002	(0.000)
Norwegian citizenship CEO	-0.171***	(0.028)	-0.046	(0.007)	-0.182***	(0.028)	-0.046	(0.001)
Sum equity and debt (log)	0.292***	(0.006)	0.078	(0.001)	0.294***	(0.006)	0.076	(0.001)
1 woman among owners and BoD (excl CEO)	-0.040*	(0.019)	-0.011	(0.005)	-0.020	(0.020)	-0.005	(0.005)
2+ women among owners and BoD (excl CEO)	-0.070	(0.044)	-0.019	(0.012)	-0.081 ⁺	(0.045)	-0.020	(0.011)
Founding team size	0.066***	(0.009)	0.018	(0.002)	0.088***	(0.009)	0.022	(0.002)
Family firm	-0.109***	(0.018)	-0.029	(0.005)	-0.105***	(0.018)	-0.027	(0.005)
Constant	-1.815***	(0.201)			-1.917***	(0.306)		
Founding year controls	yes		yes		yes		yes	
Industry controls	yes		yes		yes		yes	
Region controls	yes		yes		yes		yes	
N	51,354				51,33			
Pseudo R2	0.194				0.204			
Log Likelihood	-24341.116				-23115.304			

Standard errors in parentheses

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

Figure 1: Coefficient plot different CEO-types in probit analysis gender-based hiring



Note: these coefficient plots are based on three probit regression that in addition to the three CEO type include the same set of independent and control variables included in Table 3

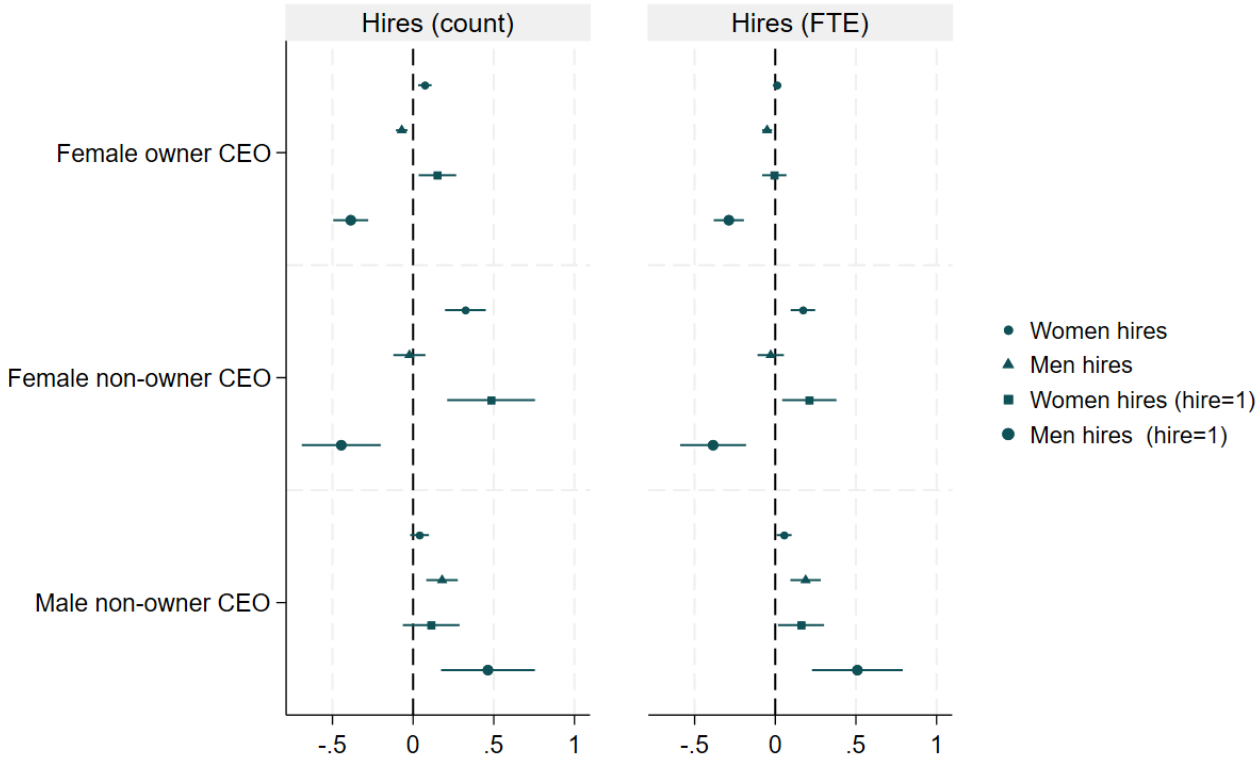
Table 5: Firm-level OLS regression on the number of employees hired (count and FTE)

	Model 5		Model 6		Model 7		Model 8	
	Hires (count)		Hires (count), if hire = 1		Hires (FTE)		Hires (FTE), if hire = 1	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Female owner CEO	0.002	(0.032)	-0.237**	(0.089)	-0.040 ⁺	(0.023)	-0.294***	(0.066)
Female non-owner CEO	0.301**	(0.098)	0.037	(0.218)	0.143*	(0.067)	-0.176	(0.155)
Male non-owner CEO	0.219**	(0.068)	0.575**	(0.198)	0.242***	(0.062)	0.668***	(0.184)
Tertiary education CEO	0.027	(0.027)	0.236**	(0.091)	0.012	(0.023)	0.145 ⁺	(0.080)
Age CEO	-0.006***	(0.001)	-0.000	(0.003)	-0.004***	(0.001)	0.003	(0.003)
Norwegian citizenship CEO	-0.232***	(0.058)	-0.366*	(0.150)	-0.258***	(0.052)	-0.454***	(0.138)
Sum equity and debt (log)	0.385***	(0.011)	0.898***	(0.042)	0.319***	(0.010)	0.771***	(0.038)
1 woman among owners and BoD (excl CEO)	-0.029	(0.035)	-0.053	(0.100)	-0.033	(0.030)	-0.080	(0.087)
2+ women among owners and BoD (excl CEO)	-0.162*	(0.074)	-0.402 ⁺	(0.214)	-0.152*	(0.064)	-0.366 ⁺	(0.190)
Founding team size	0.150***	(0.017)	0.233***	(0.049)	0.147***	(0.015)	0.247***	(0.043)
Family firm	-0.157***	(0.032)	-0.220*	(0.087)	-0.142***	(0.027)	-0.207**	(0.075)
Constant	-0.838*	(0.416)	-2.911***	(0.708)	-0.606	(0.407)	-2.342**	(0.743)
Founding year controls	yes		yes		yes		yes	
Industry controls	yes		yes		yes		yes	
Region controls	yes		yes		yes		yes	
N	51,357		14,129		51,357		14,129	
Adjusted R2	0.158		0.165		0.131		0.155	

Standard errors in parentheses

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

Figure 2: Coefficient plot size of gender-based hiring for different CEO-types in OLS regression



Note: these coefficient plots are based on eight OLS regression that in addition to the three CEO type include the same set of independent and control variables included in Table 5

Table 6: Descriptives on hired

	all hires (n=42,603)		Male hires (n=24,986)		Female hires (n=17,617)	
	Mean	s.d.	Mean	s.d.	Mean	s.d.
Female hire	0.414	0.492				
FTE	0.777	0.312	0.869	0.264	0.645	0.327
Part-time (less than 80%)	0.340	0.474	0.198	0.398	0.542	0.498
Age hire	31.908	12.187	33.238	12.110	30.023	12.047
Number of children of hired	0.575	0.950	0.569	0.941	0.584	0.962
Kids under age of 6	0.202	0.401	0.205	0.404	0.197	0.398
Married	0.274	0.446	0.284	0.451	0.260	0.439
Norwegian Citizen	0.797	0.402	0.765	0.424	0.843	0.364
Female owner CEO	0.182	0.386	0.079	0.269	0.329	0.470
Female non-owner CEO	0.030	0.172	0.017	0.130	0.049	0.216
Male non-owner CEO	0.087	0.282	0.102	0.302	0.067	0.250
Founding team size	1.938	0.924	1.972	0.938	1.889	0.902
1 woman among owners and BoD (excl CEO)	0.215	0.411	0.187	0.390	0.255	0.436
2+ women among owners and BoD (excl CEO)	0.028	0.165	0.021	0.144	0.038	0.190
Family firm	0.300	0.458	0.274	0.446	0.337	0.473
In family with owner(s)	0.077	0.266	0.058	0.234	0.103	0.304

Table 7: OLS regression on FTE

	Model 9		Model 10		Model 11	
	FTE		FTE		FTE	
	Coeff.	S.E	Coeff.	S.E	Coeff.	S.E
Female hire	-0.092***	(0.004)	-0.095***	(0.004)	-0.106***	(0.004)
Age hire	0.003***	(0.000)	0.003***	(0.000)	0.003***	(0.000)
Number of children under 18	0.021***	(0.002)	0.021***	(0.002)		
1 child under 18					0.047***	(0.005)
2 children under 18					0.050***	(0.005)
3 children under 18					0.045***	(0.007)
4 or more children under 18					0.033**	(0.013)
Child under the age of 6	0.045***	(0.004)	0.045***	(0.004)	0.030***	(0.004)
Married	-0.016***	(0.003)	-0.016***	(0.003)	-0.017***	(0.003)
Norwegian Citizen	-0.052***	(0.003)	-0.052***	(0.003)	-0.050***	(0.004)
Female owner CEO	-0.044***	(0.004)	-0.043***	(0.007)	-0.044***	(0.004)
Female non-owner CEO	-0.038***	(0.008)	-0.000	(0.009)	-0.038***	(0.008)
Male non-owner CEO	0.038***	(0.005)	-0.031*	(0.014)	0.037***	(0.004)
Founding team size	0.011***	(0.002)	0.011***	(0.002)	0.010***	(0.002)
1 woman among owners and BoD (excl CEO)	-0.011**	(0.004)	-0.012**	(0.004)	-0.011**	(0.004)
2+ women among owners and BoD (excl CEO)	-0.000	(0.009)	-0.002	(0.009)	-0.001	(0.009)
Family firm	-0.008*	(0.003)	-0.007*	(0.003)	-0.008*	(0.003)
In family with owner(s)	-0.063***	(0.006)	-0.063***	(0.006)	-0.065***	(0.006)
Interaction effects						
Female hire*Female owner-CEO			-0.009	(0.017)		
Female hire*Female non-owner CEO			0.026***	(0.005)		
Female hire*Male non-owner CEO			0.036***	(0.010)		
Female hire*1 child under 18					0.058***	(0.009)
Female hire*2 children under 18					0.051***	(0.009)
Female hire*3 children under 18					0.041**	(0.014)
Female hire*4 or more children under 18					0.046 ⁺	(0.026)
Female hire*child under the age of 6					-0.024**	(0.009)
Constant	0.805***	(0.051)	0.803***	(0.051)	0.815***	(0.050)
Founding year controls	yes		yes		yes	
Industry controls	yes		yes		yes	
Region controls	yes		yes		yes	
N	42,603		42,603		42,603	
Adjusted R2	0.329		0.329		0.333	

Standard errors in parentheses

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

Table 8: Probit regression on part-time employed

	Model 12		Model 13	
	Part-time employed		Part-time employed	
	Probit		Probit (me)	
	Coeff.	S.E.	Coeff.	S.E.
Female hire	0.493***	(0.018)	0.130	(0.005)
Age hire	-0.011***	(0.001)	-0.003	(0.000)
Number of children under 18	-0.098***	(0.012)	-0.026	(0.007)
Child under the age of 6	-0.222***	(0.026)	-0.059	(0.007)
Married	0.059**	(0.022)	0.155	(0.006)
Norwegian Citizen	0.230***	(0.021)	0.061	(0.006)
Female owner CEO	0.189***	(0.021)	0.050	(0.006)
Female non-owner CEO	0.188***	(0.041)	0.059	(0.011)
Male non-owner CEO	-0.197***	(0.029)	-0.052	(0.008)
Founding team size	-0.056***	(0.010)	-0.015	(0.003)
1 woman among owners and BoD (excl CEO)	0.067***	(0.020)	0.018	(0.005)
2+ women among owners and BoD (excl CEO)	0.034	(0.046)	0.009	(0.012)
Family firm	0.013	(0.019)	0.003	(0.005)
In family with owner(s)	0.368***	(0.028)	0.097	(0.007)
Constant	-0.907*	(0.388)		
Founding year controls		yes		yes
Industry controls		yes		yes
Region controls		yes		yes
N		42,244		
Pseudo R2		0.269		
Log likelihood		-19865.063		

Standard errors in parentheses

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

APPENDIX

Table A1: Probit analysis hire women and hire men

	Model A1		Model A2	
	Hire women		Hire men	
	Probit		Probit	
	Coeff.	S.E.	Coeff.	S.E.
Female owner CEO	0.218***	(0.022)	-0.114***	(0.025)
Female non-owner CEO	0.370***	(0.051)	0.119*	(0.053)
Male non-owner CEO	0.060 ⁺	(0.035)	0.072*	(0.031)
Tertiary education CEO	-0.029	(0.019)	-0.077***	(0.017)
Age CEO	-0.004***	(0.001)	-0.009***	(0.001)
Norwegian citizenship CEO	-0.172***	(0.035)	-0.155***	(0.029)
Sum equity and debt (log)	0.271***	(0.007)	0.289***	(0.006)
1 woman among owners and BoD (excl CEO)	-0.039 ⁺	(0.022)	-0.029	(0.021)
2+ women among owners and BoD (excl CEO)	0.006	(0.049)	-0.140**	(0.051)
Founding team size	0.012	(0.011)	0.098***	(0.010)
Family firm	-0.096***	(0.021)	-0.120***	(0.020)
Constant	-2.580***	(0.368)	-1.905***	(0.310)
Founding year controls		yes		yes
Industry controls		yes		yes
Region controls		yes		yes
N		50,742		51,219
Pseudo R2		0.248		0.204
Log likelihood		-16125.508		-20203.244

Standard errors in parentheses

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