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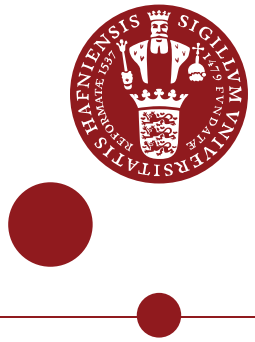

PhD Thesis

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Empirical Essays in Institutional and Organizational Economics

Supervisor: Morten Bennedsen

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Contents

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Introduction

This Ph.D. dissertation consists of three chapters that constitute independent research articles. Each chapter of the thesis focuses on the interplay between economic outcomes and different social phenomena, namely social networks (chapter 1) and social preferences (chapters 2 and 3). The first chapter highlights the role of social networks for board opportunities in the corporate sector. I find that the main beneficiaries of a board gender quota implemented in Denmark are women with existing family and spousal networks connected to firms' boards. The second chapter examines the role of social preferences in leadership. It shows that CEOs whose leadership style is grounded in strong personal values are more stakeholder-oriented and have a positive effect on firm performance. The third chapter contributes to the debate on the relationship between market participation and moral universalism: the extent to which people exhibit the same level of morality towards strangers and ingroup members. Using a field experiment in Greenland, it adds evidence that market participation correlates positively with moral universalism.

The first chapter highlights the role of family and spousal networks for women's access to the boardroom. It asks how board gender quotas interact with network-based hiring practices and which women benefit from quotas. Using matched firm-directors datasets covering the population of Danish firms and blood- and marriage-based ties as relevant social connections, I show that the introduction of a board gender quota in Denmark in 2012 intensifies network-based hiring, resulting in differential benefits of the law for potential candidates depending on their family connections. First, the quota leads firms to double the share of connected directors among female appointments. Second, potential candidates with family connections to incumbent directors and CEOs become three times more likely to be appointed, whereas the probability to be appointed remains the same for highly qualified but unconnected potential candidates. Taken together, the evidence suggests that sticky norms of hiring based on networks create search frictions in the recruitment of female directors, even in the presence of board gender quotas.

The second chapter (co-authored with Morten Bennedsen) examines the role of values in lead-

ership. The strength of personal values and how these penetrate firm organization is measured through a survey of 1500 Danish CEOs. We construct a measure of value-based leadership and investigate the impact on firm outcomes and firm policies. First, we find that value-based leadership is more common in family firms and with female leadership, but not correlated to leaders' IQ nor to management practices. Second, value-based leadership is positively correlated to firm performance. We provide causal evidence through the analysis of CEO changes and CEO hospitalizations. Third, value-based leaders build more resilient organizations in a pandemic crisis and generate less conflicts, lower employee turnover and have a flatter organizational structure in normal times. Taken together, leaders' personal values and how they spread through organizations are important factors in explaining the value they bring to their firms.

The third chapter (co-authored with Gustav Agneman) contributes to the debate on the relationship between market participation and moral universalism. We study parochial honesty, the tendency to behave more honestly toward members of the ingroup than toward strangers. To this end, we conduct honesty experiments (N=543) in 13 villages across Greenland, where small and geographically isolated communities provide for a natural definition of the ingroup. In order to study group differentiation, we introduce a negative externality in the experiment and randomly vary the identity of the interaction partner. The results reveal significant parochial honesty. Participants inflate payoffs by 11% on average when matched with an outsider, but refrain from misreporting when it negatively affects members of their local community. Furthermore, we find that only participants in the traditional economy exhibit strong parochial honesty; market integrated participants behave equally honest regardless of interaction partner.

Introduktion

Denne ph.d.-afhandling består af tre kapitler, der hver især udgør selvstændige forskningsartikler. Hvert kapitel i afhandlingen fokuserer på samspillet mellem økonomiske resultater og forskellige sociale fænomener, nærmere bestemt sociale netværk (kapitel 1) og sociale præferencer (kapitel 2 og 3). I det første kapitel undersøges rollen som sociale netværk spiller for rekrutteringen til bestyrelser i erhvervslivet. I min forskning finder jeg frem til at det hovedsageligt er kvinder med allerede eksisterende netværk, gennem enten familie eller ægtefælle, som drager nytte af de nyligt implementerede kønskvoter i Danmark, og som derfor har størst chance for at få en plads i en virksomheds bestyrelse. I det andet kapitel undersøger jeg hvilken rolle sociale præferencer spiller for virksomhedsledelse. Vores forskning viser at CEO'er, hvis ledelsesstil er baseret på stærke personlige værdier, er mere stakeholder-orienterede og har en positiv effekt på virksomhedens resultater. Det tredje kapitel bidrager til debatten om forholdet mellem markedsdeltagelse og moralsk universalisme, dvs. i hvilket omfang folk udviser samme moral over for fremmede og medlemmer af deres egen sociale gruppe. Ved hjælp af et felteksperiment foretaget i Grønland fandt vi beviser for at markedsdeltagelse korrelerer positivt med moralsk universalisme.

I det første kapitel undersøges hvilken rolle familiens eller ægtefællens netværk spiller for kvinders adgang til bestyrelseslokalerne. Vi undersøger hvordan kønskvoter i bestyrelser interagerer med netværksbaseret ansættelsespraksis, og hvilke kvinder der drager fordel af kønskvoter. Ved hjælp af matchede datasæt mellem virksomheder og virksomhedsledere, der dækker den samlede population af danske virksomheder samt blod- og ægteskabsbaserede bånd som relevante sociale forbindelser, viser jeg at indførelsen af kønskvoter for bestyrelsesmedlemmer i Danmark i 2012 intensiverede den netværksbaserede ansættelsespraksis, hvilket resulterer i differentierede fordele for potentielle kandidater afhængigt af deres familiemæssige forbindelser. For det første har indførelsen af kønskvoter ført til at virksomhederne har fordoblet andelen af bestyrelsesmedlemmer af velforbundede kvindelige kandidater. For det andet er der tre gange

så stor sandsynlighed for at potentielle kandidater med familiemæssige forbindelser til siddende bestyrelsesmedlemmer og administrerende direktører bliver udpeget, mens sandsynligheden for at blive udpeget forbliver den samme for højt kvalificerede, men ikke-forbundne potentielle kandidater. Samlet set tyder beviserne på at fastlåste normer for ansættelse baseret på netværk skaber søgefriktioner i forbindelse med rekruttering af kvindelige bestyrelsesmedlemmer, selv ved tilstedeværelsen af kønskvoter.

I det andet kapitel (som er skrevet sammen med Morten Bennedsen) undersøges personlige værdiers rolle for virksomhedsledelse. Styrken ved personlige værdier, og hvordan de trænger ind i virksomhedens organisation, måles gennem en undersøgelse af 1500 danske administrerende direktører. Vi konstruerede et mål for værdibaseret ledelse og undersøgte betydningen for virksomhedernes resultater og virksomhedspolitik. For det første fandt vi at værdibaseret ledelse er mere udbredt i familiefirmaer og firmaer med kvindelig ledelse, men er ikke korreleret med ledernes IK eller med ledelsespraksis. For det andet fandt vi at værdibaseret ledelse positivt korrelerer med virksomhedens resultater. Vi leverer kausale beviser gennem en analyse af direktørskift og hospitalsindlæggelser af direktører. For det tredje opbygger værdibaserede ledere mere modstandsdygtige organisationer i krisesituationer som under COVID-19 pandemien, giver mindre konflikt, lavere personaleomsætning og en fladere organisationsstruktur i normale tider. Samlet set er ledernes personlige værdier, og hvordan de spredes gennem organisationen, vigtige faktorer for at forklare den værdi de bringer til deres virksomheder.

Det tredje kapitel (med Gustav Agneman som medforfatter) bidrager til debatten om forholdet mellem markedsdeltagelse og moralsk universalisme. Vi undersøger parochial ærlighed, tendensen til at opføre sig mere ærligt over for medlemmer af ingruppen end over for fremmede. Til dette formål gennemfører vi ærlighedseksperimenter (N=543) i 13 landsbyer i Grønland, hvor små og geografisk isolerede samfund giver en naturlig definition af ingruppen. For at studere gruppedifferentieringen indførte vi en negativ eksternalitet i eksperimentet og varierede interaktionspartnerne tilfældigt. Resultaterne afslører en betydelig parochial ærlighed. Deltagerne opblæste i gennemsnit deres gevinster med 11% når de matches med en udefrakommende, men afstår fra at give forkerte oplysninger når det påvirker medlemmerne af deres lokalsamfund neg-

ativt. Desuden finder vi at kun deltagere i den traditionelle økonomi udviser stærk parochial ærlighed; markedsintegrerede deltagere opfører sig lige ærligt uanset interaktionspartner.

Chapter 1

It only takes a strong tie: Board gender quotas and network-based hiring

It only takes a strong tie:
Board gender quotas and network-based hiring

Esther Chevrot-Bianco*

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ABSTRACT

How do board gender quotas interact with network-based hiring practices, and which women benefit from quotas? Using matched firm-director datasets covering the population of Danish firms and blood- and marriage-based ties as relevant social connections, I show that the introduction of a board gender quota in Denmark in 2012 intensifies network-based hiring, resulting in differential benefits of the law for potential candidates depending on their family connections. First, the quota leads firms to double the share of connected directors among female appointments. Second, potential candidates with family connections to incumbent directors and CEOs become three times more likely to be appointed, whereas the probability of being appointed remains the same for highly qualified but unconnected potential candidates. Taken together, the evidence suggests that sticky norms of hiring based on networks create search frictions in the recruitment of female directors, even in the presence of board gender quotas.

Keywords: Gender Quotas, Corporate Boards, Social Networks, Family Connections

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1 Introduction

Many countries have used board gender quotas to improve women's representation in the corporate business sector [1]. Board gender quotas usually mandate a numerical target for women's representation but remain silent on *how* appointments should be made. Hence, boards have complete freedom to implement the policy requirements, and not much is known about how female directors are identified and selected and who is ultimately hired for such positions.

Ample evidence suggests that social networks play a crucial role in the recruitment of directors (Nguyen (2012); Kramarz and Thesmar (2013); Schmidt (2015); Cai et al. (2020))[2]. Generally, such positions are not publicly advertised, and candidates do not submit an application. Instead, hiring committees rely greatly on CEOs' and incumbent directors' networks to identify potential candidates, who are almost always subsequently elected by shareholders. From the potential candidate perspective, such network-based hiring implies that connections to relevant social networks are a prerequisite for a board position.

It is not clear ex ante how board gender quotas interact with network-based hiring practices. On the one hand, the introduction of quotas could spur more widespread search efforts and help qualified women outside of traditional social networks to gain the attention of businesses. On the other hand, quotas may increase reliance on traditional hiring networks and provide more opportunities to already well-connected women, thereby amplifying inequalities in opportunity. In this paper, I ask the following questions: Which women benefit from board gender-balance laws? How do these laws interact with network-based hiring practices? Do quotas enable qualified women outside the traditional busi-

[1] Since 2008, no less than 10 European countries (Belgium, Denmark, France, Germany, Iceland, Italy, the Netherlands, Norway, Portugal, Spain, and Sweden) as well as the state of California and India have adopted mandatory board gender quotas.

[2] In Denmark and many other countries, the director recruitment process is entirely left to the discretion of companies, and there are no transparency requirements regarding how appointments are made. Despite the lack of binding regulation, the Committee on Corporate Governance has formulated recommendations for good practices. Source: Recommendations for Corporate Governance. Report, 2020.

ness networks to enter the boardroom? The answers offer insights for the design of board gender-balance laws and contribute to the debate about the impact of quotas on meritocratic selection.

To address these questions, I exploit the introduction of a board gender quota implemented in Denmark in 2012 that permanently required large Danish firms to reach a 40% target for women's representation on boards within four years. Eligibility relies on passing two of three size criteria based on the number of employees, total assets, and profits.[3]. I use marriage- and blood-based ties as relevant social connections and study the effect of the law on network-based hiring at the firm level and the consequences regarding board opportunities for potential candidates. Social ties based on blood and marriage have been found to be an important pathway to political power for women across history and countries (Folke et al. (2020); Labonne et al. (2020)). In the context of business leadership, family connections may play an important role in women's access to the boardroom for several reasons. First, boards may generally prefer to hire candidates who have strong ties[4] to incumbent or close directors because, under the assumption that good directors associate with other good directors, the quality of the director could convey a signal about the candidate's quality. Strong ties may be even more crucial for female candidates, for whom hiring committees have less experience in recruitment and therefore ex ante noisier information. Second, since women are less present in traditional business networks (Allemand et al. (2021); Von Essen and Smith (2021)[5]), family ties may provide the strong connections that they need to access the boardroom[6].

I start by documenting empirical patterns motivating the choice of blood- and marriage-based ties as relevant social connections for the analysis. I combine matched

[3]In contrast to many board quotas implemented in Europe (Norway, Italy, Belgium, etc.) that cover only listed or state-owned companies, the Danish law covers both publicly traded and privately held firms.

[4]Family ties possess the typical characteristics of strong social ties as defined by Granovetter (1983), such as highly frequent interactions, strong emotional links, and the use of reciprocal services.

[5]In a paper using similar data, Von Essen and Smith (2021) document differences in professional networks across genders: female directors have fewer total connections, fewer connections to larger and listed firms, and fewer connections to men.

[6]Burke (1997) surveys 280 female directors and find that personal contacts and visibility to male board members were critical for them to access the boardroom.

firm-management datasets and administrative registers to retrieve the family ties of directors at sample firms between 2007 and 2017. Family-owned firms represent only 6% of the sample firms[7], 33% of female directors – but only 10% of male directors – had a relative or spouse who was a CEO or director at a sample firm before they started their career. The gender gap remains similar conditional on a range of personal, educational and professional characteristics and when restricting the sample to non-family-controlled firms. These patterns strongly suggest that family connections represent an important recruitment pool for female directors.

To study the effect of the quota on network-based hiring from the firm perspective, I focus on firms with at least 100 employees (henceforth referred to as large firms) and follow a difference-in-differences approach comparing the evolution of appointments across firms that passed two of the criteria and were therefore subject to the law and firms passing only one or none of the criteria and therefore remaining unaffected. To address concerns about potential differential trends across firms of different sizes, I use two additional approaches. First, I control for interactions between year fixed effects and pre-reform characteristics that differ across the treated and control firms. Second, I restrict the analysis to firms in a narrower bandwidth around the eligibility thresholds, thereby making treated and control firms comparable based on observable characteristics.

I find that the board gender quota intensifies network-based hiring. An inspection of the unconditional outcomes and dynamic treatment effects shows no pre-trends before the reform. Classifying appointments as connected if the person recruited has a blood or marriage tie to an incumbent director or CEO at a treated firm, I show that the share of women among connected appointments more than triples due to the quota. As a consequence, the share of connected directors among female hires increases by 12 percentage points or doubles relative to the pre-reform mean of 7.5%. Examining firm heterogeneity shows that the appointment of female directors through family ties is a general tendency in all firms, but is more pronounced in family-controlled firms and in medium-sized private firms. The results remain similar when using alternative outcomes,

[7]Figure from 2014. Sample firms are firms with at least 100 full-time employee equivalents. Source: Family Businesses in Denmark. *Statistics Denmark*.

introducing firm fixed effects, and reducing the sample to comparable treated and control firms. In addition, I find no evidence of firm strategic behavior to avoid the reform.

Additional tests support the interpretation that a candidate's connection – rather than other credentials correlated with family connections – was the main determinant of the appointment. First, the results remain similar when controlling for the appointment of directors possessing educational credentials and professional experience correlated with family connections. Second, the reform did not increase the appointment of women connected to *untreated* firms.

I then examine the consequences of network-based hiring for board opportunities for potential candidates. Do potential candidates differentially benefit from the reform depending on their connections? To answer this question, I construct a sample of highly qualified women who were visible to the board at the moment of the reform and adopt a triple-differences approach comparing the probability of being appointed between connected and unconnected women, across treated and untreated firms, and over time during the 2007-2017 period. Specifically, I consider women with CEO, board, and/or top executive experience prior to the reform and classify them as connected if they have a blood- or marriage-based tie to a person who was a director or CEO in the pre-reform period. To define a group of unconnected potential candidates, I include women who were CEOs or top executives between 2007 and 2011.[8] While connected and unconnected potential candidates have different types of credentials, reflecting that they correspond to two distinct recruitment pools for board positions, they had a similar probability of appointment before the reform.

I find that connected potential candidates become three times more likely than unconnected potential candidates to be appointed following the reform. I show that the results are robust to the inclusion of a wide range of individual characteristics, which mitigates the concern that the advantage of connected over unconnected potential candidates is due to differences in credentials rather than caused by connections. Furthermore,

[8]Previous studies (see, for instance, Smith and Parrotta (2018)) show that top executive positions represent a major pipeline to the boardroom; therefore, top executives around the time of the reform are a relevant pool from which firms select new directors.

the probability of being appointed remains stable for unconnected potential candidates, suggesting that the reform does not smooth access to the boardroom for highly qualified women outside the traditional hiring networks.

The last part of the paper provides descriptive evidence on the qualifications of connected female directors. While network-based hiring could allow boards to reach the best candidates, it could also restrict the search process to very few candidates, especially for groups that tend to be underrepresented in traditional hiring networks. Consistent with this second possibility, I find that connected female directors tend to be less qualified than other female directors and that the quota promotes the recruitment of slightly less qualified women. Taken together, the findings presented in this paper suggest that network-based hiring practices create frictions in the search process for qualified female directors, even when board quotas are implemented.

This paper makes three main contributions to the academic literature. First, it extends the literature on gender diversity on boards (Adams and Ferreira (2009); Bertrand et al. (2010); Adams and Funk (2012); Smith and Parrotta (2018)), specifically the literature and policy debate on the consequences of board gender quotas. While the consequences of board gender quotas for firm performance and policies have been explored in a number of studies (Ahern and Dittmar (2012); Matsa and Miller (2013); Bøhren and Staubo (2014); Bøhren and Staubo (2016); de Cabo et al. (2019); Eckbo et al. (2019); Kunze and Scharfenkamp (2019)), not much is known about their impact on the intended beneficiaries[9]. This study underlines the unequal benefits of board gender quotas caused by their interaction with powerful social networks and deeply anchored hiring practices. This paper closely relates to Ferreira et al. (2020), who find that a board gender quota introduced in France created incentives for firms to change their search technology from networks to executive search firms. My paper offers a different answer in the Danish context, where the introduction of a quota increased the number of appointments based on family networks.

Second, this paper contributes to the literature on the selection of board directors. Although the relationship between board composition and firm outcomes has been inves-

[9]Two important exceptions are Bertrand et al. (2019) and Reberioux and Roudaut (2019).

tigated theoretically and empirically, we know little about how directors are identified and selected and what the subsequent implications are for board composition (Adams et al. (2010)).[10]. Relative to this literature, my evidence highlights the considerable impact of blood- and marriage-based connections in the labor market for female directors. This finding complements a growing body of empirical literature documenting the important role played by social networks in board composition and functioning (Fracassi and Tate (2012);Nguyen (2012); Kramarz and Thesmar (2013); Schmidt (2015); Cai et al. (2020)). By providing evidence that family connections help women access the boardroom, this paper also relates to studies on women's pathways to business leadership (Adams and Ferreira (2009); Agarwal et al. (2016); Smith and Parrotta (2018)).

Third, this paper is broadly related to the economics and political science literature documenting the persistence of economic and political elites through their influence on new leader selection (Xu (2018); Voth and Xu (2019)); (Dal Bó et al. (2009); Querubin (2016); Cruz et al. (2017)). This paper highlights a mechanism through which families can perpetuate their influence in the corporate world via appointments onto boards of directors.

The rest of this paper is organized as follows: In the following section, I describe the Danish board gender quota. Section 3 presents the data and summary statistics. In Section 4, I describe the empirical strategies implemented to evaluate the effect of the law, and the results are shown in Section 5. Section 6 explores the qualifications of different types of directors, and Section 7 concludes the paper.

[10]In their review of the literature on corporate boards, they provide the following directions for future research: *"How are potential outside directors identified? (...) What is the role of social networks in this process?"* (p.99).

2 The Danish board gender quota

The law on *"Target Figures"* was implemented in Denmark in 2012 and permanently required publicly traded and large privately held companies to reach 40% representation for women on boards of directors[11]. In their annual reports, all firms had to report on their achievement with respect to this target, on the measures they had taken to achieve it, and on the reasons for failure if it was not achieved. Annual reports had to be submitted to the Danish Business Authorities and made available to the general public, and a failure to set a target figure and to report the different elements was punished by a fine. In section D of the appendix, I provide additional information about the background and contents of the law.

The largest firms in Denmark, defined in terms of total assets, net revenue, and number of employees, were affected by the law. Specifically, firms exceeding two of the three following criteria – total assets of 143 million DKK ($ 19 million), net revenue of 286 million DKK ($ 38 million), and an average of 250 full-time employees – over two consecutive years were subject to the law. While the largest firms were impacted by the law, a number of large firms remained out of the treated group because they passed only one or none of the eligibility criteria.The identification strategies presented in the next subsections build on this feature of the law.

The law created a large and sudden positive demand shock for female directors in treated firms. Figure 1 plots the number of female appointments in the group of treated firms within a 5-year period before and after the reform. The yearly number of female appointments went from approximately 23 before the reform to 50 after the reform.

The passing of the law and the group of affected firms were unexpected. Following heated debates on a potential hard quota affecting only listed firms, the proposal of a quota was abandoned in April 2012. A softer law focusing on a larger group of firms was announced in May 2012, and neither the details of implementation nor the group of affected firms was known before. The shock caused by the law was therefore plausibly

[11]Specifically, firms had to set a target at least equal to the number closest to 40% (see Table 17 in Appendix Section D for details) and reach it within 4 years.

exogenous to women's connections and outcomes.

3 Data and summary statistics

3.1 Data sources

The empirical analysis requires the construction of two datasets. The first one tracks directors at large Danish firms from 2007 to 2017 and allows us to study the impact of the law on network-based hiring from the firm perspective. The second one tracks potential female candidates during the same period and allows us to evaluate which women benefited from the law. For all directors and potential candidates, I obtain information on their personal and professional characteristics, as well as their family networks. The different sources used in the construction of the datasets are described below. All variables are listed and described in Table 15.

Matched firm-CEO and director datasets The main source of information is a database from the Danish Business Authorities (*Erhvervsstyrelsen*, or *ES*) reporting the personal identification number (CPR) of the Danish CEOs and board directors of all limited liability corporations in Denmark. Danish firms are required by law to report any change in their management or board to *ES* within two weeks after making the change. In addition, the database contains the unique identification number (CVR) of the firm in which the position is held, information on the nature of the position (CEO or director), and the exact starting and ending dates for each position.

Personal and professional information A director's unique CPR number allows us to retrieve a number of types of individual-level information. First, I add personal characteristics and family information obtained from the Danish Civil Registration System. These administrative records are provided by *Statistics Denmark* (the Danish National Statistical Agency) and cover the entire national population since the 1980s. They include personal information (date of birth and death, gender, educational attainment), as well as the CPR number of parents and spouses, which can be used to construct family trees and identify

whether directors and potential candidates are related by blood or marriage to other directors and CEOs. Second, in addition to board and CEO experience retrieved from the *ES* database, I add information on their professional experience outside the boardroom (number of years of professional experience, level of responsibility in their main position, experience as a top executive) using the matched employer-employee datasets provided by *Statistics Denmark*. Finally, I add information on their status inside the boardroom (employee- or shareholder-elected, chairperson status) using data collected by a private firm (*Experian*) that were available only through 2015.

Financial information on firms Similarly, I use the CVR number to retrieve firm-level information. The main datasets are the General Firm Statistics registers (FIRE and FIRM) provided by *Statistics Denmark*. These registers record financial statements (income and balance sheet statements), as well as the number of employees, firm age, location, and industry code.

3.2 Samples statistics

Sample of firms For the firm-level analysis, I track large Danish firms[12] and their directors from 2007 to 2017. I exclude from the sample firms for which some financial information is missing. Table 1 presents summary statistics for the 1006 firms in the final sample. The variables are averaged over the pre-reform period (between 2007 and 2011). Panel A presents firm-level characteristics, and Panel B presents board-level characteristics. The average sample firm has 413 employees, assets of DKK 1535 million ($ 256 million), and sales of DKK 1207 million ($ 201 million). Note that these measures are highly skewed by a few extremely large firms: in fact, the median firm in the sample has 188 employees and assets and sales of DKK 267 million ($ 45 million) and DKK 391 million ($ 65 million), respectively. The average board has 5 directors (excluding employee-elected directors), among whom 11.5% are women. Within boards, the average age of directors is 53 years,

[12]Section C in the appendix provides details on the sample construction. Firms with more than 100 employees represent approximately 40% of the total number of employees in Denmark. Source: *Statistics Denmark*.

and they have 21 years of professional experience on average. On the average board, 53% of directors hold a university degree, and 44%, 53%, and 65% have previous top executive, CEO and director experience, respectively.

Sample of potential candidates There is no unique way to define the set of potential candidates for board positions. I consider women with qualifications that make them relevant candidates, that is, women with previous CEO, board, and/or top executive experience. In addition, I require these women to be "visible" to boards at the moment of the reform; that is, they must have a family connection to an incumbent CEO or director or must be top executive/CEO at a sample firm during the pre-reform period. The sample includes 13,828 women, accounting for less than 0.8% of the active female labor force in Denmark. I track potential female candidates' appointments to boards between 2007 and 2017 and observe 240 appointments at the treated firms, i.e., 60% of appointments at treated firms during the sample period.

Table 2 shows summary statistics for the sample of potential candidates. Time-varying variables are measured in 2011. The average female potential candidate is 43 years old and has 17 years of professional experience. A total of 85% of potential candidates have top executive experience, and 22% and 13% have previous director and CEO experience, respectively. As expected from the sample construction, all potential candidates have at least one of the three types of experience. They have, on average, 15 years of education, and 45% hold a university degree. For comparison, the average female director in the firm sample is 48 years old, has 19 years of professional experience, and has 14 years of education. Of these female directors, 20%, 48% and 27% have top executive, director, and CEO experience, respectively (see Panel C in Table 1).

3.3 Family connections among Danish directors

Before studying the effect of the gender quota on network-based hiring, I present empirical patterns motivating the choice of blood- and marriage-based ties as relevant social connections for the analysis.

Using the first sample (directors at large firms), I create an indicator variable

Previous family connection equal to one if the director has a close relative (parents, siblings, children) or spouse who was ever a CEO or director at a sample firm and started her career *before* her and equal to zero otherwise.

Figure 2 (Panel A) shows that among directors, 33% of women and 10% of men had a previous family connection at one of the sample firms. Panel B of Figure 2 shows that the gender gap in previous family connections remains very stable when conditioning on a range of personal and professional characteristics that differ between male and female directors (see Table 1). In addition, Figure 3 shows that the general patterns remain similar when excluding family firms, firms with fewer than 250 employees, and spousal ties. Notably, the share of directors with previous family connections is reduced when considering only ties *across* firms, suggesting that a majority of connected directors sit on the board of the same firm where they had their family connection. Finally, Appendix Table 16 shows the distribution of family members among previous family connections.

These patterns suggest that family connections play an important role in women's access to the boardroom. These findings align well with previous studies documenting the impact of family networks on women's access to leadership positions in politics (Dal Bó et al. (2009); Folke et al. (2020); Labonne et al. (2020)) and on corporate boards (Bianco et al. (2015)). In addition, the size of the gender gap strongly suggests that the large share of female directors with previous family connections does not simply reflect characteristics correlated with family networks, such as talent or ability, since there is no reason to believe that the correlation between talent and family networks would differ for men and women.

4 Empirical strategies

In this section, I present the identification strategies employed to study the effect of the quota on network-based hiring and on potential candidates.

Firm-level analysis In the first part of the paper, I study the consequences of the 2012 board quota on network-based hiring. Specifically, I study whether the law has impacted the board's propensity to appoint a female director and which pool new female directors are recruited from. My main outcomes of interest are the share of women in appointments, the share of women in unconnected appointments, the share of women in connected appointments, and the share of connected directors in female appointments. I define a director as connected if she has a blood or marriage tie to the incumbent board at any treated firm. That is, a director is connected if she is related by blood or marriage to a person who was a director or CEO at a treated firm during the pre-reform period between 2007 and 2011.

I use a difference-in-differences approach comparing the outcomes of firms in the treated and control groups before and after the passing of the law in 2012. To avoid changes in the composition of the treatment group, I define firms as treated if they fulfilled the criteria to be affected by the law in 2012, that is, if their total assets, net revenue, and number of employees in 2011 and 2012 were above two of the three thresholds (see Section 2). Throughout the paper, I refer to this group of firms as the "treated" group or "intent-to-treat" group interchangeably. In Table 10, I show that the results are robust to defining the group of treated firms based on their post-reform treatment status.

For control firms, I use large Danish firms that remain unaffected by the reform because they met only one or none of the criteria. As a first test of the design, I check whether firms manipulate their profits, capital size, or number of employees to avoid having to comply with the law (Nygaard (2011); Bøhren and Staubo (2014)). I fail to reject the null hypothesis of continuity in the density of the reform criteria at the eligibility thresholds using McCrary (2008) tests (see Figure 8 in the appendix), suggesting that firms do not systematically manipulate their numbers. I begin with the following baseline

specification:

$$y_{j,t} = \lambda_t + \gamma Treat_j + \beta(Treat_j \times Post_t) + \epsilon_{j,t} \quad (1)$$

where $y_{j,t}$ denote the different outcomes in the analysis. $Treat_j$ is an indicator variable equal to one if firm j is treated and 0 otherwise, and $Post_t$ indicates the post-reform period (from 2013 to 2017). To control for common time shocks, I include year fixed effects λ_t. I do not include firm fixed effects in my main specification, as many firms hire a director only once during the sample period.[13] Note that $Post_t$ is omitted in the specification of equation 1 since it is absorbed by the year fixed effects. Standard errors are robust and clustered at the firm level, and the coefficient of interest, β, captures the average impact of the quota on the different outcomes. OLS estimation is used throughout the paper.

Analysis of potential candidates In the second part of the paper, I study the effect of the law from the potential candidates' perspective, making it possible to estimate the differential impact of the law on board opportunities for potential candidates depending on their family connections. I can also investigate to what extent unconnected potential candidates benefit from the law.

Using the sample of potential candidates described in Section 3, I classify a potential female candidate as connected to a firm if she has a close relative (parent, sibling or child) or spouse who was a director or CEO at the firm at some point during the pre-reform period (2007-2011). Measuring connections during the pre-reform period reduces endogeneity by ensuring that I do not capture connections that were strategically formed by women or their relatives in response to the law.

For unconnected potential candidates, I use recent top executives at sample firms. I classify a potential female candidate as unconnected but related to a firm if she was the CEO, vice-president, or another top executive with transverse responsibilities, was at the firm at some point during the pre-reform period (2007-2011) and had no family connections to the incumbent board or CEO. In the rest of the paper, I refer to this group

[13] I show that the results are robust to the inclusion of firm fixed effects in the robustness checks.

as unconnected potential candidates. Recent top executives represent a credible pool of potential candidates. First, top executives from within the firm and from firms in similar sectors constitute one of the main recruitment pools for new board directors (Smith and Parrotta (2018)). Second, their presence at the top of the firm hierarchy during the years leading up to the reform makes them visible on the labor market for top executives, particularly to incumbent directors. Thus, these candidates have realistic chances to be considered for board positions around the time of the reform. In support of this choice, Table 4 shows that the pre-reform probability to be appointed is similar for unconnected and connected potential candidates.

To capture variation in the exposure to the reform, I assign women to treated and untreated firms based on where their family connection or top executive experience is. Women with connections or experience to both treated and untreated firms represent x% of the sample and are assigned to the treated group, since they are known to and therefore in the potential pool of candidates for *at least one treated firm*.

To investigate which women benefit from the quota, I use a triple-difference approach comparing the probability of being appointed at a treated firm for connected and unconnected potential candidates, across treated and untreated firms, and over time between 2007 and 2017.

I estimate the following equation:

$$\begin{aligned} y_{i,t} = \alpha_i + \lambda_t + \boldsymbol{\gamma}'\mathbf{X_{i,t}} + \beta_1(Connect_i \times Post_t) \\ + \beta_2(Treat_i \times Post_t) + \beta_3(Connect_i \times Treat_i \times Post_t) + \epsilon_{i,t} \end{aligned} \tag{2}$$

The variable $y_{i,t}$ is an indicator variable equal to one if woman i was appointed to the board of a treated firm in year t and zero otherwise. $Connect_i$ is an indicator variable equal to one if the woman has a family connection and zero if she is unconnected. $Treated_i$ is an indicator variable equal to one if the woman is connected/related to a treated firm and zero if she is connected/related to an untreated firm, and $Post_t$ indicates the post-reform period. $\mathbf{X_{i,t}}$ is a vector of individual characteristics interacted with $Treated_i$ and $Post_t$. α_i and λ_t are individual and year fixed effects. Note that $Connect_i$, $Treated_i$,

$Connect_i \times Treated_i$, and $Post_t$ are omitted in the specification of equation 2 since they are absorbed by individual and year fixed effects, respectively. Standard errors are robust and clustered at the individual level, and the coefficient of interest, β_3, captures the differential impact of the reform on the probability of being appointed for connected potential candidates compared with their unconnected counterparts. OLS estimation is used throughout the paper, but the results are robust to the use of a probit model.

4.1 Identifying assumptions and threats to identification

Firm-level analysis This approach relies on the usual assumption of parallel trends in the outcomes of treated and control firms. A consequence of the research design is that treated firms are by construction larger than control firms, which raises the concern that control firms may not provide an adequate counterfactual in the outcome trend.

Table 3 presents summary statistics for control and treated firms. The median treated firm has 315 employees, assets of DKK 512 million ($ 85 million), and sales of DKK 707 million ($ 118 million). For control firms, these numbers are 132, DKK 108 million (18 $ million), and DKK 186 million (31 $ million), respectively. While treated firms are 2 to 4 times larger than control firms, they have similar levels of performance. Treated firms also have slightly larger boards (5.2 and 4.6 directors on average in treated and control firms, respectively), with slightly older and more qualified directors in terms of educational credentials, previous top manager experience, and board experience.

I follow three approaches to probe the validity of the control group as a counterfactual. First, I assess the plausibility of the parallel trends assumption by inspecting pre-trends in the raw data and by formally testing the presence of pre-trends using equation 3. To increase power and to smooth fluctuations in hiring, each dummy t corresponds to a two-year period, except for $t = 3$, which corresponds to the baseline pre-reform year, 2011:

$$y_{j,t} = \gamma Treat_j + \sum_{1}^{6} \beta_t \lambda_t + \sum_{1}^{6} \beta_t^T \lambda_t \times Treat_j + \epsilon_{j,t} \tag{3}$$

Second, the systematic differences between treated and control firms could lead to biased estimates of the reform effect if those same firm characteristics are associated with differential trends in the outcome variables. To address this possibility, I estimate equation 1 augmented with interactions between pre-reform characteristics (measured in 2011) – namely, assets, profits, number of employees, number of directors, number of seats held by directors, share of directors with a university degree, and share of directors with previous board experience – and year fixed effects, thereby flexibly controlling for differential trends [14]. In addition, Table 3 shows that the pre-reform share of female directors is higher in control firms than in treated firms: before the law, 12% of directors were women in control firms, compared to 8% in treated firms. To disentangle the reform effect from dynamic adjustment processes, I further include interactions between the pre-reform share of female directors and year fixed effects.

Third, I perform the analysis using a restricted sample, retaining only firms in a reduced bandwidth around the eligibility thresholds. This approach, comparable in spirit to a difference-in-discontinuity design, successfully eliminates observable differences between treated and control firms and leaves the results unchanged, as shown in the next section.

Finally, a last source of concern might be the existence of time-varying shocks that occur in the same period and differentially affect treated and control firms. I am not aware of other Danish laws implemented during the sample period covering the same group of firms. However, in the same year, the European Commission adopted a proposal for a directive that set the objective of 40% female directors on the board of listed firms by 2020. While this directive ultimately was not adopted, I test the robustness of my results to the exclusion of listed companies.

Analysis of potential directors This approach relies on the assumption of parallel trends in the probability of being appointed for connected and unconnected potential female candidates at treated and control firms in the absence of the reform. To test this assump-

[14] See, e.g., Jaeger et al. (2020) and Hjort et al. (2017) for a similar approach in a difference-in-differences setting with observable differences between treated and control groups.

tion, I inspect the raw data and formally test the pre-trends by estimating equation 4 separately for connected and unconnected potential candidates.

$$y_{i,t} = \alpha_i + \sum_{1}^{6} \beta_t \lambda_t + \sum_{1}^{6} \beta_t^T \lambda_t \times Treat_i + \epsilon_{i,t} \tag{4}$$

In addition, I test for parallel trends in the triple difference by estimating the following equation in the pre-reform period (2007 to 2011):

$$\begin{aligned} y_{i,t} = \alpha_i + \beta_1 Trend_t + \beta_2 Trend_t \times Connect_i + \beta_3 Trend_t \times Treat_i \\ + \beta_4 Trend_t \times Connect_i \times Treat_i + \epsilon_{i,t} \end{aligned} \tag{5}$$

Since family ties may correlate with other characteristics likely to affect the director selection process, the advantage of connected potential candidates over unconnected ones could also reflect an omitted variable correlated with family connections. Several aspects of the design mitigate this concern. First, all women in the sample of potential candidates have top-level qualifications and experience, which reduces differences between connected and unconnected women in terms of, e.g., ability and drive relative to the overall population. Second, the use of recent top executives at the sample firm as unconnected potential candidates attenuates the concern that firm-specific factors correlated with family connections – such as firm-specific skills or geographic proximity to the firm – would explain the results. Third, if connected candidates have a systematic advantage over unconnected candidates that is not due to a family connection, we may see that candidates connected to *untreated* firms are also increasingly likely to be appointed after the reform, but I do not observe this in the data.

In addition, I explicitly control for all observable differences between connected and unconnected potential candidates in the regressions. Table 4 shows summary statistics for connected and unconnected potential candidates at treated and untreated firms. Connected and unconnected candidates differ in a range of characteristics. Connected women are older, more likely to be married and have children, and less likely to be of non-Danish origin. They are slightly more educated: they have slightly less than one

additional half year of education and are more likely to hold a university degree. Connected and unconnected candidates have different professional backgrounds but similar pre-reform probabilities of board appointments. This emphasizes that they correspond to two distinct pipelines leading to the boardroom. A large share of connected women have director and CEO experience (70% and 38%, respectively), but less than 25% have another type of top executive experience. These patterns are reversed among unconnected candidates, who all have top executive experience by construction; only approximately 10% and 5% have director and CEO experience, respectively.

I interact individual characteristics – namely, age, non-Danish origin, marital status, number of children, number of years of education, whether the woman has a university degree, industry background, number of years of professional experience, CEO experience, and board experience – with $Treated_i$ and $Post_t$. These interaction terms alleviate the concern that observable differences between connected and unconnected potential candidates – rather than the family connection – explain the higher probability of appointment of connected women.

5 Results

5.1 Response to the quota and network-based hiring

Figure 4 plots the unconditional share of i) women in appointments (Panel A), ii) women in unconnected appointments (Panel B), iii) women in connected appointments (Panel C), and iv) connected directors in female appointments (Panel D) in treated and control firms. All outcomes follow stable and parallel paths in treated and control firms before the reform and show an increase in treated firms following the reform. This result is confirmed in Figure 5, which displays the coefficients from the dynamic specification in equation 3. I detect no significant differential pre-reform trends in either of the outcomes, and the effect of the reform emerges gradually over time after 2012.

Table 5 shows the regression results obtained by estimating equation 1. All specifications include year fixed effects. The coefficient on $Treat \times Post$ captures the average

effect of the law on the different outcomes. Considering that family connections may partly signal qualifications, even-numbered columns display the results based on regressions augmented with controls for appointments of directors with specific characteristics. Specifically, I add the share of new hires with i) a university degree, ii) director experience, iii) CEO experience, and iv) top executive experience.

Column 1 of Table 5 shows that the law increases the share of women in appointments by 7.6 percentage points. The effect is statistically significant at the 1% level and economically meaningful with respect to the baseline of 10%. Column 2 shows that among unconnected appointments, the share of women increases by 4.6 percentage points from a 10% baseline, which is significant at the 5% level. Column 3 shows that the effect is stronger among connected appointments: in this recruitment pool, the share of women increases by 29 percentage points from a baseline of 11.5%, which is significant at the 1% level. In other words, the share of women among connected appointments more than tripled after the reform. While the appointment of connected directors represents a minority of all appointments realized during the sample period, this intensification of network-based hiring is reflected in the total composition of female hires. Column 4 shows that the share of connected directors among female appointments increases by 12.3 percentage points from a baseline of 7.9% – i.e., more than doubled – after the reform. The inclusion of controls leaves the different estimates unchanged.

Overall, the results presented in Table 5 show that firms respond to the quota by disproportionately appointing women with family connections to incumbent directors and CEOs, indicating an increase in network-based appointments following the quota.

5.1.1 Heterogeneity by type of firms

Table 6 replicates the main results in different subsamples. In columns 1 and 2, listed firms are excluded as they may be subject to greater public attention and more pressure from investors and may have reacted to the announcement of the 2012 European directive. The results remain similar, indicating that the effect does not result from specific factors affecting only listed firms. Columns 3 and 4 indicate whether the effect is mainly driven by family firms. Family firms may have natural family candidates and organizational rules

facilitating the appointment of family members, making them likely to react to the reform by appointing a connected woman. I classify firms as family firms if three or more family members were involved as directors or CEO in 2010 or 2011. In non-family firms, the share of women among connected appointments increases by 26 percentage points with significance at the 5% level, an estimate that is very similar to that obtained when using the full sample. Excluding family firms moderately reduces the magnitude of the reform effect on the share of connected directors among female appointments, perhaps reflecting that connected appointments represent a smaller share of the total number of appointments in non-family firms. The share of connected directors among female appointments increases by 8.5 percentage from a baseline of 6%, which is significant at the 10% level. This evidence indicates that reliance on family connections following the reform was a general practice rather than being specific to family firms.

5.1.2 Robustness checks

Tables 7, 8, 9 and 10 present the results of several robustness tests.

Firm fixed effects In Table 7, I show similar results using alternative outcomes to include firm fixed effects. I define two indicator variables at the firm level. The first variable captures the probability of appointing an *unconnected* woman and is equal to one if the firm appoints an unconnected woman in a given year and zero otherwise. The second variable captures the probability of appointing a *connected* woman and is equal to one if the firm appoints a connected woman in a given year and zero otherwise. Compared to the outcomes in the main analysis that are coded as missing in the years where no appointment is made, these two variables also provide information on the decision of firms not to appoint any director, since firm-year observations in which no appointments are made are coded as zero. This feature also allows me to perform the analysis with firm fixed effects, since I have time series for each firm. Table 7 shows that the quota increases the probability of appointing an unconnected female director in a given year by 2.6 percentage points from a baseline of 4.4% (see column 1) and the probability of appointing a connected female director by 1.3 percentage points from a baseline of 0.4%

(see column 3). Economically, these numbers reveal an intensification of network-based appointments: after the reform, firms become more than four times more likely to appoint a connected woman and 1.6 times more likely to appoint an unconnected woman.

Firm size In Table 9, I present the two main tests described in Section 4.1 addressing the fact that the average sizes of control and treated firms differ. Column 1 shows the baseline specification. Column 2 shows the results obtained when augmenting the regression with time-varying controls for firm assets, profits, and number of employees, as well as interactions between pre-reform assets, profits, number of employees, number of directors, number of seats held by directors, share of directors with a university degree, share of directors with previous board experience, share of female directors, and year fixed effects. The results show that the share of connected directors among female appointments increases by 16.6 percentage points from the baseline of 7.9%, a larger increase than in the basic specification. Thus, the results are not biased by differential trends caused by differences in observable characteristics. In column 3, I replicate the result in a sample retaining only comparable treated and control firms. Specifically, I keep small treated firms, i.e., firms that are below the median value in terms of assets, profits, and number of employees among treated firms, and large control firms, i.e., firms that are above the median value in terms of assets, profits, and number of employees among control firms. This approach yields a sample of 270 firms and successfully eliminates the differences between treated and control firms (see Table 8). In the restricted sample, the average firm has 225 employees and assets of DKK 316 million. In this sample, the reform leads to a 37.3 percentage-point increase in the share of connected directors among female appointments, from a baseline of 10.5%, with significance at the 1% level. This effect is larger than for the full sample, indicating that the recruitment of women through family ties after the reform is stronger in smaller firms.

Design choices and placebo tests In Table 10, I show that the results are robust to different methodological choices and placebo tests. Column 1 shows the baseline specification. In column 2, I replicate the results using the full sample, i.e., including firms that

have missing financial information during the sample period. In Column 3, I replace the intent-to-treat indicator as the treatment variable with a variable equal to 1 if a firm is treated in a given year and zero otherwise. Second, I perform three placebo tests. In column 4, I show that the reform did not increase the appointment of women with ties to incumbent directors at *untreated* firms, supporting the interpretation that the connection – rather than other factors correlated with family connections – is the main determinant of the appointment. In column 5, I estimate the effect of a placebo reform placed in 2009 on the sample restricted to the years 2007-2011 and show that the point estimate is drastically reduced to 1.7 percentage points and statistically nonsignificant. In column 5, I estimate the reform effect on the share of connected directors among *male* appointments and find a small negative effect of 2.8 percentage points from a baseline of 6.2%, which is significant at the 10% level. The results suggest that a small share of connected male directors might have been substituted by the appointment of connected women.

5.2 Consequences for board opportunities for potential candidates

In this section, I study the effect of the quota on board opportunities for potential female candidates depending on their family connections. Figure 6 shows the share of women appointed in a given year in each group for connected (Panel A) and unconnected (Panel B) potential candidates. The probability of being appointed is stable and follows parallel paths among connected and unconnected potential candidates at treated and control firms before the reform. When the reform occurs, the probability of being appointed increases sharply among connected potential candidates at treated firms (see Panel A) and increases slightly for unconnected potential candidates at treated firms (see Panel B).

This result is confirmed in Figure 7, which displays the coefficients from the dynamic specification in equation 4, estimated separately for connected (Panel A) and unconnected (Panel B) potential candidates. That is, I compare potential female candidates connected to treated and untreated firms before and after 2012 (Panel A) and unconnected potential candidates related to treated and untreated firms before and after 2012 (Panel B). First, for both groups, I detect no significant differential pre-reform trends in the probability of being appointed between candidates at treated and untreated firms. This result

is confirmed by the test for pre-reform trends in the triple differences based on equation 5. I fail to reject the null hypothesis of parallel trends ($\beta_4 = -.0005$, p-value$= 0.31$). Second, the positive effect of the quota on the probability of being appointed of connected potential candidates emerges after 2012. The quota has no positive effect on the probability of appointment for unconnected potential candidates.

Table 11 displays the regression results. All specifications include individual and year fixed effects, and standard errors are clustered at the individual level. In columns 1 and 2, *treat* $\times$ *post* captures the effect of the law on the probability of being appointed for connected and unconnected potential candidates, respectively. Connected potential candidates are three times more likely to be appointed after the reform ($0.0019/0.0008 = 2.1$, see column 1), whereas for unconnected potential candidates, I detect no significant effect on the probability of being appointed (see column 2). Column 3 reports the results based on the triple-difference specification in equation 2. The triple-differences estimate confirms the result obtained in columns 1 and 2: the probability of being appointed increases by 0.2 percentage points for connected potential candidates relative to unconnected potential candidates after the reform from a baseline of 0.1%, a result that is significant at the 5% level. In column 4, I estimate the same regression using the number of appointments at treated firms as an alternative outcome. The estimate has a similar significance level and increases slightly in magnitude when considering the number of board appointments, suggesting that some connected women were appointed to several boards.

Overall, these results show the relative advantage of connected potential candidates and indicate that they were the main beneficiaries of the reform. Unconnected potential candidates, while highly qualified and visible, did not reap the benefits of the reform, suggesting that the reform missed its goal of smoothing access to the boardroom for all qualified women.

Differences between connected and unconnected potential candidates I test the robustness of the results to the inclusion of controls for observable differences between connected and unconnected candidates described in Section 4.1. Table 12 shows the results of the triple-difference specification in equation 2 including interactions between

individual characteristics and *Treat* and *Post*. Column 1 replicates the baseline specification. Columns 2 and 3 include controls for differences in demographic and family characteristics. Column 4 includes controls for differences in education, and column 5 includes controls for industry background. Columns 6 to 9 control for differences in professional experience, CEO experience, and director experience. The parameter estimate remains relatively stable across specifications, with magnitudes ranging from 0.18 percentage points to 0.32 percentage points, compared to the magnitude of 0.21 percentage points in the baseline specification. All estimates are significant at the 5 or 10% level. The results thus show that the advantage of connected potential candidates over unconnected candidates results from their connections rather than from other individual characteristics.

6 Do network-based hiring practices create search frictions in the recruitment of female directors?

Whether network-based hiring practices allow boards to appoint the most qualified directors remains an empirical question. On the one hand, boards could use the network of incumbent directors and CEOs when searching for potential directors because it helps them to reach the most qualified candidates. On the other hand, such a network-based search could lead boards to hire from a restricted pool of candidates, therefore excluding part of the talent pool from the search process and ultimately leading to the recruitment of less qualified directors. For women in particular, network-based hiring could lead boards to recruit from a very restricted pool of candidates, since they tend to be underrepresented in incumbent director and CEO networks (Von Essen and Smith (2021)).

In this section, I provide suggestive evidence on this question by exploring the qualifications of connected and unconnected female directors and of female directors appointed before and after the reform.

Qualifications of connected and unconnected female directors Table 13 displays the characteristics of female directors with and without previous family connections (fol-

lowing the same definition as in Section 3.3) at sample firms between 2007 and 2017. Connected female directors have fewer board seats and almost two fewer years of professional experience. The share of directors with previous top executive and director experience are similar across connected and unconnected female directors. However, unconnected female directors are more likely to have CEO experience. Finally, unconnected female directors are also more educated, as they possess one additional year of education and are 17 percentage points more likely to hold a university degree.

Overall, connected female directors appear to be less qualified than unconnected female directors. These patterns are in line with descriptive evidence provided in Bianco et al. (2015) and González et al. (2020). This evidence is consistent with network-based hiring practices leading to the recruitment of less qualified directors, indicating a potential loss of talented candidates excluded from the search process. Alternatively, family connections could substitute for other educational and professional credentials used in the recruitment process.

Qualifications of female directors appointed before and after the reform If sticky hiring norms based on networks constitute search friction in the recruitment of female board directors and the quota suddenly forced firms to hire more women without changing their hiring practices, this may have led to the recruitment of less qualified female directors. As a final exercise, I compare the qualifications of newly appointed female directors at treated firms before and after the reform. Table 14 shows the results. After the reform, there is a clear decrease in experience and a small decrease in the educational credentials of newly appointed female directors. Women appointed before the law are older and have more than 5 additional years of professional experience. Among women appointed before the law, 34 and 61% have top manager and previous director experience, respectively. After the law, these numbers decrease to 8 and 45%, respectively. While the differences in educational background are less pronounced, women appointed after the reform are also less likely to hold a university degree.

This last piece of evidence is consistent with the idea that boards consider the same restricted choice set of women before and after the reform. They start by choos-

ing the best qualified candidates and have to appoint the less qualified candidates as the required number of women on boards increases. This interpretation also helps to rationalize contradictory findings from previous studies. In the context of the Norwegian quota, Bertrand et al. (2019) show that the number of business women whose qualifications mirror those of the median male director is as large as 5,000, which is well above the total number of women on boards, yet Ahern and Dittmar (2012) find a clear decrease in the qualifications of female directors appointed following the law. This apparent contradiction could arise because, as in the Danish case, Norwegian firms mainly relied on traditional hiring networks to comply with the law, therefore overlooking a large pool of qualified female candidates. Finally, studying a board gender quota implemented in France, Ferreira et al. (2020) suggest that firms changed their search technology from network-based to executive search firms, therefore leading to an increase in the qualifications of newly appointed directors after the quota.

7 Conclusion

Mandatory board gender quotas are being implemented in an increasing number of countries but remain highly contested and controversial. One particular concern is which women benefit from these laws and the associated consequences for meritocratic selection. Since networks play a determinant role in board appointments, understanding the interaction between board gender quotas and network-based hiring practices is essential to inform this concern.

Board gender quotas does not have a clear predictive effect on network-based hiring practices. On the one hand, such laws could lead boards to adjust their hiring practices to find qualified women and rely less on the "old boys" networks. On the other hand, firms may find it costly to adjust and simply increase reliance on their traditional hiring networks.

This paper addresses this question by studying how a board gender quota implemented in Denmark in 2012 impacted a widespread practice in the recruitment of female directors: appointments through family connections. After establishing that blood- and

marriage-based ties play an important role in women's access to the boardroom, I find that the introduction of the quota intensified the recruitment of female directors through family ties, as shown by the composition of new female appointments changing to favor connected women. As a consequence, board opportunities increased for potential candidates with relevant family connections but not for other highly qualified but unconnected potential candidates. From the individual perspective, this finding suggests that the policy missed its goal of smoothing access to the boardroom for all qualified women. In addition, I find that the qualifications of connected female directors tend to be lower than those of other female directors, suggesting that such network-based hiring practices do not necessarily lead to the selection of the most qualified female candidates.

The evidence presented in this paper suggests that board gender quotas may lead to unintended consequences because they interact with deeply anchored hiring practices based on networks. Inspired by Ferreira et al. (2020), I propose a story that may account for the different findings in this paper. Before the quota, boards mainly relied on their direct networks to identify potential directors. Since women tend to be underrepresented in these networks, such hiring practices automatically led to women being underrepresented in the boardroom. After the introduction of the gender-balance law, firms did not renew their hiring practices to identify qualified women but in fact relied more on their usual hiring networks. This in turn led boards to choose new female directors from the same restricted pool of potential female candidates as before the law, therefore leading to a decrease in the qualifications of the newly appointed directors.

From a policy perspective, one implication of this paper is that numerical targets alone may not be sufficient to reform sticky hiring practices that exclude women from certain positions. However, this work does point toward potential solutions. First, an increased level of transparency in board appointment processes could help to break the path of dependence on "old boys" networks and bring more women into the pool of candidates. Second, reducing the costs associated with switching search technology may help firms adjust more rapidly to quotas.

While this article represents a first step in informing how women are selected for directorships, one open question is whether the conclusions can be generalized to

other types of networks. Although blood- and marriage-based ties arguably represent a major pathway to female business leadership, some women access the boardroom differently – for example, through the intermediary of executive search firms or through internal promotion in the company – and the effect of gender-balance laws on such practices may differ. In addition, firms with high search costs may have reacted more quickly by appointing a woman from within their network, anticipating that a change in hiring practices was not an option. In the long run, as firms with lower search costs start to appoint women and the cost of searching for qualified women decreases, women with no previous access to traditional hiring networks could secure board positions.

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8 Figures and Tables

Figure 1: Reform impact

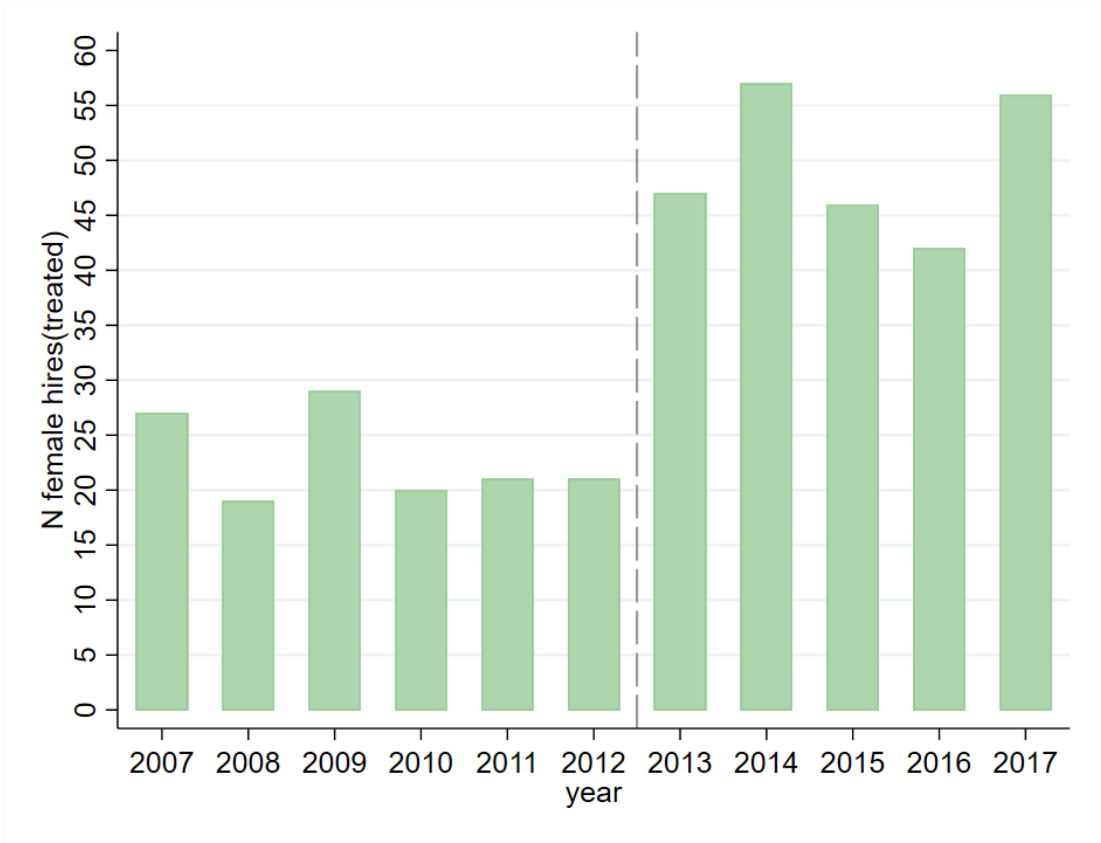
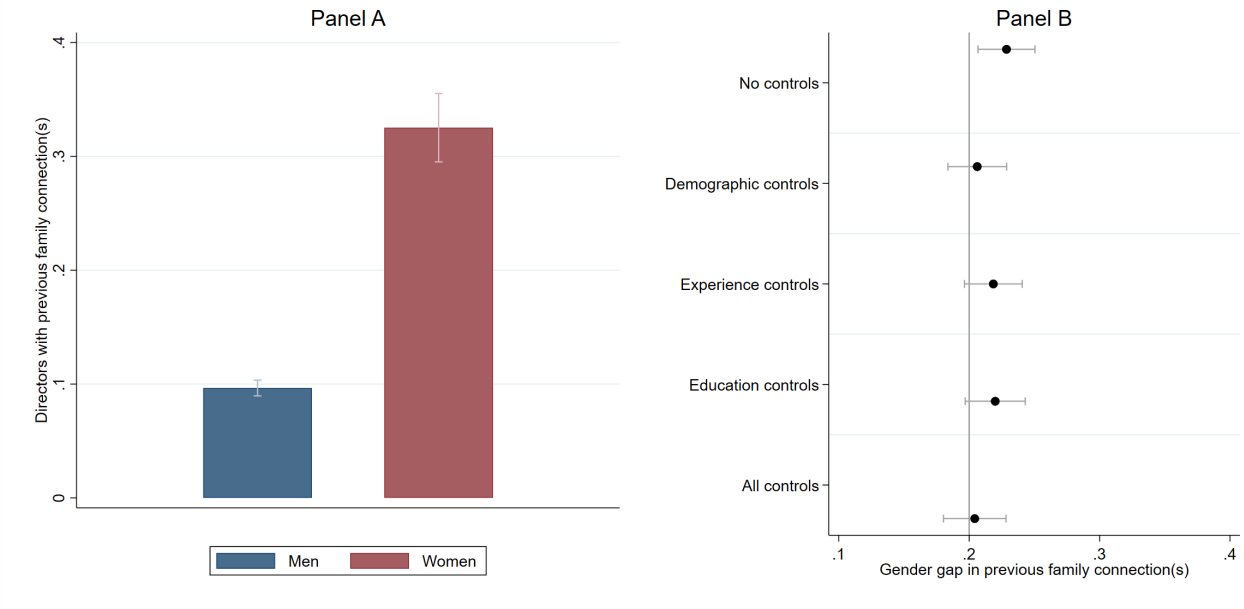


Figure 1 illustrates the positive shock on demand for female directors. Each bar corresponds to the total number of female hires in a given year, for the group of firms impacted by the law. Number of unique firms = 614, total number of female hires = 413.

Figure 2: Gender gap in family connections among board directors



Panel A of Figure 2 shows the share of male and female directors with previous family connections. Panel B of Figure 2 shows the gender gap in previous family connections conditional on a range of observable characteristics. The unit of observation is the person-position level. Demographic controls include age, married, children, and non-Danish origin. Experience controls include tenure, number of years of professional experience, top manager experience, director experience, and CEO experience. Education controls include number of years of education, university degree, and PhD degree. Definitions of variables are explained in Table 15.

Figure 3: Share of members with previous family connections, 2007-2017

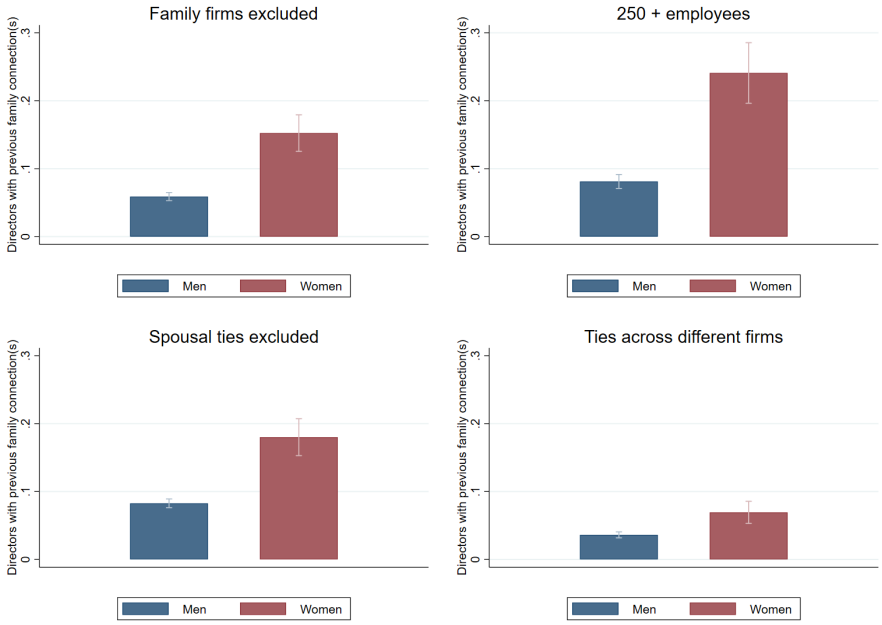


Figure 3 shows the share of male and female directors with previous family connections. The unit of observation is the person-position level. In the first row, family firms are dropped (graph on the left), and firms with less than 250 employees are dropped (graph on the right). In the second row, directors with spousal ties are dropped (graph on the left), and directors with family connections within the same firm are recoded as zero (graph on the right). Definitions of variables are explained in Table 15.

Figure 4: Time series - Composition of hires over time

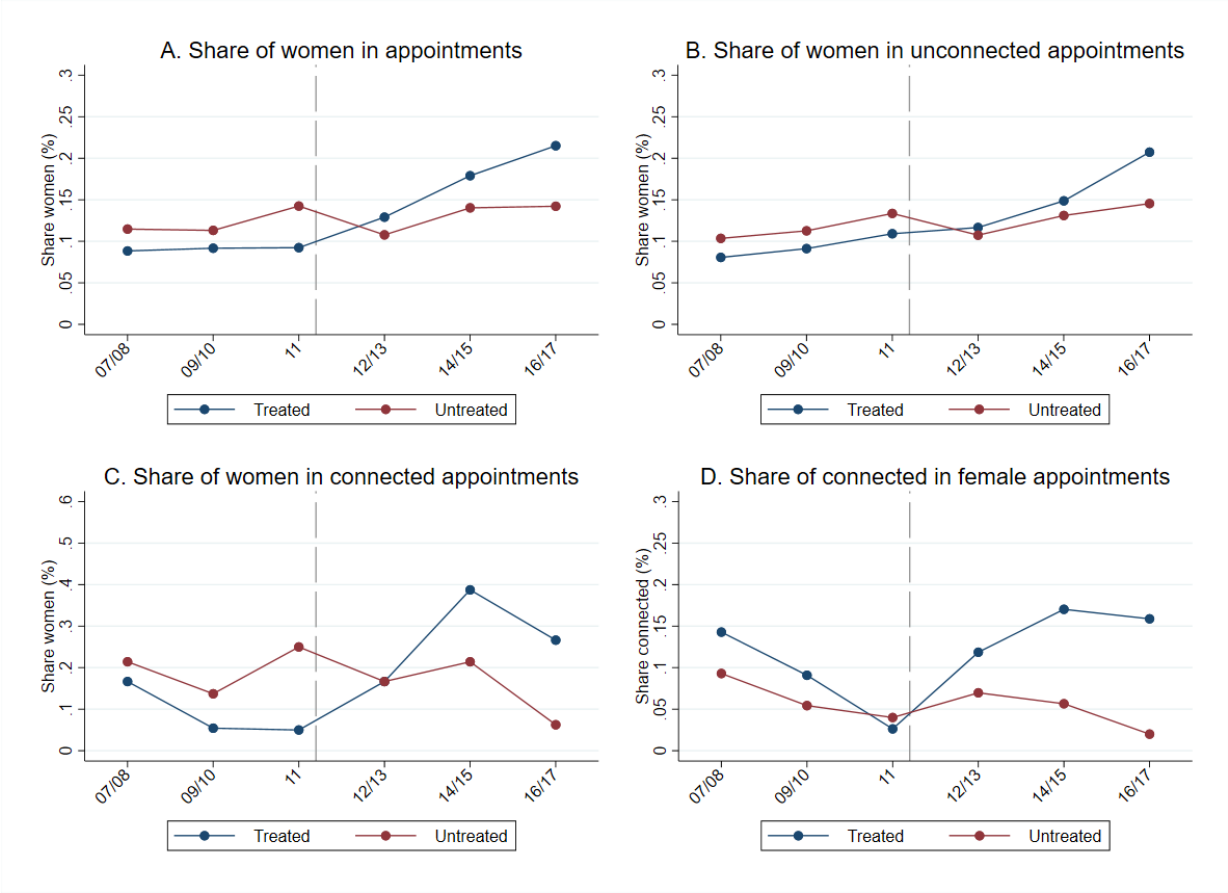


Figure 4 shows the unconditional share of i) women in appointments ii) women in unconnected appointments iii) women in connected appointments iv) connected directors in female appointments in treated and control firms. Variables definitions are available in Table 15.

Figure 5: Event study analysis - Effect of the board gender quota on network-based hiring

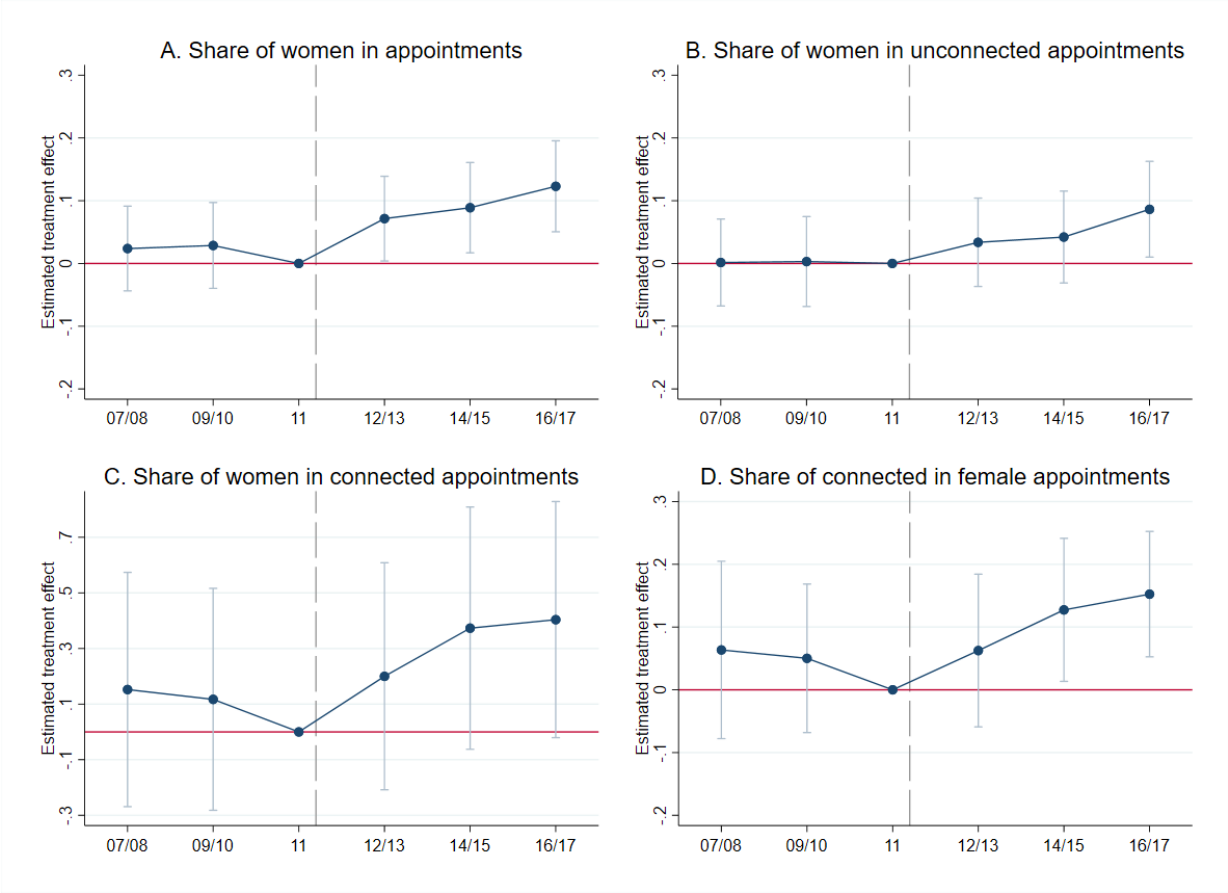


Figure 5 shows point estimates and 90 percent confidence intervals of the parameters β_t^T in equation 3. The variable $y_{i,t}$ is the share of i) women in appointments ii) women in unconnected appointments iii) women in connected appointments iv) connected directors in female appointments at firm i in year t. Standard errors are clustered at the firm level. The coefficients β_t^T measure the change in the outcomes following the reform. The coefficient β_{2011}^T is normalized to 0.

Figure 6: Time series: Unconditional probability of being appointed for connected and unconnected candidates, in treated and untreated firms

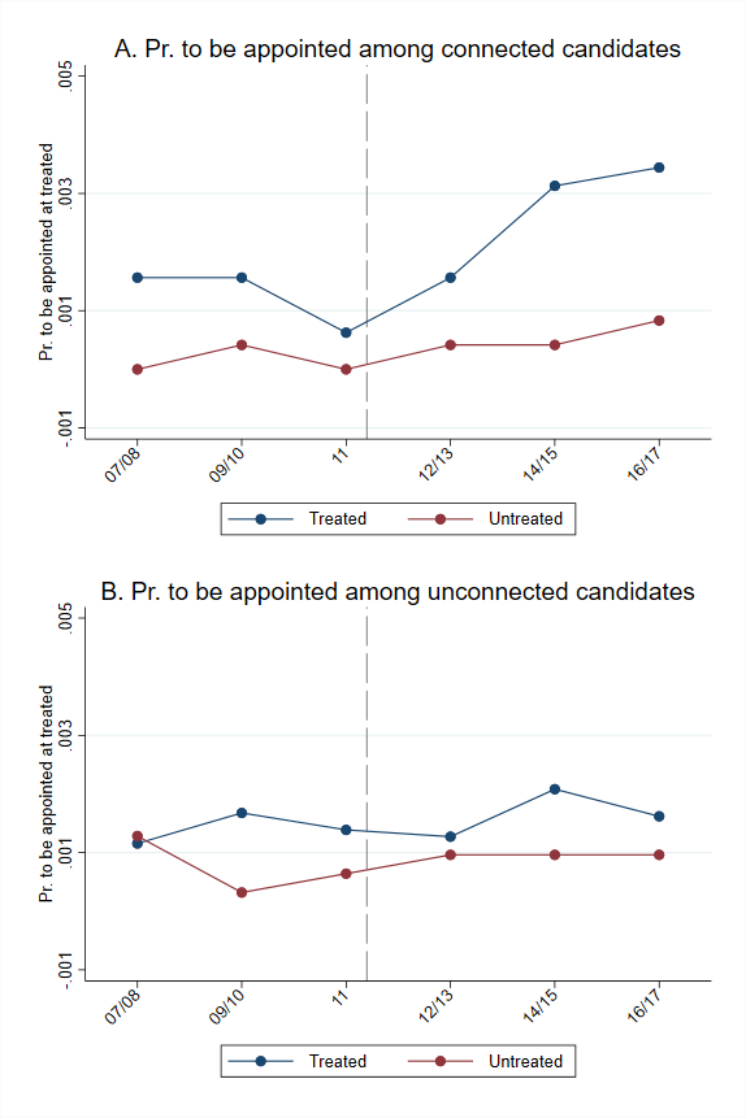


Figure 6 shows the probability of being appointed to the board of a treated firm among connected and unconnected potential candidates

Figure 7: Event study analysis: Effect of the board gender quota on the probability of being appointed of connected and unconnected candidates

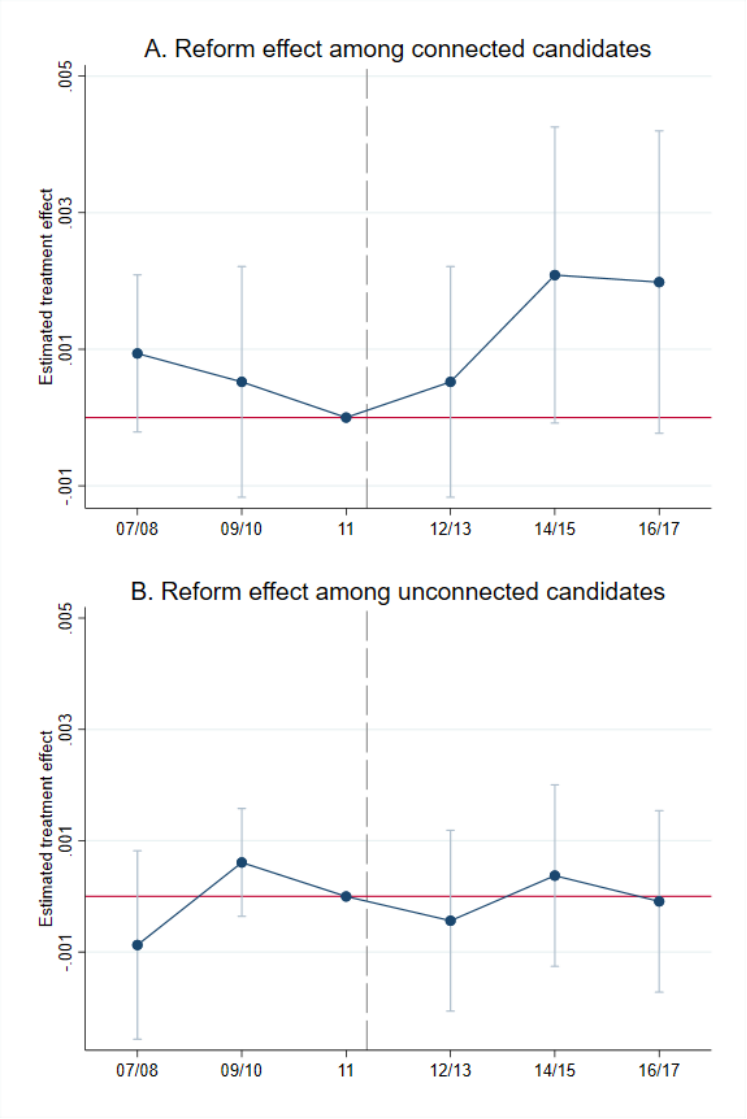


Figure 7 shows point estimates and 90 percent confidence intervals of the parameters β_t^T in equation 4. The variable $y_{i,t}$ is a dummy equal to one if women i is appointed to the board of a treated firm in year t. Standard errors are clustered at the individual level. The coefficients β_t^T measure the change in the probability of being appointed following the reform, for both groups of women separately. The coefficient β_{2011}^T is normalized to 0.

Table 1: Sample of firms: firm, board, and director characteristics

Table 1 Panel A and B display the number of observations, sample means, medians, and standard deviations of firm- and board-level characteristics for all firms. Time-varying variables are averaged over the sample period (2007-2017). The unit of observation is the firm. Panel C displays the summary statistics for male and female directors at sample firms. The unit of observation is the person-position level. The variables are defined in Table 15.

Panel A: Firm-level characteristics

Variable	Obs	Mean	Med	S.d
Profits/assets	1006	.058	.047	.259
Assets (M DKK)	1006	1535.041	261.648	9799.939
Profits (M DKK)	1006	1206.59	390.978	4326.949
N. Employees	1006	412.849	188.26	1020.187
Family firms	1006	.174	0	.379
Listed firms	1006	.041	0	.198

Panel B: Board-level characteristics

Variable	Obs	Mean	Med	S.d
Women share (%)	1006	.115	.035	.169
All-men board	1006	.679	.818	.374
Pr. appoint woman	1006	.063	0	.103
Pr. appoint connected woman	1006	.007	0	.039
N directors	1006	4.884	4.727	2.295
Age (mean)	1000	52.465	52.416	6.182
Professional experience (years, mean)	1006	20.898	21.61	7.031
Tenure (mean)	1006	7.369	4.828	7.348
Number of seats (mean)	1006	1.415	1.2	.526
University degree (%)	1001	.533	.542	.309
Top executive experience (%)	1006	.438	.442	.281
CEO experience (%)	1006	.531	.562	.292
Director experience (%)	1006	.651	.703	.282

Panel C: Directors characteristics

	All		Men		Women	
Variable	Obs	Mean	Obs	Mean	Obs	Mean
Age	7677	52.187	6756	52.735	921	48.174
Married	7677	.845	6756	.861	921	.725
Children (dummy)	8216	.874	7240	.885	976	.798
Previous family connection	7982	.123	7044	.097	938	.325
Non-Danish origin	7677	.025	6756	.023	921	.042
Chair or vice-chair	6361	.169	5676	.181	685	.069
Tenure (years)	8213	5.683	7237	5.583	976	6.428
Number of seats	8216	1.441	7240	1.475	976	1.184
Professional experience (years)	8216	20.392	7240	20.644	976	18.525
Top executive experience (dummy)	8216	.319	7240	.335	976	.195
Director experience (dummy)	8216	.667	7240	.692	976	.483
CEO experience (dummy)	8216	.543	7240	.58	976	.267
Education(years)	7037	14.557	6246	14.596	791	14.244
University degree (dummy)	7037	.519	6246	.528	791	.454
PhD degree (dummy)	7037	.01	6246	.01	791	.013
N unique individuals				5440		869
N unique individuals	6309		5440		869	

Table 2: Sample of potential female candidates

Table 2 displays the number of observations, sample means, medians, and standard deviations of individual characteristics for all potential female candidates. The unit of observation is the potential candidate. Time-varying variables are measured in 2011. The variables are defined in Table 15.

	All firms			
Variable	Obs	Mean	Med	S.d
	(1)	(2)	(3)	(4)
Age	13522	42.9517	43	11.899
Married	13522	.5947	1	.491
Children (dummy)	13827	.7101	1	.454
N Children	13827	1.4023	2	1.092
Non-Danish origin	13522	.0564	0	.231
Professional experience (years)	13827	16.5065	15.862	10.667
Top executive experience (dummy)	13828	.8426	1	.364
Director experience (dummy)	13827	.2233	0	.416
CEO experience (dummy)	13827	.1313	0	.338
Top ex/Director/CEO exp. (dummy)	13828	1	1	0
Education (years)	13420	14.7379	14	2.349
University degree (dummy)	13420	.449	0	.497
Pre-reform pr. appointment at treated firm	13827	.0054	0	.073

Table 3: Firm characteristics, by treated and control groups

Table 3 displays the number of observations, sample means, medians, and standard deviations of firm- and board-level characteristics for treated and control firms. The unit of observation is the firm. The last column reports the difference in mean of the pre-reform characteristics between treated and control firms. Time-varying variables are averaged over the pre-reform period (2007-2011). The variables are defined in Table 15. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

	Treated firms				Control firms				
Variable	Obs	Mean	Med	S.d	Obs	Mean	Med	S.d	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Firm-level characteristics									
Profits/assets	530	.083	.044	.739	455	.045	.054	.168	0.037
Assets (M DKK)	530	2286.803	511.855	10955.1	455	290.625	108.293	2163.165	1996.178***
Profits (M DKK)	530	1908.462	706.448	6176.14	455	245.782	185.723	864.494	1662.680***
N. Employees	530	646.668	314.807	1432.062	455	164.461	132.432	307.984	482.207***
Family firms	530	.128	0	.335	455	.235	0	.425	-0.107***
Listed firms	530	.064	0	.245	455	.015	0	.123	0.049***
Panel B: Board-level characteristics									
Women share (%)	530	.083	0	.152	455	.121	0	.19	-0.037***
All-men board	530	.747	1	.386	455	.666	1	.43	0.081***
Pr. appoint woman	530	.042	0	.096	455	.056	0	.124	-0.014**
Pr. appoint connected woman	530	.004	0	.029	455	.004	0	.029	0.001
N directors	530	5.167	5	2.59	455	4.574	4.2	2.301	0.593***
Age (mean)	524	55.353	54.939	6.499	449	53.988	53.597	7.229	1.365***
Professional experience (years, mean)	530	21.589	22.39	8.364	455	22.173	23.045	7.736	-0.584
Tenure (mean)	530	7.898	4.568	8.899	455	7.681	5	8.004	0.218
Number of seats (mean)	530	1.51	1.267	.621	455	1.281	1	.482	0.229***
University degree (%)	525	.573	.6	.33	451	.504	.5	.334	0.068***
Top manager experience (%)	530	.489	.49	.306	455	.444	.44	.3	0.044**
CEO experience (%)	530	.519	.54	.318	455	.507	.5	.314	0.012
Previous director experience (%)	530	.671	.733	.299	455	.62	.667	.321	0.050**

Table 4: Potential female candidate characteristics, by connected and unconnected groups, across treated and untreated firms

Table 4 displays the number of observations, sample means and standard deviations of individual characteristics for connected and unconnected potential candidates, by treated and untreated firms. Columns 10 and 16 report differences in mean between connected and top executives in each group. The unit of observation is the potential candidate. Time-varying variables are measured in 2011. Variables are defined in Table 15. *, **, and *** denote significance at 10%, 5%, and 1%, respectively

	Treated						Difference	Untreated						Difference
	Connected			Unconnected				Connected			Unconnected			
Variable	Obs	Mean	S.d	Obs	Mean	S.d	(2)-(5)	Obs	Mean	S.d	Obs	Mean	S.d	(9)-(11)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Age	1598	51.2509	13.38	8396	40.1062	10.581	11.145***	1201	51.438	12.922	1518	42.4071	10.034	9.031***
Married	1598	.7778	.416	8396	.5361	.499	0.242***	1201	.7802	.414	1518	.5586	.497	0.222***
Children (dummy)	1598	.8874	.316	8642	.6497	.477	0.238***	1201	.8893	.314	1558	.6919	.462	0.197***
N Children	1598	1.9537	1.045	8642	1.2268	1.063	0.727***	1201	1.9775	.998	1558	1.3228	1.049	0.655***
Non-Danish origin	1598	.0144	.119	8396	.0717	.258	-0.057***	1201	.0258	.159	1518	.0547	.227	-0.029***
Professional experience (years)	1598	16.8654	10.336	8642	15.6868	10.714	1.179***	1201	18.0821	10.018	1558	17.7042	10.669	0.378
Top executive experience (dummy)	1598	.2428	.429	8642	1	0	-0.757***	1201	.1965	.398	1558	1	0	-0.803***
Director experience (dummy)	1598	.7034	.457	8642	.0892	.285	0.614***	1201	.7269	.446	1558	.1335	.34	0.593***
Recent Director experience (dummy)	1598	.5682	.495	8642	.0724	.259	0.496***	1201	.5887	.492	1558	.1142	.318	0.474***
CEO experience (dummy)	1598	.383	.486	8642	.055	.228	0.328***	1201	.4147	.493	1558	.0956	.294	0.319***
Recent CEO experience (dummy)	1598	.3191	.466	8642	.0429	.203	0.276***	1201	.3281	.47	1558	.0757	.265	0.252***
Top ex/Director/CEO exp. (dummy)	1598	1	0	8642	1	0		1201	1	0	1558	1	0	
Education (years)	1591	15.1113	2.612	8293	14.6366	2.299	0.475***	1196	14.8909	2.564	1520	14.6478	2.133	0.243***
University degree (dummy)	1591	.5619	.496	8293	.4206	.494	0.141***	1196	.4858	.5	1520	.4342	.496	0.052***
Pre-reform pr. appointment at treated firm	1598	.0063	.079	8642	.0067	.082	-0.000	1201	.0008	.029	1558	.0032	.057	-0.002

Table 5: Effect of the reform on network-based hiring

Table 5 shows the effect of the board gender quota on the share of i) women in appointments (columns (1) and (2)) ii) women in unconnected appointments (columns (3) and (4)) iii) women in connected appointments (columns (5) and (6)) and iv) connected directors in female appointments (columns (8) and (9)). Controls include the share of new hires with a university degree, the share of new hires with director experience, the share of new hires with CEO experience, and the share of new hires with top executive experience. Mean of DV reported using pre-reform years. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Dep. Var.:	Share women in appointments		Share women in unconnected app.		Share women in connected app.		Share connected in female app.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	-0.0254*	-0.0233*	-0.0185	-0.0170	-0.1040*	-0.0830	0.0116	0.0129
	(0.0141)	(0.0137)	(0.0146)	(0.0142)	(0.0594)	(0.0558)	(0.0338)	(0.0336)
Treat × Post	0.0757***	0.0719***	0.0463**	0.0440**	0.2938***	0.2650***	0.1258***	0.1233***
	(0.0210)	(0.0206)	(0.0213)	(0.0209)	(0.0931)	(0.0935)	(0.0466)	(0.0460)
Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Pre-shock mean of D.V.	.1036	.1036	.1011	.1011	.115	.115	.0786	.0786
Adj. R2	.017	.067	.012	.065	.097	.166	.039	.062
Observations	3347	3347	3125	3125	326	326	636	636
N. Firms	950	950	927	927	241	241	424	424

Table 6: Effect of the reform on network-based hiring, excluding listed and family firms

Table 6 shows the effect of the board gender quota on the share of i) women in connected appointments and ii) connected directors in female appointments in non-listed firms (columns (1) and (2)) and in non-family firms (columns (3) and (4)). Controls include the share of new hires with a university degree, the share of new hires with director experience, the share of new hires with CEO experience, and the share of new hires with top executive experience. Mean of DV reported using pre-reform years. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Dep. Var.:	Listed firms excluded		Family firms excluded	
	Share women in connected app.	Share connected in female app.	Share women in connected app.	Share connected in female app.
	(1)	(2)	(3)	(4)
Treat	-0.1159*	0.0037	-0.0716	-0.0002
	(0.0603)	(0.0348)	(0.0668)	(0.0330)
Treat × Post	0.2771***	0.1117**	0.2601**	0.0847*
	(0.0944)	(0.0477)	(0.1063)	(0.0463)
Year F.E	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Pre-shock mean of D.V.	.1111	.0757	.1168	.0599
Adj. R2	.091	.032	.108	.025
Observations	292	590	234	541
N. Firms	221	399	180	355

Table 7: Robustness checks: alternative outcomes and fixed effects

Table 7 shows the effect of the board gender quota on the probability of appointing an unconnected woman and on the probability of appointing a connected woman. Controls include a dummy equal to one if the firm hires a director with a university degree this year, a dummy equal to one if the firm hires a director with director experience this year, a dummy equal to one if the firm hires a director with CEO experience this year, and a dummy equal to one if the firm hires a director with top executive experience this year. All the specifications include firm and year fixed effects. Mean of DV reported using pre-reform years. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dep. Var.:	Pr. appoint Unconnected woman		Pr. appoint Connected woman	
	(1)	(2)	(3)	(4)
Treat × Post	0.0261***	0.0095	0.0131***	0.0104***
	(0.0092)	(0.0067)	(0.0032)	(0.0031)
Firm F.E	Yes	Yes	Yes	Yes
Year F.E	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Pre-shock mean of D.V.	.0436	.0436	.004	.004
Adj. R2	.004	.515	.003	.114
Observations	10374	10044	10374	10044
Firms	1006	1001	1006	1001

Table 8: Summary statistics, restricted sample

Table 8 displays the number of observations, sample means, medians, and standard deviations of firm- and board-level characteristics for the restricted sample, and for control and treated firms. The restricted sample is constructed as follows: I keep small treated firms, i.e, firms that are below the median value in terms of assets, profits, and number of employees among treated firms, and large control firms, i.e, firms that are above the median value in terms of assets, profits, and number of employees among control firms. Time-varying variables are averaged over the pre-reform period (2007-2011). The last column reports the difference in mean of the pre-reform characteristics between treated and control firms. Variables are defined in Table 15. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

	All				Treated firms				Control firms				
Variable	Obs (1)	Mean (2)	Med (3)	S.d (4)	Obs (5)	Mean (6)	Med (7)	S.d (8)	Obs (9)	Mean (10)	Med (11)	S.d (12)	Difference (6)-(10)
Panel A: Firm-level characteristics													
Profits/assets	270	.049	.043	.094	167	.048	.041	.08	103	.05	.055	.115	-0.002
Assets (M DKK)	270	315.6	246.108	590.24	167	293.92	270.533	124.129	103	350.75	173.928	944.29	-56.831
Profits (M DKK)	270	446.845	356.576	1107.19	167	438.473	434.628	131.833	103	460.419	258.327	1790.069	-21.945
N. Employees	270	224.456	189.712	391.251	167	206.09	190.966	75.416	103	254.236	188.418	626.896	-48.146
Family firms	270	.215	0	.411	167	.216	0	.412	103	.214	0	.412	0.002
Panel B: Board-level characteristics													
Pr. appoint woman	270	.038	0	.093	167	.035	0	.088	103	.043	0	.1	-0.008
Pr. appoint connected woman	270	.005	0	.036	167	.004	0	.027	103	.008	0	.048	-0.004
N. appointed connected women	270	.005	0	.036	167	.004	0	.027	103	.008	0	.048	-0.004
N directors	270	4.972	5	2.215	167	4.898	5	2.128	103	5.092	4.8	2.354	-0.194
Women share (%)	270	.091	0	.156	167	.1	0	.167	103	.075	0	.134	0.025
All-men board	270	.727	1	.402	167	.713	1	.405	103	.75	1	.397	-0.037
Age (mean)	268	55	54.867	6.559	166	55.182	54.41	6.765	102	54.705	55.258	6.23	0.477
Professional experience (years, mean)	270	22.213	23.249	7.995	167	21.994	22.579	8.399	103	22.568	23.922	7.32	-0.574
Tenure (mean)	270	8.054	5	8.108	167	8.851	5.577	8.722	103	6.762	4.05	6.845	2.089**
Number of seats (mean)	270	1.454	1.2	.615	167	1.444	1.183	.602	103	1.471	1.2	.64	-0.027
University degree (%)	269	.539	.5	.327	166	.546	.533	.323	103	.527	.5	.336	0.019
Top manager experience (%)	270	.478	.5	.307	167	.47	.47	.309	103	.49	.5	.304	-0.020
CEO experience (%)	270	.498	.517	.31	167	.462	.5	.314	103	.558	.574	.297	-0.097**
Previous director experience (%)	270	.636	.673	.291	167	.607	.653	.294	103	.682	.733	.28	-0.075**

Table 9: Robustness checks: controlling for differential trends and restricted sample

Table 9 shows the effect of the board gender quota on the share of connected directors in female appointments. Column (1) replicates the baseline result. In Column (2), time-varying controls for firm assets, profits, and number of employees are included, as well as interactions between pre-reform assets, profits, number of employees, number of directors, number of seats held by directors, share of directors with a university degree, share of directors with previous board experience, and share of female directors (all variables measured in 2011) and year fixed effects. In columns (3), the analysis is performed using the restricted sample of comparable treated and control firms (see Table 8). Mean of DV reported using pre-reform years. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

	Basic specification	Controls for size & differential trends	Restricted sample
Dep. Var.:	Share connected in female app.	Share connected in female app.	Share connected in female app.
	(1)	(2)	(3)
Treat	0.0116	-0.0092	-0.1896*
	(0.0338)	(0.0431)	(0.1022)
Treat × Post	0.1258***	0.1666**	0.3726***
	(0.0466)	(0.0664)	(0.1351)
Year F.E	Yes	Yes	Yes
Pre-shock mean of D.V.	.0786	.0786	.1047
Adj. R2	.039	.179	.097
Observations	636	594	139
Firms	424	393	105

Table 10: Robustness checks: full sample, alternative treatment definition, and placebo tests

Table 10 shows the effect of the board gender quota on the share of connected directors in female appointments. Column (1) replicates the baseline result. In column (2), firms with missing financial information during the sample period are included. In column (3), the treatment variable is based on the post-reform treatment status rather than on the intent-to-treat status. In column (4), the outcome is the share of directors with family connections to *untreated* firms in female appointments. In column (5), the reform year is placed in 2009 and the sample of analysis is restricted to years 2007 to 2011. Columns (5) reports the results for men. Mean of DV reported using pre-reform years. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

	Basic specification	Full sample	Alternative treatment definitions	Connected to untreated	Placebo reform	Effect on men
Dep. Var.:	Share connected in female app.	Share connected in female app.	Share connected in female app.	Share connected in female app.	Share connected in female app.	Share connected in male app.
	(1)	(2)	(3)	(4)	(5)	(6)
Treat	0.0116	0.0064	0.0303	-0.2200***	0.0290	0.0541***
	(0.0338)	(0.0297)	(0.0348)	(0.0423)	(0.0499)	(0.0110)
Treat × Post	0.1258***	0.1212***	0.1072**	0.0160	0.0177	-0.0284*
	(0.0466)	(0.0422)	(0.0462)	(0.0547)	(0.0711)	(0.0155)
Year F.E	Yes	Yes	Yes	Yes	Yes	Yes
Pre-shock mean of D.V.	.0786	.0719	.0786	.1441	.1124	.0626
Adj. R2	.039	.036	.046	.127	.022	.015
Observations	636	740	547	636	229	3033
Firms	424	494	389	424	191	934

Table 11: Effect of the reform on the probability of being appointed for potential female candidates

Table 11 shows the differential effect of the reform on connected and unconnected potential candidates. Column (1) and (2) report the reform effect for connected and unconnected potential candidates, separately. Column (3) and (4) report the triple-difference estimate of the reform effect on returns to connections, using the probability and number of appointments as outcomes, respectively. All regressions include individual and year fixed effects, and standard errors are clustered at the individual level. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Dep. Var.:	Pr. to be appointed at treated firm			N appointments at treated firm
Sample:	Connected candidates	Unconnected candidates	All candidates	All candidates
	(1)	(2)	(3)	(4)
Treat × Post	0.0019**	-0.0002	-0.0002	-0.0004
	(0.0009)	(0.0005)	(0.0005)	(0.0007)
Connect × Post			-0.0003	-0.0004
			(0.0006)	(0.0007)
Connect × Treat × Post			0.0021**	0.0025**
			(0.0010)	(0.0012)
Individual F.E	Yes	Yes	Yes	Yes
Year F.E	Yes	Yes	Yes	Yes
Pre-shock mean of D.V.	.0009	.0012	.0012	.0012
Observations	30789	112200	142989	142989
N. Women	2799	10200	12999	12999

Table 12: Effect of the reform on the probability of being appointed for potential female candidates, controlling for observable differences

Table 12 shows the differential effect of the reform on connected and unconnected potential candidates. Demographic characteristics include age and non-Danish origin. Family characteristics include marital status and the number of children. Education includes the number of years of education and whether the woman has a university degree. Industry background is a dummy indicating the industry in which the woman has her most recent professional experience. Professional experience is the number of years of professional experience. All regressions include individual and year fixed effects. Standard errors are clustered at the individual level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dep. Var.:	Pr. to be appointed at treated firm								
Sample:	All candidates								
Controls for:	No controls	Demographic characteristics	Family characteristics	Education	Industry background	Professional experience	CEO experience	Director experience	All experience
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat × Post	-0.0002	0.0007	-0.0014*	-0.0031	-0.0002	-0.0005	-0.0002	-0.0001	-0.0004
	(0.0005)	(0.0011)	(0.0008)	(0.0034)	(0.0006)	(0.0007)	(0.0005)	(0.0004)	(0.0007)
Connect × Post	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0001	-0.0001
	(0.0006)	(0.0007)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0007)	(0.0010)	(0.0011)
Connect × Treat × Post	0.0021**	0.0023**	0.0020*	0.0018*	0.0026**	0.0021**	0.0023*	0.0031**	0.0032*
	(0.0010)	(0.0012)	(0.0011)	(0.0011)	(0.0012)	(0.0010)	(0.0012)	(0.0016)	(0.0018)
Individual F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic characteristics × Treat × Post	No	Yes	No	No	No	No	No	No	No
Family characteristics × Treat × Post	No	No	Yes	No	No	No	No	No	No
Education × Treat × Post	No	No	No	Yes	No	No	No	No	No
Industry background × Treat × Post	No	No	No	No	Yes	No	No	No	No
Professional experience × Treat × Post	No	No	No	No	No	Yes	No	No	Yes
CEO experience × Treat × Post	No	No	No	No	No	No	Yes	No	Yes
Board experience × Treat × Post	No	No	No	No	No	No	No	Yes	Yes
Pre-shock mean of D.V.	.0012	.0011	.0011	.0011	.0012	.0012	.0012	.0012	.0012
Observations	142989	139843	139843	138600	132462	142989	142989	142989	142989
N. Women	12999	12713	12713	12600	12042	12999	12999	12999	12999

Table 13: Female directors' characteristics, by Previous family connections

Table 13 displays the number of observations and sample means for connected and unconnected female directors at sample firms between 2007 and 2017. Columns (7) reports differences in mean between unconnected and connected female directors. The unit of observation is the person-position level. Variables are defined in Table 15. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

	No prev. family connection		Prev. family connection		Difference
Variable	Obs	Mean	Obs	Mean	(4)-(2)
	(1)	(2)	(3)	(4)	(7)
Age	610	48.205	300	47.927	-0.278
Married	610	.731	300	.733	0.002
Children (dummy)	633	.823	305	.843	0.020
Tie at *any* Danish firm	633	.463	305	1	0.537***
Non-Danish origin	610	.048	300	.02	-0.028**
Chair or vice-chair	442	.057	219	.096	0.039*
Tenure (years)	633	4.535	305	10.564	6.029***
Number of seats	633	1.217	305	1.128	-0.089**
Professional experience (years)	633	19.704	305	17.786	-1.918***
Top manager experience (dummy)	633	.183	305	.233	0.050*
Director experience (dummy)	633	.487	305	.498	0.012
CEO experience (dummy)	633	.3	305	.213	-0.087***
Education(years)	531	14.588	242	13.509	-1.079***
University degree (dummy)	531	.505	242	.339	-0.166***
PhD degree (dummy)	531	.015	242	.008	-0.007
N unique women	552		282		

Table 14: Female hires' characteristics, before and after the reform

Table 14 displays the number of observations and sample means for female directors appointed at treated firms before and after the reform. Columns (7) reports differences in mean between female directors appointed before and after the reform. The unit of observation is the person-position. The sample period corresponds to the years 2007-2017. Variables are defined in Table 15. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

	Before or in 2012		After 2012		Difference
Variable	Obs	Mean	Obs	Mean	(4)-(2)
	(1)	(2)	(3)	(4)	(7)
Connected	134	.082	236	.182	0.100***
Tie at *any* Danish firm	134	.537	236	.623	0.086
Age	133	47.353	225	43.551	-3.802***
Married	133	.707	225	.733	0.027
Children (dummy)	137	.839	248	.746	-0.093**
Non-Danish origin	133	.038	225	.049	0.011
Chair or vice-chair	137	.117	150	.02	-0.097***
Tenure (years)	137	0	248	0	
Number of seats	137	1.19	248	1.315	0.125*
Professional experience (years)	137	20.656	248	15.512	-5.144***
Top manager experience (dummy)	137	.336	248	.077	-0.259***
Director experience (dummy)	137	.613	248	.452	-0.162***
CEO experience (dummy)	137	.38	248	.286	-0.093*
Education(years)	111	14.799	182	14.659	-0.139
University degree (dummy)	111	.595	182	.495	-0.100*
PhD degree (dummy)	111	.027	182	.016	-0.011
N unique women	121		214		

Appendix

A Variable description

Table 15: Definition of Variables

Table 15 describes the variables used throughout the paper.

Variable	Description	Source
Individual characteristics		
Previous family connection	Variable is equal to 1 if the person has a close relative or spouse who ever was a CEO or director at a sample firm and started her career before her, and 0 otherwise	Administrative+Management registers
Women	Variable is equal to 1 if the individual is a woman, and 0 if it is a man	Administrative registers
Age	Person's age	Administrative registers
Married	Variable is equal to 1 if the individual is married, and 0 otherwise	Administrative registers
Children	Variable is equal to 1 if the individual has children, and 0 otherwise	Administrative registers
Non-Danish origin	Variable is equal to 1 if the individual is from a non-Danish background, and 0 otherwise	Administrative registers
Years of education	Total duration of education in years	Administrative registers
University degree	Variable is equal to 1 if the individual has a university degree, and 0 otherwise	Administrative registers
PhD degree	Variable is equal to 1 if the individual has a PhD degree, and 0 otherwise	Administrative registers
Director experience	Variable is equal to 1 if the individual has experience as a board director, and 0 otherwise[†]	Management registers
CEO experience	Variable is equal to 1 if the individual has experience as a CEO, and 0 otherwise[†]	Management registers
Professional experience	Number of years of professional experience (measured in 2011)	Labor force registers
Top executive	Variable is equal to 1 if the individual has experience as a top executive, and 0 otherwise (measured in 2011)	Labor force registers
Connected	Variable is equal to 1 if the individual has a tie based on blood or marriage with a person who was CEO or director at a treated firm between 2007 and 2011	Administrative+Management registers
Board characteristics		
Pr. appoint woman	Probability to appoint a female director	Management register
Pr. appoint connected woman	Probability to appoint a connected female director	Management register + Administrative registers
N directors	Number of board directors, excluding employees-elected directors	Management registers
Women share	Share of women on the board of directors	Management registers
All-men board	Variable is equal to 1 if there are only men sitting on the board of directors, and zero otherwise	Management registers
Age (mean)	Average age of members of the board	Management registers
Tenure (mean)	Average tenure of members of the board	Management registers
Number of seats (mean)	Average total number of seats of members of the board	Management registers
University degree	Share of board members who have a university degree	Management registers
Top manager experience	Share of board members who have top manager experience	Management registers + Labor force registers
CEO experience	Share of board members who had CEO experience prior to starting their position	Management registers
Director experience	Share of board members who had director experience prior to starting their position	Management registers
Firm characteristics		
Profits/ assets	Ratio of pre-tax earnings on the book value of total assets	Accounting registers
Assets (M DKK)	Book value of total assets	Accounting registers
Profits (M DKK)	Pre-tax earnings	Accounting registers
Employees	Number of employees	Accounting registers
Family firm	Variable equal to 1 if 3 or more family members are involved in the firm, either as board director or CEO, and 0 otherwise	Management registers

[†]: For directors, the variable is equal to one if the individual had experience before the start of her current position. For potential candidates, the variable is equal to one if the individual had experience before 2012 (year of implementation of the board gender quota).

B Family connections among Danish directors

Table 16: Types of family ties

Table 16 displays the distribution of family members among previous family connections. The sample is all unique relationships between directors and their previous family connection(s).

Family members	N	(%)
Father	420	30.9%
Mother	157	11.5%
Spouse	274	20.1%
Son	117	8.6%
Daughter	23	1.7%
Brother	299	22%
Sister	72	5.3%
N. of unique relationships	1,362	

C Construction of samples

C.1 Sample of firms

I start by extracting all Danish firms who have more than 100 full time equivalent employees on average during the sample period (2000-2017) from the *General Firm Statistics* registers provided by *Statistics Denmark* and keep only firms who have financial information every years (90% of firm-year observations). I further merge this dataset using the unique firm identifier with yearly management data provided by the *ES*. I restrict my sample to Danish directors elected at the general meeting (the law does not cover employees-elected directors).

D Law Details

Obligations On December 23, 2012, Denmark adopted Act no. 1383, which permanently required large Danish firms to decide on and to reach within four years a target figure for the representation of each gender on the board of directors. Four years is the maximum time it takes to replace the board of directors. The goal of the law was to "create a real increase in the share of women in management". The target figure had to be set at least equal to 40%, or the closest percentage to 40% depending on the total size of the board (see Table 17 for the mandated distributions based on board size). In addition, firms with more than 50 employees under the requirement to set a target figure had to establish a policy for increasing women's representation at other management levels (typically executive managers) to constitute a pool of qualified female candidates for the board of directors. However, there was no obligation to reach a target number for these other management levels.

Table 17: Minimum legal thresholds for target figures

Table 17 displays the minimum legal thresholds for setting the target figure depending on the total number of directors.

N. directors (total)	N. directors from minority	N. directors from majority	Minority (%)	Majority (%)
3	1	2	33.3%	66.7%
4	1	3	25%	75%
5	2	3	40%	60%
6	2	4	33.3%	66.7%
7	2	5	28.6%	71.4%
8	3	5	37.5%	62.5%
9	3	6	33.3%	66.7%
10	4	6	40%	60%
11	4	7	36.4%	63.6%
12	4	8	33.3%	66.7%
13	5	8	38.5%	61.5%
14	5	9	35.7%	64.3%
15	6	9	40%	60%

Incentives All companies had to include the following elements in a specific section of their annual report: the target figure and time required for achievement, the current board gender composition and the percentage of the target achieved, the measures taken to achieve the target, and the reasons for failure if the target was not achieved. Guidelines complementing the law include comprehensive indications on how the reporting must be done. For instance, reporting must occur in the form of one overall statement rather than in several places in the report in order to "provide clarity about whether there is a real increase in the share of women in management". In addition, firms that do not achieve their target have to provide detailed reasons for their failure: "The company must address the measures it has taken to achieve the target figure and on this basis conclude as to why to the target figure has not been reached". The annual report had to be audited and submitted to the Danish Business Authorities, as well as made available to the general public [15]. Failure to set a target figure and to report the different elements was punished by a fine. The law attracted great attention in the Danish media: between March and December 2012, no fewer than 16 articles about the law were published in *Politikken*, one

[15]The report must remain available for 5 years.

of most prominent Danish newspapers.

Background The debate around the implementation of a board gender quota was introduced to the Danish public in the fall of 2011 after national elections brought a social democrat government into power. They announced their willingness to "initiate a dialogue with the business sector in order to ensure more female members on boards of listed companies"[16] in their statement of intention. Initially focusing on listed companies, the proposal of a quota with financial penalties for noncompliance met with sharp resistance [17], and it was dropped in April 2012. This proposal was replaced by the "Danish model" of target figures, a law focusing on larger firms for which only the failure to comply with the reporting requirements would be punished by a fine, but not the failure to *reach* the target. The law was announced in May 2012 and adopted by the Danish parliament in December 2012, and it came into force in April 2013. Neither the details of implementation nor the group of affected firms was known before the law was announced in May 2012.

Eligibility Eligibility relied on a combination of several accounting criteria, which left other large Danish firms untreated. Firms exceeding two of three following criteria – total assets of 143 million DKK ($ 19 million), net revenue of 286 million DKK ($ 38 million), and an average of 250 full-time employees – for two consecutive years were subject to the law in the following year.

[16] *Regeringsgrundlag Oktober 2011 (Government Basis October 2011)*

[17] Source: Report on gender equality in Denmark - Directorate for internal policies, European Parliament

E Design checks

Figure 8: Manipulation test for sorting around the reform criteria

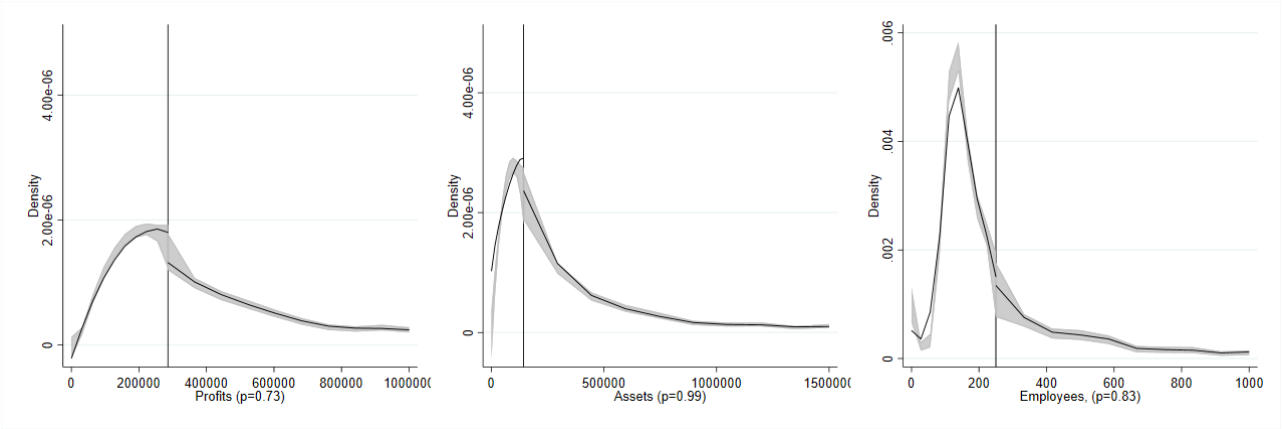


Figure 8 reports the fit of a McCrary test of continuity in the density of the profits (net revenues), the value of assets, and the number of full-time employees around the reform eligibility thresholds, using post-reform data. The p-value from the test for discontinuity at the threshold (313000, 156000, and 250 for profits, value of assets, and full-time employees, respectively) is reported below each graph.

Chapter 2

Value-based Leadership

Value-Based Leadership*

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ABSTRACT

The strength of personal values and how these penetrate firm organization is measured through a survey of 1500 Danish CEOs. We construct a measure of value-based leadership and investigate the impact on firm outcomes and firm policies. First, value-based leadership is more common in family firms and with female leadership, but not correlated to leaders' IQ nor to management practices. Second, value-based leadership is positively correlated to firm performance. Causal evidence is provided through the analysis of CEO changes and CEO hospitalizations. Third, value-based leaders build more resilient organizations in a pandemic crisis and generate less conflicts, lower employee turnover and have a flatter organizational structure in normal times. Taken together, leaders' personal values and how they spread through organizations are important factors in explaining the value they bring to their firms.

Keywords: CEOs, Values, Leadership, Performance

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"The principles of the Cadbury code are based on the same key moral guidelines that the Quaker pioneers believed in when they set up their businesses: openness, accountability, honesty, responsibility, fairness, and above all trust."
Adrian Cadbury, last family chairman of Cadbury and chairman of the Cadbury Code UK 1992, the first national code of good governance principles in the world.

1 Introduction

Are top leaders more effective when their management style is grounded in strong personal values? Value-based leadership (hereforth VBL) is a popular concept in the business press,[1] but has played a smaller role in academic economic and finance research, where it is considered a vaguely defined and hard to measure concept. It is well-established that the identity of the CEO is of importance for firm performances (see Bertrand and Schoar (2003a) and Bennedsen et al. (2007)), however little is known about what separates good and bad managers. In this paper we identify the strength of personal values and how these penetrate firm organizations as a novel channel through which CEO identity matters for firm policies and outcomes.

One prominent example of strong value-based leadership is the British chocolatier, Cadbury, created in 1837 by John Cadbury, a dedicated Quaker that taught in Sunday schools, advocated against social injustice and saw the new cocoa business as an affordable alternative to alcohol. The religious Quaker values of the Cadbury family penetrated the chocolate company such that the growth of the company catalyzed further investment in social courses from improving employees and their families health and education to active engagement in the anti-slavery movement. The key values of the Quaker religion made many Quaker firms very successful in the 19th century, not least because

[1] VBL is the core of several management books (Gilliland et al. (2003); Kraemer (2011); Kraemer (2015)), MBA and Executive courses at Business schools, and a peer-reviewed journal alimented by scholars and business leaders (*Journal of Values-Based Leadership*).

Quakers were trustworthy.[2] Almost 150 years later, Adrian Cadbury – the last family chairman and CEO of the Cadbury company – is appointed chairman of the first code of good corporate governance practice in the world. The Cadbury code is the blueprint for more than 70 country codes across the world. Although Quaker values were never specified in the code, for Adrian Cadbury they were essential: "The principles of the Cadbury code are based on the same key moral guidelines that the Quaker pioneers believed in when they set up their businesses: openness, accountability, honesty, responsibility, fairness, and above all trust" (Bennedsen and Cadbury (2013)).

We define value-based leadership as when decision-making and governance in a firm mirror the personal values of the individuals in charge (Bennedsen and Fan (2014)). We focus on CEOs' personal values and investigate to what extent they penetrate the entire organization. Firm culture is often defined as the combination of values and social norms that are present explicitly or implicitly in the firm (Graham et al. (2017)). Social norms are drivers of incentives and are known to all employees, as are consequences when they are broken (Fehr and Schurtenberger (2018)). Personal values of the CEO are used as drivers of intrinsic motivation and may be an integrated part of leadership style through several channels. First, they can be used as guidelines for decision-making in general and in particular in unprecedented situations, where experience-based decision making is less efficient.[3] Related to this, strong values can mitigate the adverse consequences of incomplete contracts (Guiso et al. (2015); Frydlinger and Hart (2019)). Second, when leaders' values penetrate the organization, it reduces coordination costs by permitting less monitoring and leading to higher utility and execution effort (Steen (2010)).

[2]The trustworthiness of the Quakers made them particularly successful in the financial sector where trust was highly sought after during the early industrial revolution in the 19th century UK. Banks like Barkley and Lloyd were founded by their namesake Quaker families.

[3]The worldwide luxury brand Hermès provides an example in which values were used to inform strategic decision-making. In the 60s, facing an increasing competitive pressure from product made of synthetic material, the CEO Robert Dumas-Hermès refused to develop similar products and chose to stick to the strict use of leather and silk. He made this decision in the name of the company's historical attachment to craftsmanship, quality, and patience, at the cost of short-term business opportunities. In 1970, the company had to stop the production for two weeks due to lack of orders (Bennedsen et al. (2015)).

Third, when top leaders' values penetrate the organization it also creates an identity for the firm and its stakeholders, and generates a formal or informal code of conduct. Finally, VBL may contribute to the formation of an homogeneous corporate culture, therefore indirectly enhancing performances (Kotter and Heskett (1992); Kreps (1990)).[4]

Our approach to quantify value-based leadership is survey-based. We have conducted a survey that elicits personal values of 1,500 CEOs in Denmark based on the methodology of the World Value Survey.[5] Our survey includes questions on personal values and on the interplay between values and leadership. We construct a VBL measure using factor analysis on answers to the 50 survey questions. This VBL measure captures both the personal values of the CEOs and to what extent these values are present in the firms they manage.

We begin the analysis by characterizing value-based leaders and their firms. We document that VBL is more common in family firms, defined as firms where multiple family members are involved. On average female CEOs score higher on our VBL scale than male CEOs. For a subset of CEOs, we compare our value-based leadership measure with a survey-based measure of management practices as developed in Bloom and Van Reenen (2007) and show that VBL is uncorrelated to survey measures of management practices. Finally, for a subset of male CEOs, we are able to use data from military drafting to compare VBL with a measure of IQ. Interestingly, we find that there is no correlation between intelligence and the VBL factor. This supports our claim that VBL is a novel channel through which the identity and personal traits of CEOs affect firm performance.

Our second contribution is to document that our VBL measure is positively correlated with firm performance. On average, CEOs that represent more value-based led firms have higher operating performance. In our most preferred specification, going from the 10th to the 90th percentile on the VBL factor predicts a 22% increase in performances. Furthermore, we derive a causal interpretation of the relationship between VBL and per-

[4]Sørensen (2002) provides one of the rare empirical test of the relationship between the strength of a the corporate culture and performance, and find that in stable environments, strong-culture firms have more reliable performance.

[5]http://www.worldvaluessurvey.org/wvs.jsp

formance through two additional exercises. First, we analyze CEO changes: When a firm hires a CEO from the above-median VBL score pool, performance increases the following years. Second, we study CEO hospitalization events: When a CEO with high-VBL score stays in hospital, it has a negative impact on firm performance, whereas we do not find any performance effect of the CEO hospitalization for CEOs with low-VBL score. To rule out the reverse causality between hospitalization and performance, we show that future hospitalization of high-VBL leaders does not impact current performance.

Our final contribution is to investigate how value-based leaders operate their companies and if we can find support for the theoretical arguments above. We first ask if value-based led organizations are more resilient in times of crisis. To answer this question we add a survey on the impact of the COVID19 crisis on firms (Bennedsen et al. (2020a)). We document that value-based leaders are more stakeholder-oriented, defined as they prioritize the well-being of communities, employees and customers more than survival. Furthermore, they were less likely to fire employees and less likely to take up government programs to furlough workers during the start of the pandemic crisis in the spring of 2020. This is consistent with VBL being used as guiding principles in novel business situations where experience-based leadership is less useful. We then proceed to analyse leadership behavior in non-crisis periods and find that high-VBL CEOs self-report less conflicts in their firms. Furthermore, firms run by high-VBL CEOs experience lower turnover, have more female employees and a less hierarchical organizational structure. These findings are consistent with value-based leadership reducing coordination costs and the need for monitoring, and providing an informal identity accepted by employees.

There is a growing empirical literature on the interaction between top leaders' individual traits and firm performance (for example: Bertrand and Schoar (2003b); Bennedsen et al. (2007); Malmendier and Tate (2008); Malmendier and Tate (2009); Kaplan et al. (2012) Bandiera et al. (2020)). It has been shown that prior corporate and non-corporate experience matters (Schoar and Zuo (2016); Schoar and Zuo (2017); Benmelech and Frydman (2015)), that networks created during education are correlated with firm policies and firm outcomes (Nguyen (2012); Kramarz and Thesmar (2013); Shue (2013)). Related to this literature, we propose top leaders' personal values as a channel through which the

identity of the CEO matters to performance.

Our paper provides empirical support to a theoretical literature emphasizing the role of managerial beliefs and vision for firm activities. Economists[6] have modelled how managers' characteristics (Steen (2005); Bolton et al. (2013); Dessein and Santos (2016); Steen (2018))[7] and leadership style (Rotemberg and Saloner (1993); Rotemberg and Saloner (1994); Rotemberg and Saloner (2000); Hermalin (1998); Hermalin (2007))[8] can help to monitor business activities and solve coordination issues. In particular, Steen (2005) proposes that managerial vision helps attract and retain employees with similar beliefs. Bolton et al. (2013) highlight how the CEO's resoluteness (or vision) can sustain her credibility among followers, which in turn aligns their incentives and increases performance.

The rest of this paper is organized as follows: In Section 2 we describe our data and provide descriptive statistics. In section 3 we identify firm and personal characteristics that are correlated with higher VBL scores. Section 4 documents the causal relationship between value-based leadership and firm performance. In Section 5 we analyze what leaders with strong values that penetrate their firms do differently. Section 6 concludes. We elaborate on the data construction and the factor analysis in the Appendix.

[6]Outside of economics, in the management, sociology, organizational psychology and organizational behavior literature, leadership has received considerable attention. For a perspective on the different approaches, see Nohria and Khurana (2010).

[7]Dessein and Santos (2016) show how small initial differences in managers' expertise can lead to important differences in strategic choices due to selective attention allocation in complex environments. Alternatively, Steen (2018) proposes that the fact that strategies reflect the leader's background is attributable to the need for credibility and confidence in the strategy execution.

[8]Rotemberg and Saloner (1993) and Rotemberg and Saloner (2000) mainly study how certain dimensions of leadership (the strength of empathy and vision, respectively) affect the distribution of incentives in the firm, and in turn, profitability. Hermalin (1998) and Hermalin (2007) propose a theory of "Leading by Example", in which the leader has informational advantage and solves the misaligned incentives problem by working hard to signal the high payoff of effort to followers.

2 Data and summary statistics

2.1 Quantifying leadership values

Our primary source of data for quantifying leadership values comes from a survey we conducted in 2015 in Denmark.[9] The survey focused on leaders' attitudes and personal values and was done through the Danish National Statistical Agency (*Statistics Denmark*), who were responsible for sending out the survey and collecting answers.[10] We contacted 49,799 CEOs[11] and collected 13,593 answers, resulting in a final response rate of approximately 27%.[12]

The survey contained 50 questions[13] in three main sections: the attitudes, social and leadership value section; a section about firm characteristics and the industry in which the firm operates; and, a section on change in ownership. In the first section we used questions routinely asked in the World Value Survey and the European Values Study.[14] For data on the interplay between values and leadership, we asked the CEOs questions covering the visibility of the management values in the firm, the role of their personal values in the daily management, and the strength of moral values in the business operation.

To identify variation in leadership values we first conduct a factor analysis. Table

[9] This subsection is a summary of Appendix B and C. Tables and figures are reported there.

[10] *Statistics Denmark* emailed an invitation to participate in the survey featuring a link to the questionnaire. After two weeks, non-responding CEOs were reminded with a second email, and ultimately received a phone call where they given the opportunity to answer the questionnaire in a phone interview.

[11] We started with all equity and limited liability companies in Denmark, which represent 39,3% of the active 280,000 companies (Source: *Statistics Denmark*). Among these firms, we identified the CEO in as many as we could, which left us with 49,799 firms.

[12] Response rate for CEOs surveys usually range between 9% and 16% (Graham et al. (2013)). However, this comparison has to be taken with caution since our original sample includes a large share of single-person companies.

[13] The exact wording of questions is provided in Table 15.

[14] Questions from these surveys are regularly used in economic research linking cultural and personal values to economic outcomes (La Porta et al. (1997); Au and Cheung (2004); Guiso et al. (2008); Gabaix and Landier (2008)).

16 in the Appendix shows the results of the Exploratory Common Factor Analysis (ECFA) for the 50 survey items. We obtain seven latent factors with an eigenvalue higher than one. Factor loadings display a clear pattern: the seven factors have distinct sets of loadings, and few survey items have high loadings on multiple factors. These results are indicative of a clear underlying structure in the data, and support the grouping of survey questions in seven unique factors: dishonesty, altruism, nationalism, leadership values, religiosity, trust, and interest for politics.

In this paper we focus on leadership values and use this factor as basis for our measure of value-based leadership. There are four questions that load high on our VBL factor, the highest being "To what extent are the management values visible to the employees and present in the company?". The second highest is "To what extent is there a clear, focused, and well-defined leadership in the company?" and these are followed by "To what extent do you think that your personal values are important to the company's operation?" and "To what extent is the business operation based on strong moral values, e.g keeping words, treating all stakeholders well?". These four questions are thus crucial for our quantification of the variation in value-based leadership. As our measure of value-based leadership we will primarily use the VBL factor and sometime supplement with a VBL index, which is constructed by taking the average of answers for each leader to the four questions identified above.

To document the consistency of our VBL measures we repeated two important questions ("To what extent are the management values visible to the employees and present in the company?" and "To what extent do you think that your personal values are important to the company's operation?") in a new survey we conducted in April 2020. Among the CEOs that participated in both the 2015 and the 2020 survey we found a strong positive association between our VBL measures in 2015 and the answers to the two key questions in 2020 (see Figure 9 and Table 18 in the Appendix). This is consistent with the view that management styles are shaped by early life factors and persistent over time (Schoar and Zuo (2017)).

2.2 Other data sources

We combine the survey data with firm and CEO-level data. Unique CEO and firm identifiers were provided by *Statistics Denmark* and allowed us to merge the survey with Danish administrative records.

The unique personal identification number allows us to merge the survey with Danish administrative records that cover the entire national population. From these records we obtain information on various personal characteristics of the CEO, such as sex, age, education, income etc.

Similarly, the unique firm identification number allows us to retrieve information on many aspects of the firms from Danish registers. Our main data sources are the Accounting Statistics register (FIRE)[15] and the General Company Statistics register (FIRM).[16] From these we obtain financial information (such as firm earnings, capital, debt) and other characteristics of the firm (such as age, legal type, number of employees, industry code). In addition, we use information on ownership and management from business registers provided by the Danish Business Authorities (*Erhvervsstyrelsen*). The list of variables is provided in Table 13.

2.3 Sample statistics

We start with all firms that answered the survey and retain only those with an average of at least 3 employees in a 3-year period before the survey[17], which results in a sample of

[15]The FIRE register records income and balance sheet statements for all active firms in Denmark.

[16]The FIRM register records additional statistics on labor forces and firm background information.

[17]We use the the average number of employees over 3 years rather than the number of employees in 2015 to smooth out fluctuations due to idiosyncratic factors.

1,557 unique firms.[18] [19]. Summary statistics are presented in Table 1.

Panel A of table 1 shows that sample CEOs are 54 years old on average. There are very few female CEOs, only 12% are women. Their educational level varies significantly with 32% of them holding a bachelor or higher degree. Most CEOs have been in the same firm for a long time with 84% of the sample having more than 10 years tenure.

Panel B displays summary statistics at the firm level. Our main measure of firm performance is operating returns on assets (OROA), computed as the ratio of pre-tax earnings to the book value of total assets[20]. The mean OROA is 8 % which is similar to other studies of small and medium sized firms in Denmark (see for instance Bennedsen et al. (2007)), and the net income over assets is slightly smaller. The average age of the firms is 17 years. Mean asset size is DKK 15 millions and the mean number of employees is slightly more that 14. Notice both these measures are highly skewed with few very big firms. Thus, we will use the logarithm to these variables in our analysis.

In Denmark there are two types of firm structure: limited liability firms for smaller firms where boards are optional, and A/S for relatively larger firms where boards are mandatory. We note that six out of ten firms are incorporated as APS, the incorporation for smaller firms. One out of two firms have a supervisory board. Around three out of four companies are founder managed and one in four are family firms with at least three family members involved in the board or management.

[18]The objective of the survey was partly to study entrepreneurship, thus there was no employment restriction on the surveyed firms. The relatively small sample size is therefore explained by the dominance of single-person companies in the initial sample of respondents, and by the Danish Business structure. Out of the 200,000 active companies in Denmark, 80% have less than five employees and less than DKK 5 million in total assets (Source: *Ejerledelse i Danmark*. Report 2015).

[19]The final sample includes 100 firms in Agriculture, Forestry and Fishing , 213 in Manufacturing, 287 in Construction, 346 in Transport and Tourism, 76 in Information and Communication, 25 in Finance and Insurance, 31 in Real Estate, 219 in Business services, and 260 in Wholesale and Retail Trade.

[20]One advantage of using pre-tax earnings rather than net earnings as the performance measure is that it is unaffected by difference in capital structure (Amore and Bennedsen (2013)). To mitigate the effect of outliers, we winsorize OROA at the 1% level.

3 What characterizes value-based leaders and their firms?

Variations in the VBL factor are systematically correlated with variation in CEO, industry and firm level characteristics. In this section we identify some main correlates of VBL with respect to CEO and firm characteristics.

3.1 Value-based Leadership and CEO characteristics

Figure 2 shows correlations between CEO characteristics and the VBL factor score. For each CEO characteristic we have run a separate regression controlling for industries and we show the 95 pct confidence interval for the estimate.

The left hand side of the figure is based on register variables collected by Statistics Denmark. We notice that women and older CEOs score higher on the VBL factor. There is also a positive significant correlation between VBL and tenure, which seems natural given that CEOs with longer tenure have more time to impact their firm. VBL is also correlated with higher income but this is less statistically significant. Later in the paper, we control for the CEO's gender, age, and education in all of our specifications.

The right hand side of Figure 2 shows correlation with other types of personal values. These six variables are constructed from the same survey and represent the six other factors in the factor analysis. The VBL factor is positively correlated with being engaged in politics, having higher trust and higher level of altruism. Not surprisingly VBL is negatively correlated with acceptance of dishonesty.

Next we document to what extent VBL correlates with traditional measures of CEO quality. In the top panel of Figure 3, we have years of education as a measure of quality on the vertical axis and VBL factor on the horizontal axis. We bin the observations and see a slightly downward relationship but there is no statistically significant correlation between the two measures.

In the middle panel we estimate CEO quality from wage equations. We use a pre-sample of workers at our sample firms to estimate the contribution of education, experience, gender, and civil status to wages. We then use the coefficients obtained to

predict the quality of CEOs during the sample period. Again we find in the plot a slightly negative relationship, however this correlation is not statistically significant.

In the bottom panel of Figure 3 we replace CEO quality with CEO IQ. We do this for a subset of firms where we can find military draft data for the CEO. In the military draft process there is a compulsory IQ test that we have access to for the last three decades. Since the test is taken by men at the age of 18 year, we do not have the data for more than 110 of our CEO sample. Again we notice a slight negative trend between CEO IQ and value-based leadership, but the relationship is not statistically significant.

We thus conclude that VBL is not correlated with CEO quality in any of the three measures we have access to.

3.2 Value-based Leadership and firm characteristics

We now investigate which firm and industry characteristics correlate with value-based leadership. In Figure 1 we find that VBL CEOs are distributed unevenly across industries. Higher mean VBL is found in industries like Information and Communication, and wholesale and retail trade. In contrast, the VBL factor is lower in resource-based industries and in the construction sector. These average differences line up intuitively with part of the economy in which interpersonal interactions are more likely to play a crucial role for the business operations.

Turning to firm characteristics, table 2 shows that the VBL factor is not strongly correlated to any of the typical firm characteristics such as size and age. The VBL factor is higher in firms managed by the founder (on average by 13% of a standard deviation) and in family firms (on average by 15% of a standard deviation), even within industry, and when controlling for other firm observable characteristics. Founders have unique impact on their firm because they make critical decisions in periods where the firm is highly malleable and thus have the tools to reflect their preferences and values in the structure of the firm. Family values are commonly accepted as one of the core asset of family firms (Bertrand and Schoar (2006); Bennedsen and Fan (2014)). They originate in family history, regional culture, or religions, and are transmitted within the family, sometimes across generations. Family members embody these values, and often play an active role

in the management of the firm. Such a deep grounding of values makes family firms an ideal setting for VBL to be successfully implemented. These correlations remain largely unchanged when we control for CEO characteristics (results available upon request).

Next we investigate if VBL is correlated with a broader stakeholder view through relational contract and/or if it correlates with other measures of management and orgaizational practices. We do this through merging our sample with a survey of management practices that we was implemented in 2018. The survey was similar to the international surveys of management practice (Bloom and Van Reenen (2007) and Bloom et al. (2019)) and was answered by approximately 5,000 Danish CEOs, among whom 175 also participated in the survey conducted in 2015. The results are showed in table 3.

Controlling for CEO characteristics, we find very robust associations between the VBL factor and a question measuring the strength of relational contracts with different types of stakeholders: "As a director of your company, how loyal do you feel to the following stakeholders in the company?". This question is very close to our interpretation of VBL, since it captures the use of guiding principles in the CEO's conduct with different stakeholders. VBL-oriented leaders are more likely to be loyal to any type of stakeholders, but even more so to employees and customers.

In contrast, there is no significant association between the VBL factor and an overall management score calculated using all the questions related to management practices in the 2018 survey. Thus, we can see that value-based leadership as defined in this paper is not the same nor correlated with overall management score. Management practices can be split up in subgroups (namely, in the survey we define two subgroups: incentives score and leadership score). In unreported regressions we find no correlation between these subgroups and value-based leadership.

To sum up, value-based leadership is more common in family firms, under female leadership and corresponds to a broader stakeholder view of the corporation. However, it is not correlated with measures of CEO quality - including intelligence - nor common measures of management practices.

4 Value-based Leadership and Firm Performance

In this section, we present our results on the effect of VBL on firm performances. Section 4.1 shows correlations between the VBL factor and register-based measures of firm performances. We then provide causal evidence for this relationship by exploiting CEO changes (section 4.2.1), and CEOs' hospitalization shocks (section 4.2.2). Additional robustness tests are discussed in Section 4.3.

4.1 Baseline results

We start by analyzing whether VBL correlates with firm performances. To this end, we match our measure of VBL with register-based accounting data, keeping data in a 3-year period before – and including – the year in which we observe VBL for the CEO (2015)[21]. We further restrict our sample to firm-year observations for which the current CEO is at the helm of the company.[22] Using OLS, we estimate the following regression:

$$y_{ifs} = \alpha + \beta\hat{\theta}_i + \gamma_1 \mathbf{X_i} + \gamma_2 \mathbf{X_f} + \upsilon_s + \epsilon_{ifs} \tag{1}$$

in which y_{ifs} is the outcome of interest (OROA, ratio of net income to assets, and standard deviation of OROA) in firm f, led by CEO i and industry s. $\hat{\theta}_i$ is the VBL score of CEO i, $\mathbf{X_i}$, and $\mathbf{X_f}$ are vectors of CEO and firm characteristics, respectively. $\mathbf{X_i}$ includes age, gender and a dummy for whether the CEO holds a university degree, and $\mathbf{X_f}$ includes the number of employees and total assets. All time-varying variables are averaged based on years 2013-2015, and variables definitions are given in table 13. υ_s are two-digit industry fixed effects. Standard errors are robust and clustered at the 2-digit industry level, which accounts for heteroskedasticity and correlation in the structure of the residuals. The coefficient of interest, β, captures the correlation between the VBL factor and the various outcomes of interest.

[INSERT TABLE 4 ABOUT HERE]

[21] Limitation of data availability prevents us from using data in the post-survey period.

[22] We observe 1 year for 6.9%, 2 years for 8.9%, and 3 years for 84.3% of the sample, respectively.

Results are shown in Table 4. The first three columns use the entire sample of firms (conditional on the availability of controls). Column 1 displays the estimate from the least restrictive specification of equation 1. A one unit increase on the VBL factor is associated to a 0.6 ppt higher OROA (a 8% change), significant at the 1% level. This effect is economically meaningful since it implies that going from the 10th to the 90th percentile on the VBL factor predicts a 22% increase in performances (0.006 x (1.27 - (-1.57))/0.077). Column 2 shows that the estimate is robust to the inclusion of CEO and firm controls. We control for CEO's gender, age, and education. Furthermore, we control for firm size through the logarithm of number of employees and asset size.

In column 3, we test the robustness of our finding to the use of an alternative measure of VBL. We estimate the most restrictive version of equation 1 using the VBL index (a simple average of our different survey measures of VBL). A one unit increase in the VBL index is associated to a 1 ppt higher OROA, significant at the 1% level. Since the VBL index ranges in a narrower set of values than the VBL factor, the economic effect is similar: going from the 10th to the 90th percentile of the VBL index is associated to a 22% increase in performances (0.01 x (5-3.25)/0.077). In the top-left corner of Figure 4, we show binned scatter plots for regression results of Column 2 of Table 4, illustrating the positive relationship between VBL and OROA.

We are interested in understanding if the correlation between VBL and firm performance is driven by small firms or if it holds for larger firms too. In columns 4 and 5 we restrict the analysis to the subsample of firms with more than 10 employees. The coefficient for the VBL factor is twice as large as for the whole sample and significant on a 5% level. Similarly, the coefficient for the VBL index is more than twice as large and significant at a 5% level. Thus, we conclude that the correlation between VBL and firm performance is larger and with similar statistical significance for larger firms. In the top-right corner of Figure 4 we show binned scatter plots for regression results of Column 5 of table 4, illustrating the positive relationship between VBL and OROA for larger firms.

In Columns 6 and 7 we repeat the analysis from the first two columns but now replacing operating return over asset with net-income over assets as our performance measure. We find the coefficient of VBL factor (Column 7) and VBL index (Column 8) to

be economically similar to the regressions with OROA as the performance measure, and statistically significant at 5 and 1% level, respectively.

High-VBL CEOs might not only have better average performances but might also be better at smoothing out variations in performances. We test this possibility by regressing the standard deviation of OROA across the sample years on the VBL factor and averages of other regressors. Column 8 shows the results: the coefficient on VBL enters negatively and significantly at the 10% level. A one unit increase on the VBL factor is associated to a 0.4 ppt reduction in the standard deviation of OROA (a 5% decrease). In the bottom part of Figure 4, we show binned scatter plots for regression results of Column 8 of table 4, illustrating the negative relationship between VBL and the standard deviation of OROA. The subfigures in the left hand side shows the relationship for the entire sample, right-hand side restricts to larger firms with more than 10 employees.

4.2 Causal evidence

In this subsection we provide evidence for a causal interpretation of the documented correlation between VBL and firm performance. Alternatively, the correlation could be the result of firm heterogeneity: For instance, in Table 2 we noticed that the VBL factor is higher in family firms, who in many studies have been shown to outperform non-family firms (see for instance Anderson and Reeb (2003) and Sraer and Thesmar (2007)).[23] To support a causal interpretation, we exploit variation in firm exposure to VBL from CEO changes and from CEO hospitalizations. Finally, we support the causal interpretation through a placebo test of *future* hospitalization on current performance. Our findings support that VBL creates firm value.

[23]Scholars have suggested relations-specific family assets as drivers of performance in family firms, including heritage, legacy, business and political networks and value-based leadership (see Bennedsen and Fan (2014)). Thus, any superior performance by family firms may be driven by more than value-based leadership.

4.2.1 Firm performance around CEO appointments

Our first approach is to investigate whether the change in performance following a CEO appointment is related to the VBL score of the incoming CEO[24]. To be specific we denote the CEO that answered our survey for the incoming CEO and we focus on firms where we can observe when the incoming CEO started in the firm. The ideal test would be to measure the change in performance around the change in CEO against the difference between the VBL factor of the incoming and outgoing CEO. Unfortunately we do not have the VBL factor of the outgoing CEO since we only did the survey once in 2015.

Instead we categorize incoming CEOs into high- and low- VBL CEOs, depending on if the VBL factor is above or below the median value of VBL. Thus, we compare the *change* in performance in firms hiring a high-VBL CEO versus in firms hiring a low-VBL CEO. The underlying premise is that on average firms that hire a high-VBL CEO will experience an increase in value-based leadership and firms that hire a low-VBL CEO will experience a decrease in value-based leadership. This approach is similar in spirit to a difference-in-difference strategy and enables us to include firm fixed effects.

Despite this obvious advantage, our strategy does not control for time-varying shocks correlated with performance. In other words, it relies on the assumption that firms hiring high-VBL CEOs and firms hiring low-VBL CEOs are on similar performance trends (the "parallel trends" assumption). Before implementing our main analysis, we test this assumption by examining the relationship between *pre*-appointment performance trends and the probability of hiring a high-VBL CEO.

To perform the main analysis, we restrict the sample to a subset of firms for which we observe the appointment of the current CEO (the CEO who was at the helm of the firm in 2015). We obtain 163 CEO appointments in total[25] and merge this subsample

[24] We follow the approach of Bandiera et al. (2020).

[25] In order to increase the number of events and statistical power, we consider appointments in a 6-year period (years 2009 to 2015) before the year in which we measure VBL. We don't go further back in time in order to avoid the immediate consequences of the 2008 financial crisis. The results remain unchanged when considering only appointments in a shorter period before 2015. Of the 163 appointments, 83 concern a high VBL-oriented CEO and 80 a low VBL-oriented CEO.

with register-based accounting data up to 5 years before and after the appointment. In order to investigate the change in performance following the appointment of a high-VBL CEO, we estimate the following difference-in-differences model:

$$y_{ift} = \lambda_f + \nu_t + \beta \mathbb{I}\{Post\}_t \times \mathbb{I}\{\hat{\theta}_i \geq \underline{\hat{\theta}}\}_i + \gamma \mathbf{X_{f,t}} + \epsilon_{ift} \quad (2)$$

in which y_{ift} is OROA of firm f where the CEO i was appointed in period t. t varies from 5 years before to 5 years after the CEO appointment. $\mathbb{I}\{\hat{\theta}_i \geq \underline{\hat{\theta}}\}_i$ is a dummy variable equal to 1 if the VBL score of the appointed CEO is higher than or equal to the sample median of the VBL factor, $\mathbf{X_{f,t}}$ is a vector of time-varying firm characteristic including the same variables as in (1). ν_t and λ_f are period and firm fixed effects. Note that $\mathbb{I}\{\hat{\theta}_i \geq \underline{\hat{\theta}}\}_i$ and $\mathbb{I}\{Post\}_t$ are omitted in the specification of equation 2 because they are absorbed by firm and period fixed effects, respectively. Standard errors are robust and clustered at the firm level, and the coefficient of interest β captures the differential effect of hiring a high-VBL CEO compared to a low-VBL CEO on performances.

[INSERT TABLE 5 ABOUT HERE]

Before estimating equation 2, we test whether performance trends *before* appointment predict the type of CEO eventually hired by the firm. Column 1 of table 5 reports the results of regressing the firm OROA before the CEO appointment on a trend interacted with the high-VBL indicator of the appointed CEO ($\mathbb{I}\{\hat{\theta}_i \geq \underline{\hat{\theta}}\}$). The estimated coefficient is 0.004, not significantly different from zero (p-value=0.75), therefore suggesting that firms that ultimately hire high-VBL CEOs have similar performance trends relative to firms that hire low-VBL CEOs. In figure 5, we provide an additional test of this assumption by plotting coefficients and confidence intervals from a flexible version of equation 2 that interacts the high-VBL indicator with dummies for each time period. It shows that relative to the pre-appointment period, the difference between firms that hire high-VBL CEOs and firms that hire low-VBL CEOs is close to zero and stable before the appointment, and materializes in the years following the appointment. Figure 10 plots coefficients from a similar analysis, but in which the VBL *indicator* is replaced by the VBL *factor*, and shows the same pattern. This alleviates the concern that the positive effect of VBL is mainly the result of pre-appointment shocks to performance.

Table 5, columns 2 to 4, reports the results obtained when estimating equation 2. Column 2 only includes firm fixed effects, and columns 3 and 4 add year fixed effects and time-varying controls for firm size. The parameter estimate is positive, significant, and stable across specifications (β=0.045, significant on a 5% level in the most restrictive specification in column 4). Columns 5 and 6 test the robustness of the results to alternative independent and dependent variables, respectively. In column 5, we use the VBL index instead of the VBL factor and assign 1 if the CEO is above the sample median. In column 6, we use the ratio of the net income to total assets as an alternative measure of firm performance. Coefficients remain of similar magnitude and significance.

Interpretation of β The positive estimated effect indicates that firms hiring a VBL-oriented CEO experience greater increase in their performances following the appointment, compared to firms hiring a low-VBL CEO. Specifically, taking the parameter estimate in column 4, hiring a VBL-oriented CEO results in a 4.5 ppt greater increase in OROA (a 52% change relative to the pre-appointment performance) compared to hiring a low-VBL CEO. Note that the counterfactual in our regressions are firms that hire a low-VBL CEO, and the β parameter captures the positive effect of switching to a VBL-oriented CEO *compared* to the negative effect of switching to a low-VBL CEO (though this effect is not significant in our results). Including the VBL factor as a continuous instead of an indicator variable does not qualitatively change our results. The parameter estimate is 0.014, which corresponds to a 16% change in performance, significant on the 10% level (results not reported).

Taken together, these within-firm results strongly suggest that VBL positively and causally impact firm performance. It is worth emphasizing that our lack of evidence for outgoing CEOs' VBL score is likely to bias our results downwards. Since at least some of the firms in this analysis replaced a VBL-oriented leader by another VBL-oriented leader we conjecture that our estimates are lower bounds for the impact of value-based leadership on firm performance.

We are able to abstract from concerns related to time-invariant firm heterogeneity, and from concerns related to time-varying heterogeneity correlated with performance

before the CEO appointment. However, the analysis does not fully account for time-varying heterogeneity correlated with performance *after* the CEO appointment. For instance, it could be the case that firms anticipate an increase in performance and appoint a high-VBL CEO in consequence. Though this is quite unlikely in our sample of small and medium-size firms, in the next exercise, we ensure that our results are robust to this concern by employing a research design that allows to keep the CEO-firm match constant.

4.2.2 Evidence from CEO hospitalizations

Though previous results strongly suggest a positive impact of VBL on firm performance, we cannot fully account for the endogeneity of CEOs' turnover. As pointed out in Fee et al. (2013), CEOs effects identified from CEO turnover events might reflect other factors determining the CEO appointment and termination decisions, such as changes in the strategic orientation. Though this concern is mitigated by the relatively small size of our average firm, [26] we follow Bennedsen et al. (2020b) and employ an alternative identification strategy based on CEO hospitalization events.

The main intuition behind this test is that hospitalization events affect the CEOs' ability to manage the firm as they cannot be present at the firm and have reduced capacity due to their health condition. While hospitalization events are rare and therefore reduce the sample of analysis, this research design presents several advantages. First, it provides for a source of variation in exposure to the CEO while keeping the firm-CEO match constant. Second, Bennedsen et al. (2020b) provide evidence that past performance do not predict CEOs hospitalization, and that they are unlikely to be strategically planned, therefore supporting the assumption that hospitalization events are largely exogenous to firm performance. Third, even short hospital stays are likely to translate into long periods of absence, therefore negatively impacting performance. Bennedsen et al. (2020b) report that an hospitalization from one to three days typically corresponds to an absence spell of 23 days on average, and that hospitalization events cause a negative shock to

[26] Only approximately half of the firms in our sample have a board, and the process leading to CEO change is more likely to be informal and less likely to be driven by strategic concerns and formal decision-making of supervisory boards.

performance that materializes in the year of the event.

We investigate whether the impact of hospitalization events is correlated to the VBL score of the hospitalized CEO. To implement this analysis, we use data from the National Patient Register, which contains all public and private health care interactions in Denmark. Similar to the previous analysis, we restrict the sample to firms in which the survey answering CEO was hospitalized at least once, and retrieve register-based accounting data before and after the event.[27] We obtain 447 hospitalization events,[28] and only keep firm-year observations for which the survey-answering CEO was already at the helm of the company.

We compare the hospitalization-induced decline in performance in firms led by a high-VBL CEO to the decline in firms led by a low-VBL CEO. If VBL impacts performances positively, we should see that firms led by CEOs with a higher VBL score experience a larger decline in performance following an hospitalization shock. We estimate the following model:

$$y_{ift} = \delta \mathbb{I}\{Hosp\}_{i,t} + \beta \mathbb{I}\{Hosp\}_{i,t} \times \hat{\theta}_i + \gamma \mathbf{X_{f,t}} + \lambda_f + \nu_t + \epsilon_{ift} \tag{3}$$

in which y_{ift} is OROA of firm f led by CEO i in year t. $\hat{\theta}_i$ is the VBL score of the CEO at the helm of the firm, $\mathbb{I}\{Hosp\}_{i,t}$ is an indicator variable equal to 1 if CEO i was hospitalized in year t, $\mathbf{X_{f,t}}$ is a vector of time-varying controls for firm size. ν_t and λ_f are year and firm fixed effects. Note that $\hat{\theta}_i$ is omitted in the specification of equation (3) since it is absorbed by firm fixed effects. We control for the firm-CEO match by restricting our sample to firm-year observations in which the current CEO was already present, therefore we do not need to include CEO fixed effects. Standard errors are robust and clustered at the firm level, and the coefficient of interest, β, captures the differential effect of hospitalization shocks in firms led by CEOs with higher VBL scores.

[27] Similar to the previous analysis, we consider hospitalization events in a 6-year period before the year of the survey, and retrieve data on performance up to 5 years before and after the event. In addition, in order to avoid events caused by chronic illness and that may affect the firm more generally, we exclude CEOs who have been hospitalized three times or more during the sample period.

[28] We observe 238 hospitalization events for VBL-oriented and 209 for low-VBL CEOs, respectively.

[INSERT TABLE 6 ABOUT HERE]

Before estimating equation (3), we provide a visualization of the performance trends around hospitalization events. Figure 6 plots the coefficients and confidence intervals from a different version of equation (3), in which time periods vary relatively to and are centered around the event period,[29] and are interacted with the VBL factor. Relatively to the pre-hospitalization period, firms led by a high-VBL CEO do not differ from firms led by a low-VBL CEO two periods before the hospitalization, but they under-perform in the year of hospitalization.[30] This pattern suggests that all sample firms follow similar performance trends prior to the hospitalization shock, therefore supporting the causal interpretation of the result.

Table 6 shows the results obtained when estimating equation (3). Column 1 includes firm fixed effects, year fixed effects, and time-varying controls for firm size are added in columns 2 and 3. The parameter estimate of the interaction term between hospitalization and VBL is negative and stable across specifications, and significant at the 5% level in the most restrictive specification (β=-0.014, p-value=0.044). In column 4, we replace the VBL factor by the VBL index. As in table 4, the parameter estimate increases in magnitude, which corresponds to the same economic effect since the VBL index ranges in a narrower set of values than the VBL factor. In column 5, we re-estimate our most restrictive specification using the ratio of the net income to total assets as the dependent variable. In all specifications, the impact of hospitalization at the baseline - i.e, for CEOs with low VBL score - is not significantly different from zero. By contrast, the interaction between CEO hospitalization and the VBL score enters negatively, suggesting that the harmful impact of hospitalizations increases in the VBL score. Economically, the parameter estimates suggests that the CEO hospitalization results in a 1.4 ppt greater decrease in OROA (a 22% change relatively to pre-hospitalization OROA) when the VBL factor increases by one unit.

[29] The event period is normalized to 0.

[30] The difference is not significant in this specification due to the use of fewer years of data for the estimation.

4.2.3 Placebo test

[INSERT TABLE 7 ABOUT HERE]

To confirm that causality runs from hospitalizations to performance, we conduct a placebo test by investigating the impact of *future* hospitalizations on current performances. We are both interested in if future hospitalization has an impact on current performance per se and if this effect depend on the VBL level of the CEO. In this analysis, we focus on first-time events to avoid capturing the effect of prior hospitalizations in our regressions.

Table 7 shows the results of regressions based on a modified version of equation (3), in which we replace the indicator for hospitalization in the current year by an indicator equal to one if the first hospitalization occurred one and two year after the current year, respectively. In this analysis, the coefficient on the interactions between future hospitalization variables and the VBL factor are close to 0 and not statistically significant (β=-0.004, p-value=0.58 for hospitalizations in t+1, and β=-0.001, p-value=0.91 for hospitalizations in t+2, respectively). Thus, we exclude that the positive correlation between value-based leadership and operating performance is due to reverse causality, lending even more support to a causal interpretation.

4.3 Robustness checks

Adding richer controls In this section, we address the concern that VBL is correlated with other personal characteristics by including controls for the CEO's other values, family structure, and professional characteristics. As shown from Figure 2, the VBL factor correlates positively with political engagement, altruism and trust, and negatively with tolerance for dishonesty. We therefore include the 6 other values constructed from our survey (political engagement, altruism, trust, religiosity, nationalism, and dishonesty tolerance) as additional controls. For family structure, we include marital status, number of children, and number of daughters. The latter has been suggested as a proxy for having a more social perspective (Dahl et al. (2012); Cronqvist and Yu (2017)). Finally, we also add income and tenure, that is the income of the CEO and a dummy for if the CEO has been

10 years or more in the position, as controls for the CEO's professional characteristics. We reproduce Table 4 and include these additional controls in every specifications.

[INSERT TABLE 8 ABOUT HERE]

Results are showed in Table 8, and closely resemble results in Table 4. The coefficients on the VBL factor have similar level of statistical significance and economic magnitude, even after the inclusion of this extensive set of controls.

5 What do value-based leaders do? Value-based leadership and firm policy

We have established, which types of leaders are more value-based, and that VBL creates more firm value. In this section we investigate what value-based leaders do differently from other leaders. We will focus on four areas: Resilience in times of crisis, organizational climate in normal times, selection of employees and use of incentives.

5.1 Value-based Leadership and resilience in pandemic crisis

We noted in the introduction that personal values of leaders can be guidelines for decision-making in general and in particular in unprecedented situations, where experience-based decision making is less efficient. We document this using the context of the unprecedented COVID19 pandemic crisis. We are in particular interested in whether CEOs with strong values differs in their priorities and in their policy choices during the pandemic crisis.

To do this we have developed a survey that was sent out on April 23, 2020 to 44,374 firms; effectively the entire population of private-sector firms with more than 3 employees in Denmark.[31] We received 10,642 responses by June 1 2020 yielding a response rate of 24 percent. With register data, we verify that the respondents are representative of

[31]For a detailed description of the survey and an analysis of the impact of government programs on retaining employees, see Bennedsen et al. (2020a).

the population of firms with respect to both firm size and industry. In the following we focus on 455 firms that both answered this crisis survey and are in the sample we use to study value-based leadership.

The survey included 23 questions, on basic firm characteristics (such as employment in January, and revenue change since January), and on main priorities, government aid take-up and labor demand choices during the crisis. Survey respondents were asked to indicate what their main priorities were during the first 6 months of the pandemic crisis, among local community, employees, customers, and survival of the business. In addition, all firms were asked to report the number of employees they furloughed and laid off as a result of the pandemic. Our main results are based on answers reported by the respondents in the survey, and the questions used to construct the variables are reported in Table 13.

[INSERT TABLE 9 ABOUT HERE]

In Table 9 we present how VBL correlates with priorities, use of government programs and dismissal of employees. We control for gender, age and education of CEO and for the size of the firm. First note that leaders with high VBL factor have more focus on the local community (Column 1), employees (Column 2) and customers (Column 3) than leaders with lower VBL factor. Thus, value-based leaders are more stakeholder-oriented and care more about the environment which they operate during this unprecedented crisis. The effect is statistically significant at the 5 % level for all three stakeholder group. It is worth remarking that high value-based leaders' stakeholder focus do not make them less focused on survival of their business as seen in Column 4.

Second, Column 5 shows that value-based leaders less frequently accept government aid programs to furlough their employees. The effect of VBL on take-up of programs is economically high: Moving from the 10th to 90th percentile in VBL is associated with a reported 82 % reduction in the use of furlough compensation (-0.026 $\times$ (1.27 - (-1.57))/0.09). The effect is also statistically significant at a 5 % level.

Finally, even though value-based leaders use less government programs they also fire less employees: Moving from the 10th to 90th percentile in VBL is associated

with a reported 77 % reduction in employee dismissal. This is statistically significant at a 10 % level.

It is noteworthy that value-based leaders on the same time are able to use less government programs *and* lay off fewer employees. Since the government furlough programs typically works as an alternative to lay off employees, the stakeholder focus of the value-based leaders appear to help avoiding layoffs without the government aid. This is consistent with the notion that VBL functions as a guideline in unprecedented situations where experience-based leadership is less valuable.

5.2 Value-based Leadership and organizational climate in normal times

VBL does not only help as a guidance in unprecedented times, it also serves as a coordination device in normal times. When the CEOs have strong values that penetrate the firms they lead, it serves as a cultural focus point and become a benchmark for what is expected from employees in the firm.

[INSERT TABLE 10 ABOUT HERE]

Table 10 shows the relationship between VBL and organizational climate in the firm. We reproduce the specification of equation 1, with measures of organizational climate as our dependent variables. We control for gender, age and education of CEO and for the size of the firm, as well as for industry including 1-digit industry fixed effects. All time-varying variables are averaged based on years 2013-2015, and variables definitions are given in table 13. Our first climate measure is a variable based on a survey question that asked the CEO to indicate whether there had been serious conflicts in the firm in the last three years. Column 1 shows that the VBL factor is statistically significant at the 1 % level and is economically meaningful. Moving from the 10th to 90th percentile on the VBL factor is associated with a 7 ppt (83%) reduction in reported serious conflicts (-0.025 x (1.27 - (-1.57))/0.086). In Column 2 we confirm this result using the VBL index.

While it is remarkable that value-based leaders report less conflicts, we investigate this relationship using objective proxies for organizational climate. We focus on employee turnover, excluding from this measure employees with top management positions.

We claim that employee turnover is a good proxy for organizational climate since lower turnover implies that there are less employees leaving the firm. As an additional measure, we build an indicator variable equal to one if the firm experienced a high turnover event (turnover rate $> 50\%$) at some point during the sample period.

Columns 3 and 4 of Table 10 show the correlation between employee turnover and VBL. There is a negative correlation between the VBL factor and employee turnover, significant at the 5 % level. This result is confirmed by the use of the VBL index. The relationship is economically meaningful: moving from the 10th to 90th percentile is associated with a 8% reduction in employee turnover (-0.008 x (1.27 - (-1.57))/0.28). We then study high turnover events in Columns 5 and 6 and again find a negative correlation between the VBL factor and high turnover events. Moving from the 10th to 90th percentile on the VBL factor is associated with a 16% reduction in the frequency of high turnover events (-0.015 x (1.27 - (-1.57))/0.27). The result is similar when using the VBL index.

To sum up, VBL provides a more harmonious work environment in normal time. This is consistent with the notion that leaders' values can contribute to the formation of an homogeneous – and therefore less conflictual – corporate culture (Kotter and Heskett (1992); Kreps (1990)).

5.3 Value-based Leadership and selecting and incentivizing employees

We next investigate to what extent value-based leaders differ in the employees they hire, and the types of incentives they provide to them. We employ the same specification as equation (1), and investigate a range of outcomes. As in the previous section, we control for the CEO's age, gender, education, firm size, as well as for industry using 1-digit industry fixed effects. All time-varying variables are averaged based on years 2013-2015, and variables definitions are given in table 13.

[INSERT TABLE 11 ABOUT HERE]

First, we explore correlations with gender, age and quality of employees. Results are shown in Table 11. Columns 1 and 2 show that value-based leaders are more likely to hire women, even when we control for the sexe of the CEO. The association is statistically

significant at the 5% level, and economically meaningful: moving from the 10th to the 90th percentile in VBL factor is associated with a 12% increase in the proportion of female employees (0.015 x (1.27 - (-1.57))/0.34). Columns 3 to 6 show that employees in value-based led firms do not differ in terms of age or quality[32].

[INSERT TABLE 12 ABOUT HERE]

Second, we investigate whether VBL is associated with different types of organizational structures and the use of wage as an incentive device. In the introduction, we suggested that VBL may reduce coordination costs and the need for monitoring in the organization. If this is true, we should observe that value-based leaders run flatter organizations. We document this in Columns 1 and 2 of Table 12. We measure hierarchy through the number of hierarchical layers in the firm[33], and find a negative correlation with the VBL factor. The effect is statistically significant for both measures and implies that moving from the 10th to 90th percentile on the VBL factor is associated with a 6% reduction in the number of hierarchical layers (-0.044 x (1.27 - (-1.57))/2.193). This is consistent with organizational values serving as a coordination device, and thus substituting to formal governance captured through hierarchical structures.

In the rest of Table 12, we analyze the correlation between VBL and wage levels (columns 3 and 4), wage growth (columns 5 and 6) and wage dispersion (columns 7 and 8), and find no meaningful impact of stronger values on any of these measures.

6 Conclusion

We document that the strength of top leaders' personal values and how these values penetrate the firms they run has important consequences. We argue that VBL is a unique trait

[32] We use a measure of predicted quality based on earnings regressions for employees at our sample firms. We use the same method to obtain an estimation of the CEO's quality, and describe the method in section 3.1.

[33] For each employees, we use a variable indicating their level of responsibility in the firm, going from 1 (top manager) to 7 (unskilled worker). To obtain a measure of hierarchy, we count the total number of layers represented at the firm level.

of leadership that is higher in family firms and in firms with female leaders. We also document that VBL is not correlated with management practices nor with other dimensions of the leader's quality, such as intelligence.

VBL is positively correlated with firm performance and we find evidence that this relationship is causal. In our preferred specification, we find that moving up from the 10th to 90th percentile in our VBL measure improves firm performance by 22%.

We provide suggestive evidence that VBL improves firm performance through several channels. First, VBL can be a guideline for decision-making in unprecedented times. We find value-based led organizations to be more resilient in the COVID19 pandemic crisis. Second, VBL creates a more homogeneous work environment in normal times, thus reducing conflicts and employee turnover. Finally, VBL is correlated with a flatter organizational structure, which is consistent with the view that organizational values reduce coordination costs and act as a substitute to formal monitoring of employees.

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7 Tables and Figures

Table 1: Summary Statistics

Panel A of this table reports summary statistics for CEOs in the final sample. Panel B reports summary statistics for corresponding firms. CEO-level characteristics are measured in 2015, and firm-level characteristics are averaged between 2013 and 2015. See Table 13 for definition of variables.

	N	Mean	Med	S.d.
	(1)	(2)	(3)	(4)
Panel A - CEO-Level Characteristics				
Women (%)	1557	.12	0	.33
Age	1557	53.65	53	9.68
Years of education	1543	14.3	14.42	2.2
No degree (%)	1543	.13	0	.34
Student degree (%)	1543	.55	1	.5
University degree (%)	1543	.32	0	.47
Tenure $>$ 10 years	1551	.84	1	.37
Income (K DKK)	1557	534.29	454.64	873.39
Log(income)	1540	6.13	6.12	.64
VBL factor	1557	-.05	.13	1.19
Panel B - Firm-Level Characteristics				
OROA	1447	.08	.07	.13
Net income/ assets	1447	.06	.05	.1
Firm age (years)	1557	17.06	14	10.83
A/S type (%)	1557	.41	0	.49
Assets (K DKK)	1447	15100.87	4608.33	80931.88
Log(assets)	1447	8.57	8.44	1.22
Number of employees	1557	14.34	7.33	56.43
Log(employees)	1557	2.14	1.99	.83
Board of directors (%)	1557	.49	0	.5
Founder CEO (%)	879	.74	1	.44
3 family directors (%)	884	.26	0	.44

Table 2: VBL and founder/ family-managed firms

This table shows correlations between the VBL factor and firm characteristics. All columns report linear regressions in which the dependent variable is the VBL factor. All regressions include 1-digit industry fixed effects. Clustered standard errors at the industry level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dependent Variable:	VBL factor	VBL index	VBL factor	VBL index	VBL factor	VBL index
	(1)	(2)	(3)	(4)	(5)	(6)
Log(av. employees)	0.055	0.022	0.073	0.022	0.037	0.009
	(0.051)	(0.023)	(0.065)	(0.028)	(0.055)	(0.021)
Log(av. assets)	0.011	0.000	-0.013	-0.016	0.027	0.015
	(0.029)	(0.014)	(0.024)	(0.014)	(0.021)	(0.010)
Firm Age	0.003	0.001	-0.003	-0.003	0.003	0.002
	(0.001)	(0.001)	(0.006)	(0.003)	(0.002)	(0.001)
Board of directors	-0.011	-0.007	-0.062	-0.031	-0.066	-0.013
	(0.063)	(0.031)	(0.088)	(0.035)	(0.124)	(0.068)
Founder			0.155*	0.052		
			(0.074)	(0.041)		
3 family directors					0.181**	0.082*
1-digit industry F.E	✓	✓	✓	✓	✓	✓
Mean of D.V	-.049	4.233	-.049	4.233	-.049	4.233
Adj. R2	.006	.005	.003	.005	.002	0
Firms	1447	1447	815	815	817	817

Table 3: VBL, relational contracts, and management practices

Columns 1 to 5 of this table shows the results from an ordered logit model in which the dependent variable is the CEO's response to the question "As a director of your company, how loyal do you feel to the following stakeholders in the company?". Possible responses are: 5 Agree a lot; 4 Agree; 3 Neither nor; 2 Disagree, 1 Disagree a lot. Panel A shows estimated coefficients, and Panel B shows the marginal effect of the VBL factor on the probability to answer "Agree a lot" to the question. In column 6, the dependent variable is the management score, and the model is estimated using OLS. All columns include controls for the CEO's gender, age, level of education, as well as other personal values. Robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Panel A: Regression coefficients							
Dependent variable:	**Relational contracts**					**Management score**	
	Customers	**Employees**	**Owners**	**Suppliers**	**Banks**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VBL factor	0.677***	0.598***	0.407**	0.330***	0.258**	0.004	
	(0.157)	(0.156)	(0.174)	(0.124)	(0.120)	(0.014)	
VBL index							0.000
							(0.024)
Women	1.079	-0.359	0.080	-0.492	-0.726	-0.091**	-0.089**
	(0.879)	(0.529)	(0.795)	(0.441)	(0.443)	(0.042)	(0-042)
Age	-0.012	-0.013	-0.025	0.007	0.023	-0.002	-0.002
	(0.022)	(0.021)	(0.021)	(0.019)	(0.018)	(0.001)	(0.001)
Education	-0.064	-0.004	0.021	-0.124	-0.101	0.009*	0.009*
	(0.087)	(0.090)	(0.084)	(0.078)	(0.083)	(0.005)	(0.005)
Dishonesty	-0.141	-0.348**	-0.148	-0.090	0.033	0.007	0.007
	(0.138)	(0.141)	(0.139)	(0.113)	(0.142)	(0.010)	(0.010)
Altruism	0.106	0.398**	0.124	0.304	0.410**	0.007	0.007
	(0.214)	(0.187)	(0.187)	(0.190)	(0.192)	(0.014)	(0.014)
Nationalism	0.003	-0.139	0.028	-0.185	-0.162	-0.016	-0.016
	(0.149)	(0.162)	(0.161)	(0.129)	(0.142)	(0.011)	(0.011)
Religiosity	-0.070	0.109	-0.051	0.211	0.072	-0.016	-0.016
	(0.198)	(0.215)	(0.198)	(0.150)	(0.133)	(0.011)	(0.011)
Trust	0.214	-0.107	-0.030	-0.025	0.112	-0.001	-0.000
	(0.138)	(0.129)	(0.138)	(0.116)	(0.118)	(0.008)	(0.008)
Politics	-0.081	-0.041	0.151	-0.183	-0.130	0.032***	0.033***
	(0.175)	(0.162)	(0.189)	(0.163)	(0.157)	(0.011)	(0.011)
Panel B: Corresponding marginal effects on Pr(answer=5)							
VBL factor	**0.130*** **	**0.115*** **	**0.074** **	**0.063*** **	**0.054** **		
	(0.025)	(0.026)	(0.030)	(0.024)	(0.026)		
Observations	175	175	175	175	175	175	175
Pseudo R2	0.098	0.095	0.041	0.047	0.047		
Adj R2						0.060	0.060

Table 4: VBL and firm performance

Table 4 shows correlations between VBL and measures of firm performance. In columns 1 to 5, the dependant variable is the firm average OROA based on years 2013-2015. In column 6 and 7, the dependant variable is the firm average ratio of net income to the total value of assets, based on years 2013-2015. In column (8) and 9, the dependant variable is the standard deviation of OROA based on years 2013-2015. The VBL factor is our measure of VBL based on factor analysis, and the VBL index is our measure of VBL based on the average of survey questions. Columns 2 to 9 include the CEO's gender, age, level of education, as well as the firm's total assets, number of employees, and 2-digit industry fixed effects. Standard errors are clustered at the industry level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dependent variable:	**OROA**					**Net income/ assets**		**sd(OROA)**	
	All firms	All firms		10+ employees firms		All firms		All firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VBL Factor	0.006***	0.005**		0.012**		0.004**		-0.004*	
	(0.002)	(0.002)		(0.005)		(0.002)		(0.002)	
VBL Index			0.010***		0.023**		0.008***		-0.005
			(0.003)		(0.009)		(0.003)		(0.003)
gender		0.015	0.015	0.033**	0.033**	0.012	0.012	0.006	0.006
		(0.010)	(0.010)	(0.015)	(0.015)	(0.009)	(0.009)	(0.007)	(0.007)
Age		-0.002***	-0.002***	-0.001**	-0.001*	-0.001***	-0.001***	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
University Degree		-0.005	-0.005	-0.011	-0.011	-0.002	-0.002	0.014***	0.014***
		(0.007)	(0.007)	(0.009)	(0.009)	(0.006)	(0.006)	(0.004)	(0.004)
Log(av. assets)		0.003	0.003	0.004	0.004	0.005	0.005	-0.023***	-0.023***
		(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.004)	(0.004)
Log(av. employees)		0.005	0.005	-0.001	-0.001	0.001	0.001	0.012**	0.012**
		(0.008)	(0.008)	(0.011)	(0.011)	(0.007)	(0.007)	(0.005)	(0.005)
2-digit industry F.E		✓	✓	✓	✓	✓	✓	✓	✓
Mean of D.V	.077	.077	.077	.077	.077	.057	.057	.088	.088
Adj. R2	.003	.08	.081	.068	.07	.075	.076	.071	.069
Firms	1447	1435	1435	523	523	1435	1435	1332	1332

Table 5: CEO appointment and change in performance

This table reports change in performances following the appointment of an above-median versus below-median VBL CEO. The sample is restricted to 163 firms for which we observe a change in CEO in the period 2009 to 2015. In columns 1 to 5, the dependent variable is the firm OROA, and in column 6, it is the firm ratio of net income to total assets. In column 1, the analysis is restricted to pre-appointment years, and in columns 2 to 6, the analyses use all available years of data in the pre- and post appointment periods. Firm controls include the logarithm of number of employees and total assets. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dependent variable:	**OROA**					**Net income/ assets**
	(1)	(2)	(3)	(4)	(5)	(6)
Trend	-0.003					
	(0.005)					
VBL indicator	-0.007					
	(0.023)					
Trend × VBL indicator	0.004					
	(0.008)					
After appointment		-0.016				
		(0.014)				
After appointment × VBL indicator		0.043*	0.043*	0.045**		0.042**
		(0.022)	(0.022)	(0.022)		(0.018)
After appointment × VBL indicator (index)					0.049**	
					(0.022)	
Firm F.E		✓	✓	✓	✓	✓
Period F.E			✓	✓	✓	✓
Firm controls				✓	✓	✓
Mean of D.V.	.095	.095	.095	.095	.095	.071
Adj. R2	-.004	.003	.002	.008	.008	.009
Observations	704	1253	1253	1236	1236	1235
Firms	161	163	163	163	163	163

Table 6: Effect of CEO hospitalization

This table reports the effect of hospitalization of VBL-oriented versus low VBL CEOs. We keep the same sample period as in the previous analysis (2009 to 2015) and restrict the sample to firm-year observations in which the current CEO was at the helm of the firm. We further restrict the sample to 380 firms where the CEO was hospitalized at least once but no more than twice during the sample period. In columns 1 to 4, the dependent variable is the firm OROA, and in column 5, it is the firm ratio of net income to total assets. Firm controls include the logarithm of number of employees and total assets. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dependent variable:	**OROA**				**Net income/ assets**
	(1)	(2)	(3)	(4)	(5)
Hospitalization event, t	-0.008	-0.001	-0.000	0.016	0.001
	(0.007)	(0.007)	(0.007)	(0.011)	(0.006)
Hospitalization event, t × VBL factor	-0.013*	-0.013*	-0.014**		-0.014**
	(0.007)	(0.007)	(0.007)		(0.006)
Hospitalization event, t × VBL index				-0.030**	
				(0.015)	
Firm F.E	✓	✓	✓	✓	✓
Year F.E		✓	✓	✓	✓
Firm controls			✓	✓	✓
Mean of D.V.	.063	.063	.063	.063	.049
Adj. R2	.001	.027	.034	.034	.035
Observations	3114	3114	3071	3071	3068
Firms	380	380	380	380	380

Table 7: Placebo analysis

This table reports the effect of future first-time hospitalization of VBL-oriented versus low VBL CEOs. We further restrict the sample to first-time hospitalization events, which corresponds to 323 firms out of the 380 under study previously. The dependent variable is the firm OROA. Firm controls include the logarithm of number of employees and total assets. Standard errors are clustered at the firm level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dependent variable:	**OROA**	
	(1)	(2)
Hospitalization event, t+1	0.002	
	(0.009)	
Hospitalization event, t+1 × VBL factor	-0.004	
	(0.007)	
Hospitalization event, t+2		0.007
		(0.010)
Hospitalization event, t+2 × VBL factor		-0.001
		(0.008)
Firm F.E	✓	✓
Year F.E	✓	✓
Firm controls	✓	✓
Mean of D.V.	.064	.064
Adj. R2	.026	.026
Observations	2566	2566
Firms	323	323

Table 8: VBL and firm performance, controlling for additional personal characteristics

Table 8 shows correlations between VBL and measures of firm performance. In columns 1 to 5, the dependant variable is the firm average OROA based on years 2013-2015. In column 6 and 7, the dependant variable is the firm average ratio of net income to the total value of assets, based on years 2013-2015. In column 8 and 9, the dependant variable is the standard deviation of OROA based on years 2013-2015. The VBL factor is our measure of VBL based on factor analysis, and the VBL index is our measure of VBL based on the average of survey questions. Columns 2 to 9 include the CEO's gender, age, level of education, as well as the firm's total assets, number of employees, and 2-digit industry fixed effects. All columns include other values from the survey, marital status, number of children, number of daughters, income, and an indicator variable for whether the CEO's tenure is above 10 years. Standard errors are clustered at the industry level. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dependent variable:	**OROA**					**Net income/ assets**		**sd(OROA)**	
	All firms	All firms		10+ employees firms		All firms		All firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VBL Factor	0.008***	0.006**		0.011**		0.005**		-0.003	
	(0.002)	(0.003)		(0.005)		(0.002)		(0.003)	
VBL Index			0.012***		0.021**		0.010**		-0.004
			(0.004)		(0.008)		(0.004)		(0.005)
gender		0.015	0.015	0.031*	0.031**	0.010	0.010	-0.000	-0.000
		(0.011)	(0.011)	(0.016)	(0.015)	(0.011)	(0.011)	(0.007)	(0.007)
Age		-0.002***	-0.002***	-0.001**	-0.001**	-0.001***	-0.001***	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
University Degree		-0.008	-0.008	-0.017*	-0.017*	-0.004	-0.005	0.015***	0.015***
		(0.007)	(0.007)	(0.009)	(0.009)	(0.006)	(0.006)	(0.004)	(0.004)
Log(av. assets)		-0.004	-0.004	-0.006	-0.006	-0.001	-0.001	-0.025***	-0.025***
		(0.006)	(0.006)	(0.008)	(0.008)	(0.005)	(0.005)	(0.005)	(0.005)
Log(av. employees)		0.003	0.004	-0.004	-0.004	-0.000	-0.000	0.010*	0.010*
		(0.008)	(0.008)	(0.012)	(0.012)	(0.007)	(0.007)	(0.005)	(0.005)
2-digit industry F.E		✓	✓	✓	✓	✓	✓	✓	✓
Other values		✓	✓	✓	✓	✓	✓	✓	✓
Family characteristics		✓	✓	✓	✓	✓	✓	✓	✓
Professional characteristics		✓	✓	✓	✓	✓	✓	✓	✓
Mean of D.V	.077	.077	.077	.077	.077	.057	.057	.088	.088
Adj. R2	.038	.101	.102	.091	.093	.095	.096	.079	.078
Firms	1303	1294	1294	484	484	1294	1294	1202	1202

Table 9: VBL and resilience in pandemic crisis

This table shows the results of models relating VBL and management during the COVID19 crisis. In columns 1 to 4, the dependent variable is the CEO's response to the question "Which of the following considerations has been important in your management decisions during the COVID19 crisis?". Possible responses are: 1 Not at all important; 2 not important; 3 important; 4 very important; and the regressions are estimated using an ordered logit model. In columns 5 and 6, the dependent variables are a dummy for whether the CEO used the possibility of being exempted of sickness contribution and for whether one or more employees were dismissed during the crisis, respectively. The regressions are estimated using a logit model. Panel A displays regression coefficients, and panel B displays corresponding marginal effect of the VBL factor on the probability of answering "Very important" to the question in columns 1 to 4 and on the probability of being exempted of sickness contribution, and on the probability of dismissal in columns 5 and 6, respectively. Robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Panel A: Regression coefficients						
Dependent variable:	**Priorities**				**Sick Package**	**Dismissal**
	Community	**Employees**	**Customers**	**Survival**		
VBL factor	**0.308***** (0.090)	**0.198**** (0.083)	**0.201**** (0.081)	**0.102** (0.090)	**-0.338**** (0.139)	**-0.290*** (0.150)
Women	0.264 (0.283)	0.162 (0.304)	0.181 (0.279)	0.046 (0.316)	0.517 (0.460)	-0.136 (0.542)
Age	-0.022** (0.011)	-0.010 (0.011)	-0.020* (0.011)	-0.011 (0.012)	-0.005 (0.021)	-0.025 (0.019)
Education	-0.005 (0.004)	-0.006 (0.004)	0.001 (0.004)	0.007 (0.005)	0.001 (0.007)	0.011 (0.007)
Log(N employees)	-0.200** (0.082)	-0.091 (0.087)	-0.090 (0.086)	-0.050 (0.126)	0.542*** (0.133)	0.517*** (0.135)
Panel B: Marginal effects on Pr(dummy=1)						
VBL factor	**0.063***** (0.018)	**0.047**** (0.019)	**0.048**** (0.019)	**0.020** (0.017)	**-0.026**** (0.011)	**-0.029**** (0.015)
1-digit industry F.E	✓	✓	✓	✓	✓	✓
Observations	453	451	453	452	455	403
Pseudo R2	0.051	0.027	0.018	0.047	0.087	0.094

Table 10: VBL and organizational climate

Table 10 shows correlations between VBL and measures of organizational climate. All time-varying variables are averaged based on years 2013-2015. In column 1 and 2, the dependent variable is an indicator equal to 1 if the CEO reported conflicts in the firm (information based on the following survey question: *"Have there been serious conflicts between owner(s) and management that have significantly affected the company's operations, eg by blocking effective decision making?"*). In columns 3 and 4, the dependent variable is the turnover rate of employees, excluding employees with management responsibilities. In columns 5 and 6, the dependent variable is a dummy equal to one if the firm experienced a high turnover event (turnover rate $> 50\%$) at some point during the sample period. All columns include the CEO's gender, age, level of education, as well as the firm's total assets, number of employees, and 1-digit industry fixed effects. *, **, and *** denote significance at 10%, 5%, and 1% respectively. Standard errors are clustered at the industry level.

Dependent variable:	Conflict		Turnover (exc. top management)		High turnover event	
	(1)	(2)	(3)	(4)	(5)	(6)
VBL Factor	-0.025***		-0.008**		-0.015*	
	(0.006)		(0.003)		(0.007)	
VBL Index		-0.041**		-0.021**		-0.036**
		(0.012)		(0.007)		(0.015)
Sexe	0.004	0.003	0.021	0.022	0.058	0.059
	(0.031)	(0.030)	(0.014)	(0.015)	(0.034)	(0.034)
Age	-0.001	-0.001	0.000	0.000	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
University Degree	0.024	0.024	-0.004	-0.004	0.018	0.018
	(0.027)	(0.027)	(0.018)	(0.018)	(0.022)	(0.022)
Log(av. assets)	0.013*	0.013*	-0.029	-0.030	-0.038	-0.039
	(0.006)	(0.006)	(0.017)	(0.017)	(0.025)	(0.025)
Log(av. employees)	0.013	0.013	0.014	0.014	-0.036	-0.036
	(0.014)	(0.014)	(0.025)	(0.025)	(0.040)	(0.040)
1-digit industry F.E	✓	✓	✓	✓	✓	✓
Mean of D.V.	.086	.086	.277	.277	.268	.268
Adj. R2	.022	.02	.028	.03	.041	.042
Firms	1407	1407	1310	1310	1310	1310

Table 11: VBL and selection of employees

Table 11 shows correlations between VBL and the composition of employees along several dimensions. All time-varying variables are averaged based on years 2013-2015. In columns 1 and 2, the dependent variable is the proportion of female employees. In columns 3 and 4, the dependent variable is the average age of employees. In columns 5 and 6, the dependent variable is the average predicted quality of employees based on earnings regressions. All columns include the CEO's gender, age, level of education, as well as the firm's total assets, number of employees, and 1-digit industry fixed effects. *, **, and *** denote significance at 10%, 5%, and 1% respectively. Standard errors are clustered at the industry level.

Dependent variable:	Prop. women		Av. age		Av. predicted quality	
	(1)	(2)	(3)	(4)	(5)	(6)
VBL Factor	0.015**		-0.220		0.001	
	(0.006)		(0.223)		(0.005)	
VBL Index		0.031**		-0.483		0.004
		(0.012)		(0.431)		(0.010)
Sexe	0.185**	0.184**	2.038***	2.046***	-0.052	-0.052
	(0.057)	(0.056)	(0.325)	(0.323)	(0.028)	(0.028)
Age	0.003***	0.003***	0.195***	0.195***	0.001	0.001
	(0.001)	(0.001)	(0.023)	(0.023)	(0.001)	(0.001)
University Degree	0.037	0.037	0.081	0.084	0.031	0.031
	(0.031)	(0.031)	(0.525)	(0.525)	(0.025)	(0.025)
Log(av. assets)	-0.031*	-0.031*	2.388***	2.386***	0.114**	0.114**
	(0.016)	(0.016)	(0.560)	(0.560)	(0.040)	(0.040)
Log(av. employees)	0.013	0.013	-3.517**	-3.520**	-0.098	-0.098
	(0.022)	(0.022)	(1.019)	(1.026)	(0.062)	(0.062)
1-digit industry F.E	✓	✓	✓	✓	✓	✓
Mean of D.V.	.344	.344	40.774	40.774	12.293	12.293
Adj. R2	.24	.241	.164	.165	.195	.195
Firms	1435	1435	1434	1434	1432	1432

Table 12: VBL and organizational incentives

Table 12 shows correlations between VBL and measures of organizational structure and incentives. All time-varying variables are averaged based on years 2013-2015. In columns 1 and 2, the dependent variable is the number of hierarchical layers in the firm. In columns 3 and 4, the dependent variable is the logarithm of the average real wage in the firm. In columns 5 and 6, the dependent variable is real wage growth in the firm. In columns 7 and 8, the dependent variable is the standard deviation of real wages in the firm. All columns include the CEO's gender, age, level of education, as well as the firm's total assets, number of employees, and 1-digit industry fixed effects. *, **, and *** denote significance at 10%, 5%, and 1% respectively. Standard errors are clustered at the industry level.

Dependent variable:	Hierarchy		Log(av. wage)		Av. wage growth		Wage dispersion	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VBL Factor	-0.044**		0.002		0.004		-0.000	
	(0.017)		(0.009)		(0.003)		(0.009)	
VBL Index		-0.082**		0.009		0.007		0.004
		(0.026)		(0.015)		(0.005)		(0.014)
Sexe	0.099	0.099	-0.105*	-0.106*	-0.024**	-0.024**	0.008	0.008
	(0.071)	(0.071)	(0.052)	(0.052)	(0.008)	(0.008)	(0.017)	(0.018)
Age	0.004**	0.004**	0.001	0.001	-0.002***	-0.002***	-0.003	-0.003
	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.002)
University Degree	0.181***	0.182***	0.036	0.036	0.001	0.001	0.044	0.044
	(0.042)	(0.042)	(0.066)	(0.066)	(0.009)	(0.009)	(0.044)	(0.044)
Log(av. assets)	0.170***	0.169***	0.191***	0.191***	-0.035**	-0.035**	-0.079*	-0.079*
	(0.033)	(0.034)	(0.049)	(0.049)	(0.013)	(0.013)	(0.036)	(0.036)
Log(av. employees)	1.079***	1.078***	-0.088	-0.088	0.072**	0.072**	0.085	0.084
	(0.117)	(0.118)	(0.058)	(0.057)	(0.021)	(0.021)	(0.046)	(0.046)
1-digit industry F.E	✓	✓	✓	✓	✓	✓	✓	✓
Mean of D.V.	2.193	2.193	12.461	12.461	.122	.122	.767	.767
Adj. R2	.632	.632	.271	.271	.104	.104	.053	.053
Firms	1352	1352	1435	1435	1420	1420	1412	1412

Table 13: Definition of Variables

Variable	Description	Source
CEO characteristics		
Women	Variable is equal to 1 if the CEO is a woman, and 0 if it is a man	Administrative registers
Age	CEO's age	Administrative registers
Years of education	Total duration of education in years	Administrative registers
No degree	Variable is equal to 1 if the CEO does not have any degree, and 0 otherwise	Administrative registers
Student degree	Variable is equal to 1 if the CEO has a student degree, and 0 otherwise	Administrative registers
University degree	Variable is equal to 1 if the CEO has a university degree, and 0 otherwise	Administrative registers
Tenure $\geq$ 10	Variable is equal to 1 if the CEO has spent 10 years or more in the company, and 0 otherwise	Business registers
Income	CEO's total income	Administrative registers
Log(income)	Logarithm of the CEO's total income	Administrative registers
VBL factor	Value-based leadership score, based on factor analysis	CEO survey
VBL index	Value-based leadership score, based on average of survey questions	CEO survey
Politics factor	Political engagement score, based on factor analysis	CEO survey
Altruism factor	Altruism score, based on factor analysis	CEO survey
Trust	Trust score, based on factor analysis	CEO survey
Religiosity	Religiosity score, based on factor analysis	CEO survey
Nationalism	Nationalism score, based on factor analysis	CEO survey
Dishonesty	Dishonesty tolerance score, based on factor analysis	CEO survey
Hospitalization event	Variable equal to 1 if the CEO was hospitalized in a given year, and 0 otherwise	Administrative registers
Priority: community	Answer to the question: "Which of the following considerations has been important in your management decisions during the COVID19 crisis? Community - 1: Not at all important - 2: not important - 3: important - 4: very important	Covid survey
Priority: employees	Employees' health and economy - 1: Not at all important - 2: not important - 3: important - 4: very important	Covid survey
Priority: customers	Customers - 1: Not at all important - 2: not important - 3: important - 4: very important	Covid survey
Priority: survival	Company's survival - 1: Not at all important - 2: not important - 3: important - 4: very important	Covid survey
Firm characteristics		
OROA	Ratio of pre-tax earnings on the book value of total assets	Accounting register
Net Income/Assets	Ratio earnings net of taxes to the book value of total assets	Accounting register
Firm's age	Age of the firm	Business register
A/S type	Variable equal to 1 if the firm is an A/S, and 0 if it is an ApS	Business register
Assets	Book value of total assets	Accounting register
Log(av. assets)	Logarithm of the book value of total assets	Accounting register
Employees	Number of employees	Accounting register
Log(av. employees)	Logarithm of the number of employees	Accounting register
Board of directors	Variable equal to 1 if the firm has a board of directors, and 0 otherwise	Business register
Founder CEO	Variable equal to 1 if the CEO is the founder of the firm, and 0 otherwise	Business register
3 family directors	Variable equal to 1 if 3 or more family members seat at the board of directors, and 0 otherwise	Business register
Sick package	Variable equal to one if the CEO has indicated that the company used government aid programs to furlough employees during the COVID crisis, and 0 otherwise	Covid survey
Dismissal	Variable equal to one if the CEO has indicated that the company dismissed employees during the COVID crisis, and 0 otherwise	Covid survey
Conflict	Variable equal to 1 if the CEO answered "yes" to the question: "Have there been serious conflicts that have significantly affected the company's operations, e.g. by blocking effective decision making?", and 0 otherwise	CEO survey
Turnover	Employees turnover rate, excluding top management	Accounting register
High turnover event	Variable equal to 1 if the company experienced a high turnover event (turnover rate $>$ 50%) during the sample period, and 0 otherwise	Accounting register
Proportion women	Share of women among the company's employees	Accounting+Administrative registers
Average age	Average age of the company's employees	Accounting+Administrative registers
Average predicted quality	Average predicted quality of the company's employees, based on earnings regressions	Accounting+Administrative registers
Hierarchy	Number of hierarchical layers in the company	Accounting+Administrative registers
Log(av. wage)	Logarithm of average wage at the company	Accounting register
Average wage growth	Average wage growth at the company	Accounting register
Wage dispersion	Wage dispersion at the company	Accounting register

Figure 1: Average VBL factor by 1-digit industry

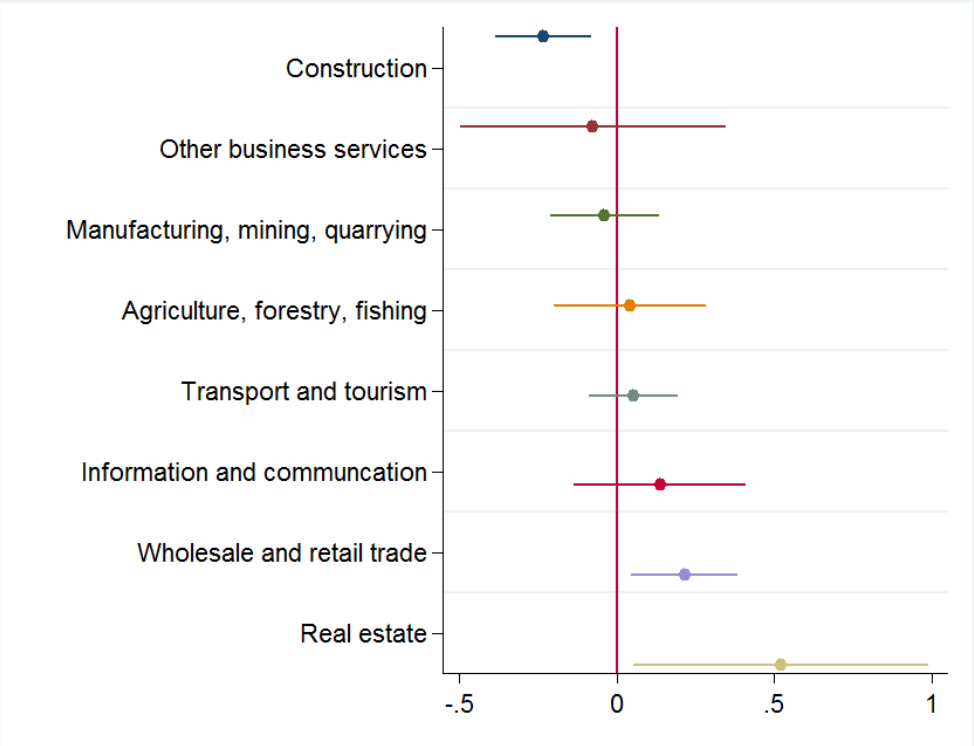

Figure 1 plots the coefficients and 95% confidence intervals from a projection of VBL factor on a complete set of sector dummies without a constant.

Figure 2: VBL, personal characteristics, and values

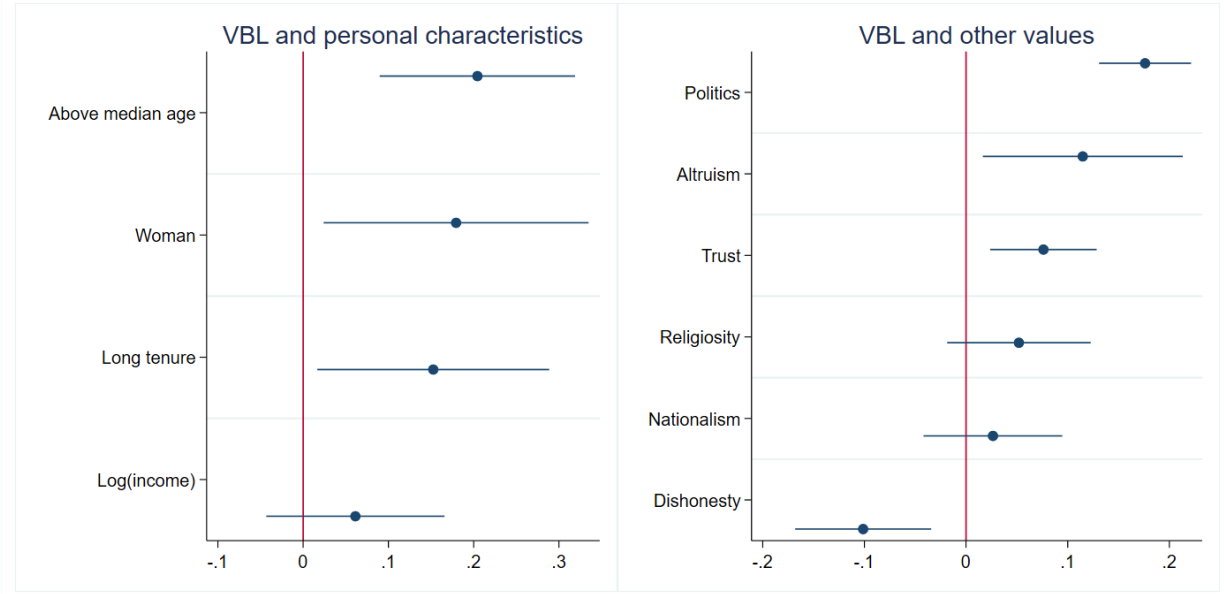

Figure 2 shows coefficients and 95% confidence intervals obtained when regressing the VBL factor on each variable separately. All regressions include 1-digit industry fixed effects. Standard errors clustered at the industry level.

Figure 3: VBL and CEO ability - binned scatter plots of regression results

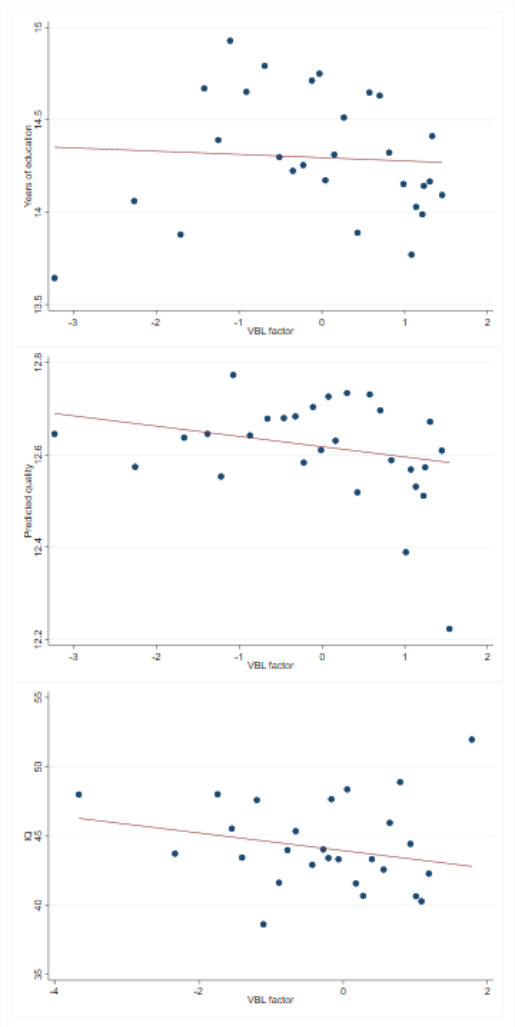

Figure 3 shows binned scatter plots that correspond to the regressions or different measures of the CEO's ability on the VBL factor. All regressions include 1-digit industry fixed effects. Data are plotted using bins by 20 quintiles sorted on the VBL factor. The red lines plots the predicted values from bivariate linear regressions. The first, second, and third rows display regressions of the number of years of education, the predicted quality, and a measure of IQ, respectively.

Figure 4: VBL and firm performance - binned scatter plots of regression results

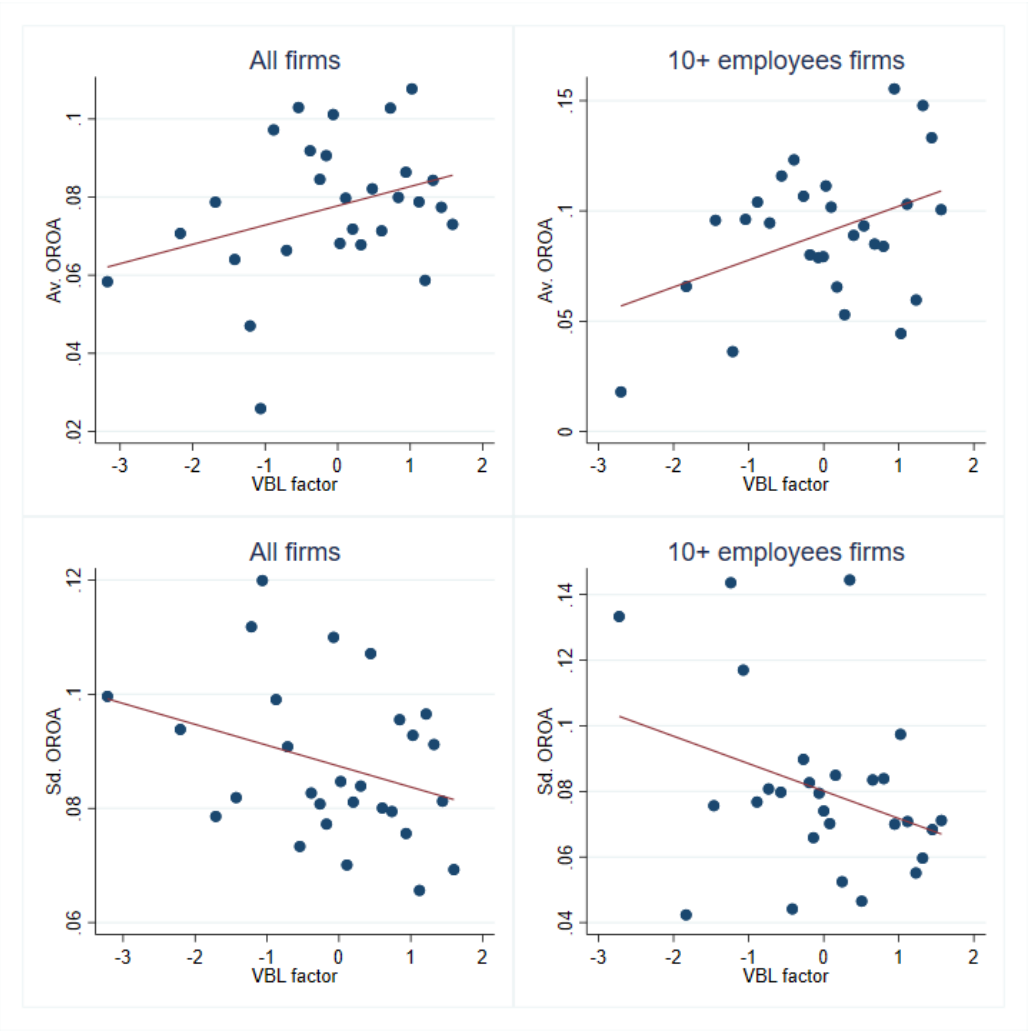

Figure 4 shows binned scatter plots that correspond to the regressions in table 4. Data are plotted using bins by 20 quintiles sorted on the VBL factor. The red lines plots the predicted values from bivariate linear regressions. Regressions of average OROA and standard deviation of OROA on the VBL factor are displayed in the first and second row, respectively. Graphs on the left display results using all firms in the sample, and graphs on the right display results using only firms with at least 10 employees.

Figure 5: Difference in OROA between firms hiring a high-VBL and a low-VBL CEO

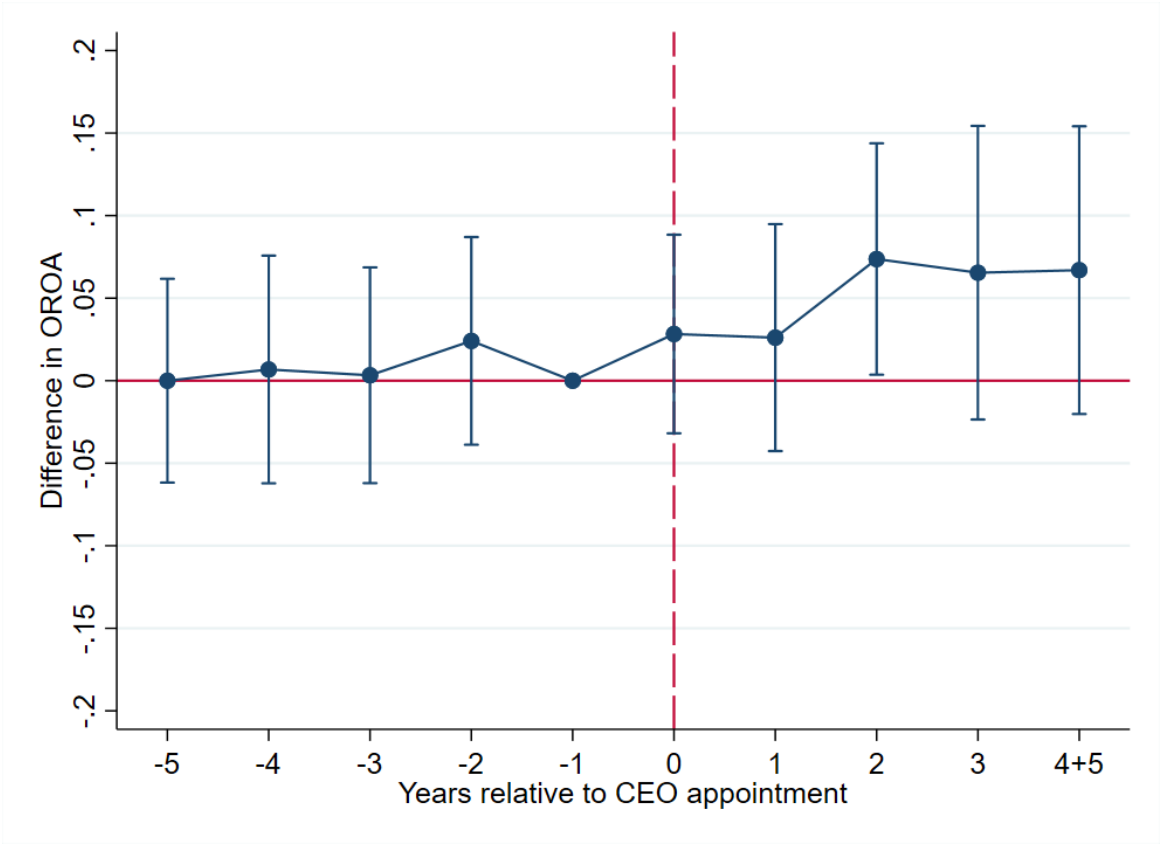

Figure 5 shows coefficients and 95% confidence intervals from a regression of OROA on the high-VBL indicator interacted with each time-period dummy. The reference period is -1, i.e, 1 year before the CEO was appointed. The model includes time-varying controls for firm size (logarithm of total assets and number of employees), period fixed effects and firm fixed effects. Standard errors are clustered at the firm level. Due to low number of observations, time periods 4 and 5 (respectively 4 and 5 years after the CEO appointment) are pooled together

Figure 6: Difference in OROA between VBL-oriented and low-VBL CEOs around hospitalization events

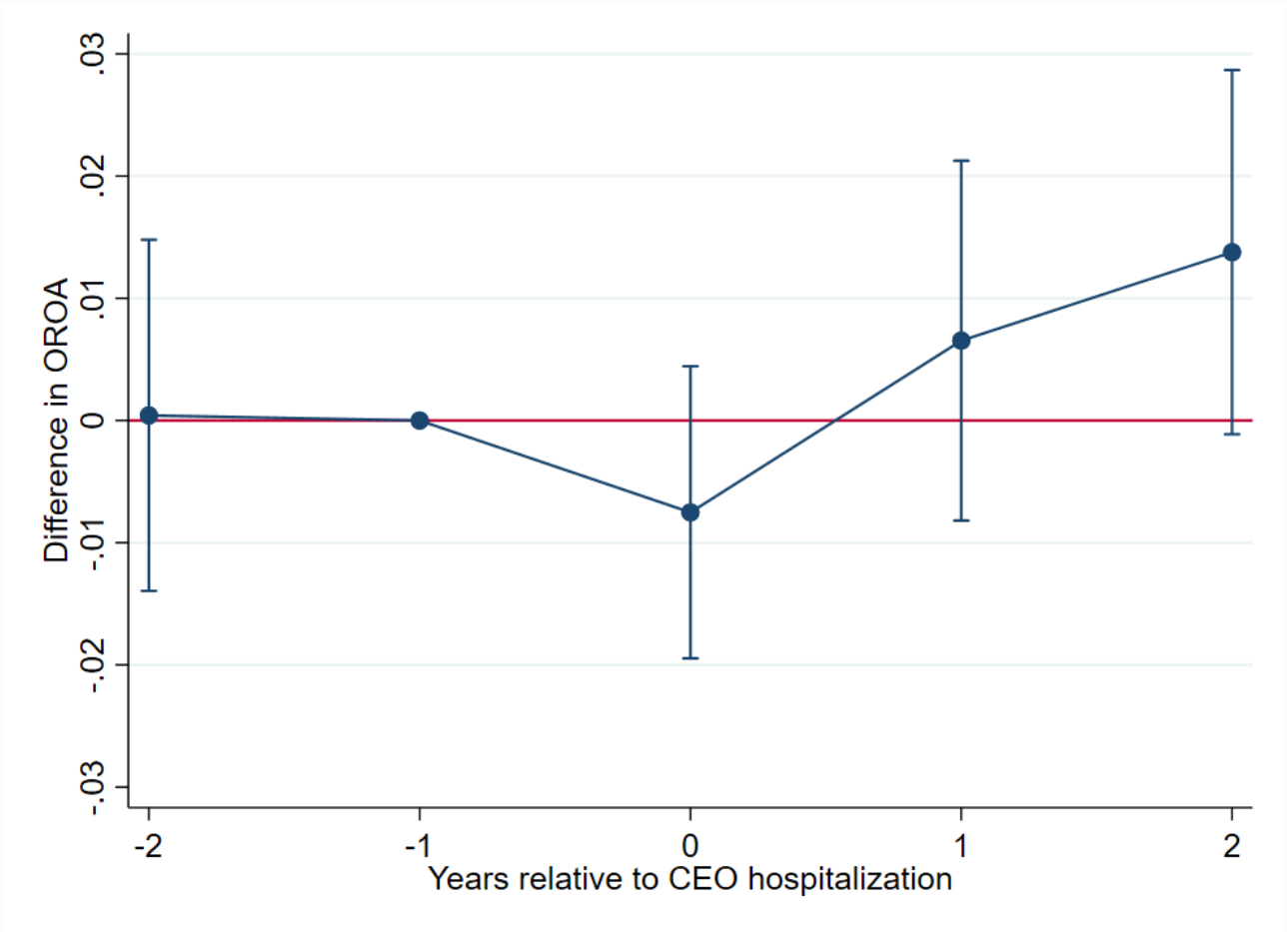

Figure 10 shows coefficients and confidence intervals from a regression of OROA on the VBL factor interacted with each time-period dummy. The reference period is -1, i.e, 1 year before the CEO was hospitalized. The model includes the logarithm of number of employees and total assets, as well as year fixed effects. Standard errors are clustered at the firm level.

Appendix A Survey questions

Table 14: Survey questions

Values Section	Scale
To what extent is there a clear, focused and well-defined leadership in this company?	1: Not at all - 5: Greatly
To what extent are the management values visible to the employees and are present in the company?	1: Not at all - 5: Greatly
To what extent do you think that your personal values are important to the company's operation?	1: Not at all - 5: Greatly
To what extent do you think that your children and other family members share your values?	1: Not at all - 5: Greatly
To what extent do you consider yourself as religious?	1: Not at all - 5: Greatly
To what extent is your family cohesive and united?	1: Not at all - 5: Greatly
To what extent is the business operation based on strong moral values, eg. keeping words, treating employees, customers and suppliers well?	1: Not at all - 5: Greatly
To what extent are each of the following areas important to your life? - Work	1: Not at all - 5: Greatly
To what extent are each of the following areas important to your life? - Family	1: Not at all - 5: Greatly
To what extent are each of the following areas important to your life? - Friends and acquaintances	1: Not at all - 5: Greatly
To what extent are each of the following areas important to your life? - Leisure	1: Not at all - 5: Greatly
To what extent are each of the following areas important to your life? - Politics	1: Not at all - 5: Greatly
To what extent are each of the following areas important to your life? - Religion	1: Not at all - 5: Greatly
To what extent do you approve these actions? To receive social benefits that you are not entitled to	1: Not at all - 10: Greatly
To what extent do you approve these actions? To cheat with taxes if you have the option	1: Not at all - 10: Greatly
To what extent do you approve these actions? To drive a car that belongs to someone else	1: Not at all - 10: Greatly
To what extent do you approve these actions? That married men and women have a relationship outside marriage	1: Not at all - 10: Greatly
To what extent do you approve these actions? To receive bribery in connections with one's work area	1: Not at all - 10: Greatly
How proud are you to be Danish?	1: Not at all - 5: Greatly
According to you, to what extent each of the following thing is important for a happy marriage? Fidelity	1: Not at all - 5: Greatly
According to you, to what extent each of the following thing is important for a happy marriage? Sufficiently high income	1: Not at all - 5: Greatly
According to you, to what extent each of the following thing is important for a happy marriage? You are from the same social layer	1: Not at all - 5: Greatly
According to you, to what extent each of the following thing is important for a happy marriage? Children	1: Not at all - 5: Greatly
To what extent are you interested in politics?	1: Not at all - 5: Greatly
Where do you want to place your own political stance?	1: Left wing - 10: Right wing
What do you think the government should do? "Let anyone who wants it come into the country"; "Let people come here as long as there are available jobs"; "Have limits on how many foreigners may enter the country"; "Ban people from other countries to enter the country"	1 unique choice among the 4 options

Table 15: Survey questions

Please tell us where on the 1-10 scale your point of view is: immigrants take jobs from Danes?	1: Not at all - 10: Greatly
Please tell us where on the 1-10 scale your point of view is: the country's culture is being undermined by the immigrants?	1: Not at all - 10 :Greatly
Please tell us where on the 1-10 scale your point of view is: immigrants make the problems with crime worse?	1: Not at all - 10: Greatly
To what extent do you agree with the following statement? "Politics today is too little about creating better conditions for small and medium-sized companies in Denmark"	1: Not at all - 5: Greatly
To what extent do you agree with the following statement? "Politics today rarely rely on the Grundvigian tradition of free debate based on man and community"	1: Not at all - 5: Greatly
To what extent do you agree with the following statement? Politics today is too little about social and equality issues	1: Not at all - 5: Greatly
Was politics discussed a lot in your childhood home?	1: Not at all - 5: Greatly
How will you characterize your childhood home politically?	1: Left wing - 10: Right wing
To what extent do you agree with the following statement? "My childhood home was religious and religion was a major part of my childhood"	1: Not at all - 5: Greatly
To what extent do you feel the living conditions of the following groups concern you? Your closest family	1: Not at all - 5: Greatly
To what extent do you feel the living conditions of the following groups concern you? People in the area you live in	1: Not at all - 5: Greatly
To what extent do you feel the living conditions of the following groups concern you? Your countrymen	1: Not at all - 5: Greatly
To what extent do you feel the living conditions of the following groups concern you? Europeans	1: Not at all - 5: Greatly
To what extent do you feel the living conditions of the following groups concern you? The mankind	1: Not at all - 5: Greatly
To what extent do you agree with the following statement? "I would like to give a part of my income if I could make sure the money was spent on preventing pollution"	1: Strongly agree - 5: Strongly disagree
To what extent do you agree with the following statement? Human ingenuity will ensure that it will still be possible to live on earth in 100 years	1: Strongly agree - 5: Strongly disagree
To what extent do you agree with the following statement? If the current tendencies continue we will soon exerience a major environmental disaster	1: Strongly agree - 5: Strongly disagree
To what extent do you trust the following institutions? Humanitarian organizations	1: Not at all - 10: Greatly
To what extent do you trust the following institutions? Unions	1: Not at all - 10: Greatly
To what extent do you trust the following institutions? The police	1: Not at all - 10: Greatly
To what extent do you trust the following institutions? The Danish parliament	1: Not at all - 10: Greatly
To what extent do you agree with the following statement? Adult children have their own lives and should not sacrifice their own well-being for the sake of their parents	1: Strongly agree - 5: Strongly disagree
To what extent do you agree with the following statement? Marriage or a stable relationship is a condition for happiness	1: Strongly agree - 5: Strongly disagree
If we need more information we would like to contact you again, can we do that?	1: Yes agree - 2: No

Appendix B Factor Analysis

We start by exploring the main underlying dimensions of the variation in survey answers. The survey includes a relatively high numbers of questions, and our prior is that they are multiple noisy measurements of fewer underlying constructs. A question is then, how can we efficiently make use of the available data?

We perform an Exploratory Common Factor Analysis (ECFA) using all items included in the "Values" section of the survey. ECFA is a data reduction technique that extracts the main underlying dimensions from a set of variables while preserving the variance (Gorsuch (2003))[34]. Intuitively, ECFA helps to find variables that correlate sufficiently such that they are measuring the same construct. ECFA has several advantages in our setting. First, it allows to test the existence of underlying constructs in the data. Second, by combining several variables into a unique factor, we are able to use the entirety of the survey in our regressions while reducing problems arising from multicollinearity and measurement error.

Table 16 shows the results of ECFA for the 50 survey items. We obtain seven latent factors with an eigenvalue higher than one[35]. Each cell of table 16 corresponds to a given factor loading on a given item[36]. Factor loadings display a clear pattern: the seven factors have distinct sets of loadings, and few survey items have high loadings on multiple factors. These results are indicative of a clear underlying structure in the data, and support the grouping of survey questions in seven unique factors. In what follow, we discuss the salience and measurement of VBL in the data, and shortly describe the six other factors [37].

[34]Factor analysis is most commonly employed in the psychology literature, but has also been used by economists to study, for instance, managerial traits (Kaplan et al. (2012)), and human capital (Cunha and Heckman (2008); Attanasio et al. (2018)).

[35]A variety of methods are available to select the number of factors. Here we use the Eigenvalue's rule developed by Kaiser(1960). An eigenvalue above one means that the extracted factor has more explanatory power than any of the original variables by itself.

[36]To ease interpretation of factors, factor loadings are obtained after performing an *oblique promax* rotation. The rotation step is extremely common in factor analysis, and leads to a structure such that measures mainly load heavily on one factor. Several rotating methods are available. We choose a type of rotation (*oblique*) that allows for correlations between factors.

[37]Other factors include dishonesty, altruism, nationalism, religiosity, trust, and interest for politics.

Table 16: Exploratory Factor Analysis: rotated loadings

This table presents the results of the exploratory factor analysis based on 50 survey questions for 1,389 CEOs. Each column corresponds to one factor (ordered by eigenvalue), and the table displays share of variance explained and rotated factor loadings for each of the 7 retained factors. Factors are selected according to Kaiser's method (1960). Rotated factor loadings are estimated using an *oblique promax* rotation and ordered by strength of loading. Loadings lower than .2 are left blank. The rotation allows to identify variables loading heavily on a given factor. Blue cells indicate that the variable is selected to be included in the measurement system for the factor in question. Exact wording of survey questions is available in table 15.

	Fact. 1	**Fact. 2**	**Fact. 3**	**Fact. 4**	**Fact. 5**	**Fact. 6**	**Fact. 7**
Eigenvalue	4.37	3.50	2.92	1.79	1.72	1.34	1.23
Variance explained	0.19	0.17	0.15	0.13	0.12	0.10	0.10
Cheating: bribery	0.930						
Cheating: car	0.886						
Cheating: social benefits	0.858						
Cheating: taxes	0.846						
Cheating: marriage	0.566						
Concerns: European		0.828					
Concerns: Countrymen		0.821					
Concerns: neighbours		0.692					
Concerns: Mankid		0.678					
Concerns family		0.349					
Immigrants: culture			0.783				
Immigrants: crime			0.764				
Immigrants: job			0.517				
Reinforce borders			0.462				
Trust: humanitarian org.			-0.449			0.307	
Right-wing			0.356				0.347
Proud to be Danish			0.352				
Would not give money for environment		-0.221	0.299				
Too little discussions: small businesses			0.294				
Imortant in marriage: high income			0.217			0.208	
Clear values				0.711			
Clear leadership				0.700			
Personal values				0.515			
Strong values				0.423			
Values shared				0.380			
Importance: family		0.214		0.275		0.229	
Importance: friends		0.233		0.270		0.200	
Importance: work				0.246			
Importance: leisure		0.203		0.239			
Importance: religion					0.824		
Religious					0.829		
Religious childhood home					0.595		
Too little Grundvigian tradition					0.282		
Trust: police						0.571	
Trust: Danish parliament						0.549	
Imortant in marriage: children						0.302	
Cohesive family				0.269		0.269	
Imortant in marriage: same social layer						0.267	
Human progress will not ensure life on earth						-0.226	
Trust: unions				-0.224		0.219	
Interested in politics							0.695
Importance: politics							0.560
Politics discussed at home							0.436
Right-wing childhood home							0.317
Too little discussion: equality							-0.259
Unconcerned: environment							0.220
Imortant in marriage: fidelity							
Children should not sacrifice for parents							
Marriage is essential for happy life							
Willingness to be contacted again							

B.1 Value-based Leadership Factor

The ECFA suggests that the strength of values in leadership is an important underlying construct in the data. All questions related to the interplay between values and leadership load highly and uniquely on the fourth factor (eigenvalue = 1.79, capturing 13% of the variation), suggesting that they are different measurements of a unique construct. The question with highest loading on the factor measures the salience of management values in the company: "To what extent are the management values visible to the employees and present in the company?". The variable measuring the transparency of leadership ("To what extent is there a clear, focused, and well-defined leadership in the company?") has second highest loading, followed by variables measuring the role of the CEO's values in the management ("To what extent do you think that your personal values are important to the company's operation?") and the role for ethical values in the company ("To what extent is the business operation based on strong moral values, e.g keeping words, treating all stakeholders well?"). Though our survey was designed to measure other important constructs such as political orientation or environmental concern (see table 15 for related questions), the interplay between values and leadership stands out as having more explanatory power in our data.

As a more formal test, we calculate the Cronbach's alpha of variables with high and unique loading on factor four[38]. Cronbach's alpha is a widely used measure of internal consistency, that relies on intercorrelations among items supposedly corresponding to the same construct. We find that retained variables have an alpha of 0.7[39], which supports the interpretation of these variables as different measures of VBL. Consequently we use these variables to generate a score for VBL for all CEOs. The score is predicted as a weighted sum of standardized versions of the variables[40], which accounts for how salient

[38] We retain "Clear values", "Clear Leadership", "Personal values" and "Strong values" as measurements of VBL. We follow what is standard in the literature and only consider variables that are clearly related to only one factor as potential candidates for measuring constructs. Blue cells in table 16 indicate retained variables.

[39] Typically, the range of 0.6 - 0.8 is required for constructs to be considered as reliable in EFA.

[40] This procedure is usually referred to as factor scoring and is standard in factor analysis. After the extraction of the main underlying constructs, each of them is separately predicted as a linear combination of the observed variables. The system of factors' and coefficients' scores is estimated using using Maximum Likelihood.

each variable is to the concept being measured. Table 17 reports the estimated weights used to generate the VBL factor [41]. The factor is then standardized to have zero mean and a standard deviation of approximately 1. We call this measure the VBL "factor": a more VBL-oriented leadership style is reflected in higher scores of the VBL factor. As an alternative measure, we also use a simple average of the four variables, which we refer to as "VBL index" in the rest of the analysis. Figure 7 and 8 show the distribution of answers for each variable used to generate the VBL factor score, and the distribution of the VBL factor and index, respectively.

In Figure 9 and Table 18 we investigate the persistence of VBL over time using questions from the survey on the impact of COVID conducted in 2020. For a subsample of approximately 450 CEOs, we are able to confront the 2015 measure of VBL and a 2020 measure based on the two following questions: "To what extent are the management values visible to the employees and present in the company?" and "To what extent do you think that your personal values are important to the company's operation?"[42]. Though measured 5 years apart and under different economic circumstances, VBL displays a clear pattern of persistence. The coefficient of 0.24 means that a CEO who scores 1 point higher on the 2015 VBL factor will score on average 0.24 point higher on the 2020 VBL factor (see Figure 9). In Table 18, we show that similar correlations are found on each of the two VBL-related questions.

Though the predictiveness of the VBL factor is sizable, especially considering that the two measures were taken 5 years apart, the correlation is not close to 1. This may be partly due to measurement error[43], variation in leadership style over time due to important life events or changes in economic conditions [44], as well as differences in the number of questions used in the construction of the 2015 and 2020 VBL indexes.

[41] Table 19 reports Cronbach alphas and weights for other factors in the data.

[42] Space limitation in the survey questionnaire prevented us to ask the four questions used in the measure of VBL in 2015. We therefore decided to include questions with highest loading on the 2015 VBL factor and most intuitive interpretation.

[43] Measurement error can occur when respondents need to answer multiple questions, especially when they are subjective (Bound et al. (2001)).

[44] Guiso et al. (2018) show that attitudes and preferences can change in response to important, traumatic events such as the 2008 financial crisis.

Table 17: VBL factor scoring

This table shows the variables retained as measures for the VBL factor and their associated weights in the VBL factor.

Factor	Variables	Weights
Value-based Leadership ($\alpha = 0.7$)	To what extent are the management values visible to the employees and present in the company?	0.60
	To what extent is there a clear, focused and well-defined leadership in the company?	0.58
	To what extent do you think that your personal values are important to the company's operation?	0.15
	To what extent is the business operation based on strong moral values, eg. keeping words, treating employees, customers and suppliers well?	0.12

Figure 7: Distribution of survey answers

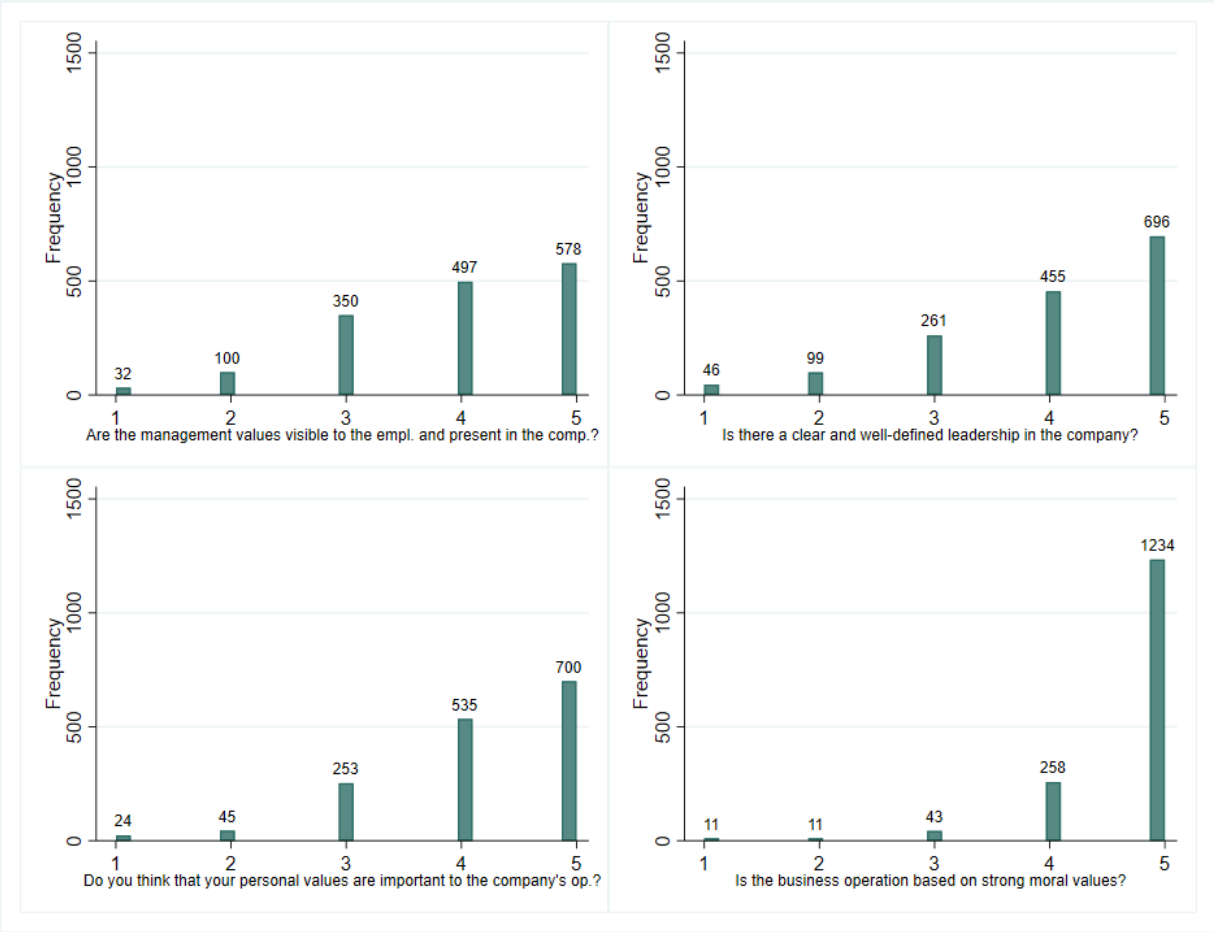

Figure 7 shows the distribution of answers to questions used in the scoring of the VBL factor. Questions are ordered based on their salience to the VBL construct and are, from upper left to lower right: "To what extent are the management values visible to the employees and present in the company?"; "To what extent is there a clear, focused, and well-defined leadership in the company?"; "To what extent do you think that your personal values are important to the company's operation?"; "To what extent is the business operation based on strong moral values, e.g keeping words, treating all stakeholders well?".

Figure 8: Distribution of factor scores

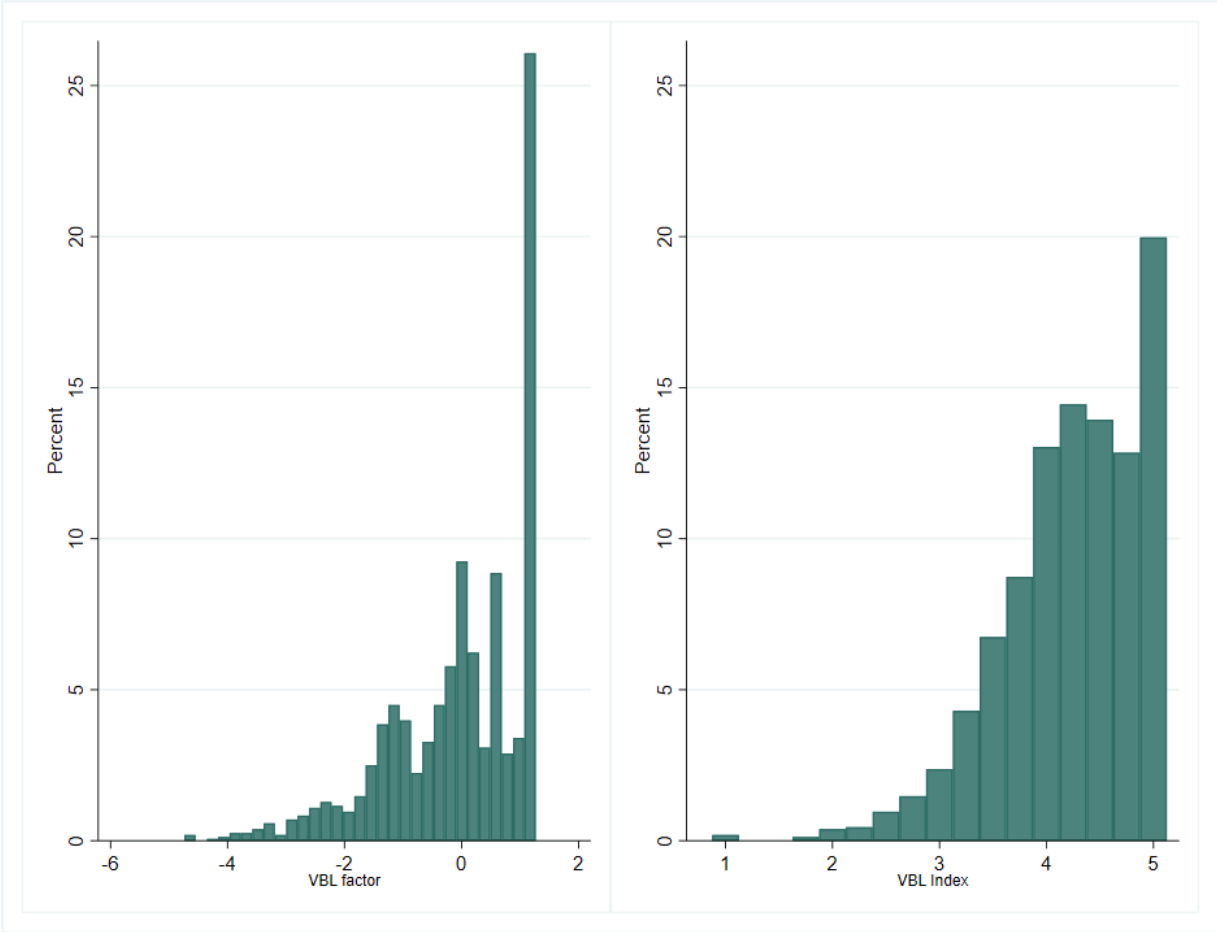

Figure 8 shows the distribution of the VBL factor and the VBL index.

Figure 9: Binned scatter plots of 2020 VBL index on 2015 VBL index

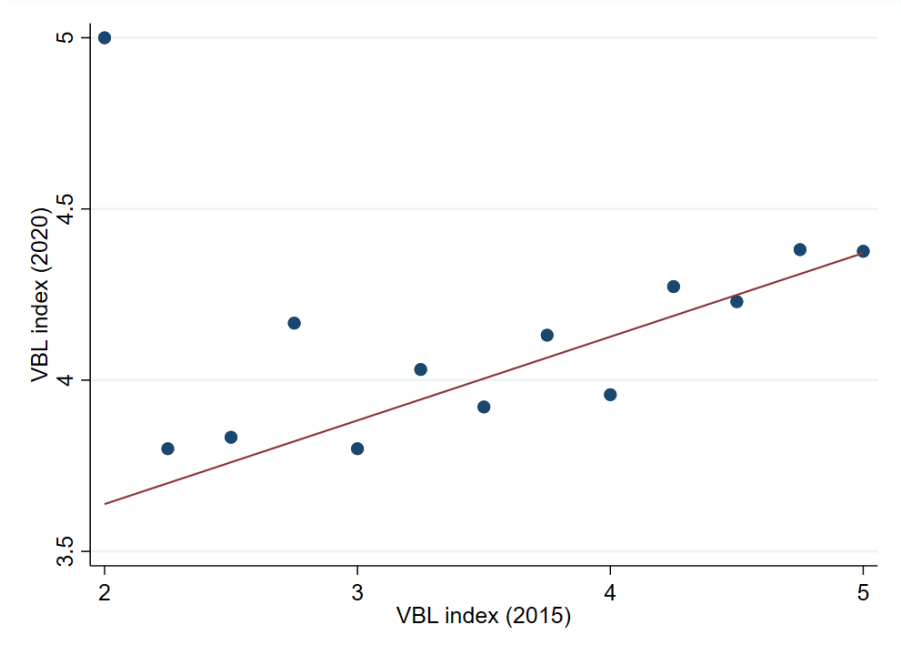

Figure 9 shows binned scatter plots of a 2020 VBL index on the 2015 VBL index used throughout this paper with no controls. The coefficient and robust standard error of the corresponding regression are 0.24 and (0.048), respectively.

Table 18: Persistence of VBL

This table shows correlations of VBL in 2015 and VBL in 2020. In column 1, the dependent variable is the VBL index computed based on questions from the 2020 survey (a simple average of the 2 questions) and the independent variable is 2015 VBL index. In column 2, the dependent and independent variables are the question "To what extent are the management values visible to the employees and present in the company?" in 2020 and 2015, respectively. In column 3, the dependent and independent variables are the question "To what extent do you think your personal values are important to the company's operation?" in 2020 and 2015, respectively. Robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

Dependent Variable:	VBL index (2020)	Management values (2020)	Personal values (2020)
	(1)	(2)	(3)
VBL index (2015)	0.243***		
	(0.054)		
Management values (2015)		0.161***	
		(0.033)	
Personal values (2015)			0.103**
			(0.041)
Observations	448	449	450
Adjusted R^2	0.23	0.21	0.18

B.2 Additional Factors

Factor 1 (Propensity to cheat): it explains 19% of the variance and captures the CEO's propensity to cheat. It loads very highly and uniquely on all questions measuring the CEO's propensity to cheat or break different kind of rules and norms, such as receiving undue social benefits, cheating taxes, driving someone else's car, cheating in marriage or receiving briberies.

Factor 2 (Other-regarding concerns): it captures 17% of the variance and has positive and high loadings on all questions capturing other-regarding concerns for different reference groups. We interpret it as the strength of concern for specific others, and others in general.

Factor 3 (Nationalism): it captures 15% of the variance and can be interpreted as nationalist values. The factor captures both a preference for Denmark versus the rest of the world, and attitudes of fear regarding immigration. It has high positive loadings on preference for reinforcing Denmark's borders, and thinking that immigrants worsen economic and crime problems, and undermine Danish culture.

Factor 5 (Religiosity level): it captures 11% of the variance and loads highly and uniquely on questions capturing the importance of religion in the CEO's life, and in her childhood home. We interpret this factor as the religiosity level of the CEO.

Factor 6 (Propensity to trust): it explains 10% of the variation and has its highest loads on questions measuring the CEO's level of trust towards different institutions: humanitarian organizations, Danish unions, Danish parliament, and the police. We interpret this factor as a measure of the CEO's level of trust.

Factor 7 (Political interest): it explains 10% of the variance, has its highest loads on questions measuring the significance of politics in the CEO's life. We interpret this factor as the tendency to be interested in and to follow political affairs.

Table 19: Additional factors scoring

This table shows the variables retained as measures for each factor and their associated weights.*, **, and *** denote significance at 10%, 5%, and 1% respectively.

Factor	Variable	Weight
Honesty ($\alpha = 0.9$)	To what extent do you approve these actions? To receive bribery in connections with one's work area.	0.44
	- To drive a car that belongs to someone else.	0.27
	- To receive social benefits that you are not entitled to.	0.21
	- To cheat with taxes if you have the option.	0.18
	- That married men and women have a relationship outside marriage.	0.04
Altruism ($\alpha = 0.8$)	To what extent do you feel the living conditions of the following groups concern you? Europeans.	0.49
	- Your countrymen.	0.38
	- People in the area you live in.	0.20
	- The mankind.	0.18
Nationalism ($\alpha = 0.7$)	Please tell us where on the 1-10 scale your point of view is: The country's culture is being undermined by the immigrants?	0.55
	- Immigrants make the problems with crime worse?	0.50
	Immigrants take jobs from Danes? -	0.17
	What do you think the government should do with the country's borders?	0.12
Religion ($\alpha = 0.8$)	To what extent do you consider yourself as religious?	0.54
	To what extent are each of the following areas important to your life? - Religion	0.53
	To what extent do you agree with the following statement? "My childhood home was religious and religion was a major part of my childhood"	0.17
Trust ($\alpha = 0.5$)	To what extent do you trust the following institutions? The police	0.85
	To what extent do you trust the following institutions? The parliament	0.85
Political Interest ($\alpha = 0.7$)	To what extent are you interested in politics?	0.70
	To what extent are each of the following areas important to your life? - Politics	0.50
	Was politics discussed a lot in your childhood home?	0.17

Appendix C Selection Analysis

Table 20: Selection Analysis

All columns report a probit model in which the dependent variable is a dummy indicating 1 if the survey was answered at least partially. Marginal effects are reported, and standard errors are in parenthesis. In columns 1 and 2, we characterize selection bias using the full sample. In columns 4 and 5, we use only firms with an average of at least 3 employees. Robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1% respectively.

	All sampled firms		Average N. empl> 3	
	(1)	(2)	(3)	(4)
Women	-0.0265***	0.0315**	0.0165	0.0320*
	(0.006)	(0.0130)	(0.0172)	(0.019)
Age	0.0052***	0.0063***	0.0055***	0.0059***
	(0.0001)	(0.0004)	(0.0005)	(0.0006)
Years of education	0.0081***	0.0094***	0.0082***	0.0093***
	(0.0009)	(0.0019)	(0.0026)	(0.0027)
Log(income)	0.0158***	0.0231***	0.0231***	0.0243**
	(0.0028)	(0.0073)	(0.0087)	(0.0011)
Log(Assets)		0.0020		-0.00004
		(0.0037)		(0.0060)
Log(employees)		0.0072		-0.0036
		(0.0046)		(0.0083)
Firm age (years)		-0.0010**		-0.0008
		(0.0004)		(0.0006)
OROA		0.0008***		0.001***
		(0.0002)		(0.0004)
N Firms	46,080	10,925	6,226	5,462

Appendix D Additional Figures

Figure 10: Difference in OROA between firms hiring a VBL-oriented and a low-VBL CEO (continuous factor)

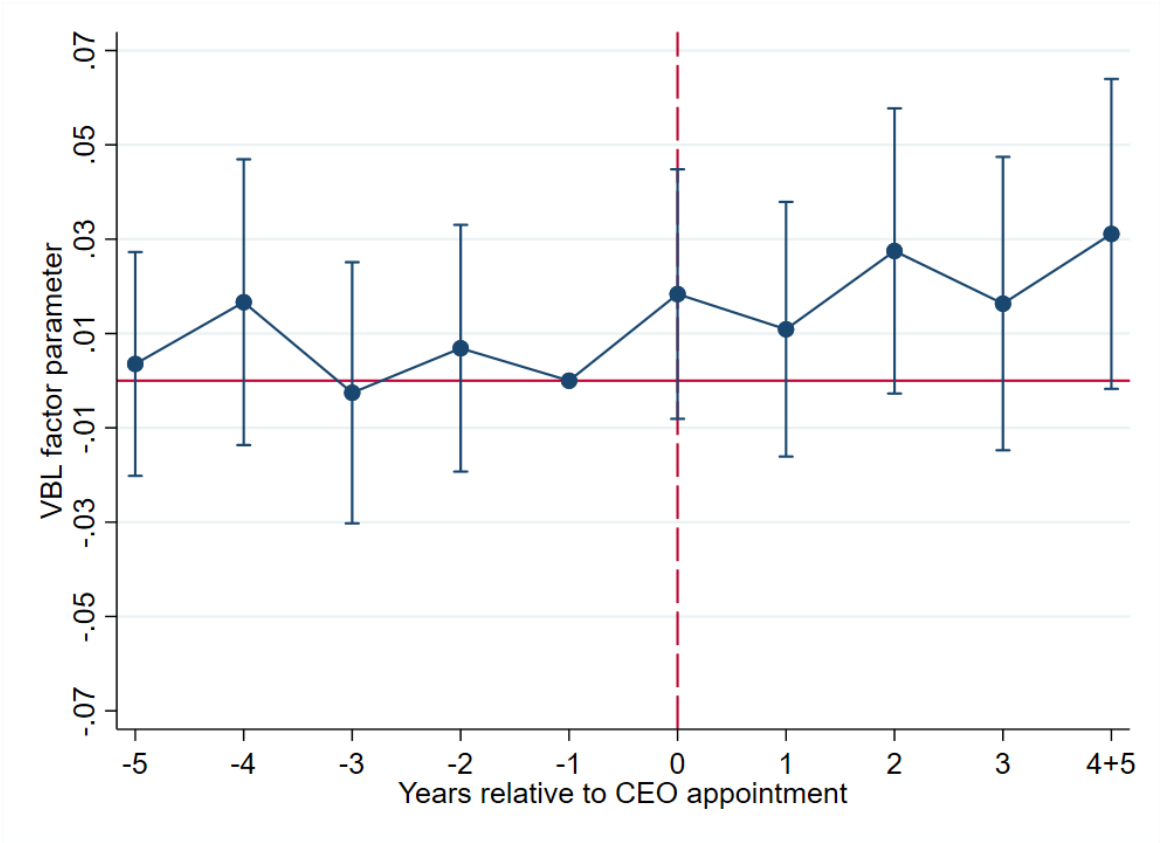

Figure 10 shows coefficients and confidence intervals from a regression of OROA on the VBL factor interacted with each time-period dummy. The reference period is -1, i.e, 1 year before the CEO was appointed. The model includes time-varying controls for firm size (logarithm of total assets and number of employees), period fixed effects and firm fixed effects. Standard errors are clustered at the firm level. Due to low number of observations, time periods 4 and 5 (respectively 4 and 5 years after the CEO appointment) are pooled together.

Chapter 3

Market participation and parochial honesty: experimental evidence from Greenland

Market Participation and Parochial Honesty: Experimental Evidence from Greenland*

Gustav Agneman † Esther Chevrot-Bianco ‡

ABSTRACT

This article studies parochial honesty, the tendency to behave more honestly toward members of the ingroup than toward outgroups. To this end, we conducted honesty experiments (N=543) in 13 villages across Greenland, where small and geographically isolated communities provide for a natural demarcation between ingroup and outgroup. In order to study group differentiation, we introduced a negative externality in the experiment and randomly varied the identity of the interaction partner. The results reveal significant parochial honesty. Participants inflate payoffs by 11% on average when matched with an outsider, but refrain from misreporting when it negatively affects members of their local community. Furthermore, we find that only participants in the traditional economy exhibit strong parochial honesty; market integrated participants behave equally honest regardless of interaction partner.

Keywords: Ingroup bias, Honesty, Market integration, Field experiment

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1 Introduction

In many economic activities, exposure and sanctioning of rule breaking is unlikely, providing actors the opportunity to cheat to increase their monetary gain. Yet, most people are honest in most situations[1], suggesting that rule breaking is costly not only because of the threat of externally imposed sanctions, but also due to an internal code of conduct. In this study we investigate how shared community affiliation influences this code of conduct, and whether community affiliation regulates behavior *more* for participants in the traditional economy, who rely more heavily on their local community for subsistence. Using natural group identities, we show that participants generally behave more honestly toward members of the ingroup than toward the outgroup, a tendency we label parochial honesty. Furthermore, we find that variation in parochial honesty can be accounted for by individual participation in market institutions. Leveraging unique variation in market dependence *within* societies allows us, in contrast to previous studies relying on between-society variation, to abstract from sources of omitted variable bias at the community-level. In addition, our rich survey data enable us to rule out important confounders and alternative explanations, such as socio-economic factors, kinship structure, and exposure to political and religious institutions. By documenting a robust link between market integration and group specific moral behavior, the present study provides an important contribution to the literature on the co-evolution of market institutions and social preferences.

The notion that social identity matters for human behavior is not novel. Social Identity Theory has established that we perceive ourselves and others along social categories such as age cohort, gender, occupation, religious affiliation and community membership (Tajfel et al. (1979)). By ascribing social categories to others as well as to ourselves, we construct an "ingroup", composed of individuals with whom we identify, and an "outgroup", consisting of all others. Categorization and identification beget parochial-

[1] In a meta-analysis of 72 experimental studies on honesty, Abeler et al. (2019) estimate that subjects forgo on average about three-quarters of the potential gains from cheating, even when they run no risk of being detected.

ism, a mindset in which the ingroup is favored over the outgroup (Akerlof and Kranton (2000); Reynolds (2019)). It contrasts with a mentality where the in- and outgroup are treated equally, commonly labeled universalism (Waytz et al. (2019)).

Over the past decades, scholars have documented how parochialism influences behaviors such as altruism, reciprocity and trust (Fershtman and Gneezy (2001); Buchan et al. (2002, 2006); Bernhard et al. (2006); Chen and Li (2009); Leider et al. (2009); Wang et al. (2017)), the willingness to cooperate (Eckel and Grossman (2005); Ruffle and Sosis (2006); Charness et al. (2007); Chen and Chen (2011)), and engaging in third-party punishment (Bernhard et al. (2006); Goette et al. (2006); Mussweiler and Ockenfels (2013)). Moreover, research has shown that people favor their own group in public goods provision (Solow and Kirkwood (2002)), charity giving (Croson and Shang (2008)), and that they support redistributive schemes favoring their ingroup (Klor and Shayo (2010)). Recently, social scientists have also turned to the role of parochialism as a determinant of honest conduct (Hruschka et al. (2014); Cadsby et al. (2016); Purzycki et al. (2018b); Benistant and Villeval (2019)). Yet, the prevalence of parochial morality, as well as the factors underpinning and undermining its existence, remain contested (Baldassarri (2020)).

A burgeoning literature has investigated how norms and social preferences respond to structural factors[2] such as political (Becker et al. (2016); Hruschka et al. (2014); Lowes et al. (2017)), religious (Shariff et al. (2016); Lang et al. (2019)), and economic (Henrich et al. (2001, 2004, 2010); Gneezy et al. (2016); Glowacki and Molleman (2017)) institutions. In this paper, we leverage unique variation in economic institutions – specifically market integration – to study how it predicts group differentiation in moral decision-making. While theories on the role of economic institutions in shaping norms and social preferences can be traced back to the 18th century (see Hirschman (1982) for a review of this literature), there is still no consensus as to whether market forces are conducive or detrimental to prosocial norms.

We refer to markets as the rule-based, monetized and impersonalized transactions that are prevalent in advanced economies. One strand of research has argued that markets undermine prosocial conduct, claiming that the ephemeral and impersonal na-

[2]See Meier (2007) for an early review of this literature.

ture of market relations erode the cornerstones of "nice behavior" (Bowles (1998); Falk and Szech (2013)), and that market incentives crowd out intrinsic motivations (Bénabou and Tirole (2006)).[3] In contrast, another body of literature has argued that economic incentives need not crowd out prosocial motivations (Lacetera et al. (2012, 2013)), and that market interactions rather promote prosocial behavior (Henrich et al. (2001, 2004)). This proposition is henceforth referred to as the "Market Integration Hypothesis". According to the Market Integration Hypothesis, repeated successful exchanges entrench prosocial behavior toward anonymous others in order to sustain future trust and cooperation. A number of empirical studies have supported this hypothesis (e.g. Henrich et al. (2001); Henrich et al. (2010); Baldassarri (2020)), by showing that market integration positively correlates with average prosociality. Although the Market Integration Hypothesis implies that market participation primarily should promote prosociality toward outsiders, no studies have thus far established an empirical link between market participation and parochial prosociality.

We present results from field experiments on parochial honesty conducted in 13 villages across Greenland. Honesty is measured by means of the "Dice Experiment" (Fischbacher and Föllmi-Heusi (2013)), in which participants privately roll a die, report an outcome (truthfully or not), and receive a monetary payoff determined by the reported number. We introduce an externality based on the reported outcome by passing the residual payoff (the maximum possible payoff minus the actual payoff) on to another participant in the experiment. Inflating one's own payoff thus entail a negative externality on someone else. In order to test for the presence of parochial honesty, we randomly vary information about the residual payoff and the identity of the externality recipient. In the first treatment (the No Externality treatment), the externality is not mentioned. In the second treatment (the Externality/No Identity treatment), the externality is mentioned but not the identity of the recipient. In the third treatment (the Externality/Ingroup Identity

[3]Bowles (1998)) suggested that market integration should have profound effects on norms: "economic institutions influence the structure of social interactions and thus affect the evolution of norms by altering the returns to relationship-specific investments such as reputation-building, affecting the kinds of sanctions that may be applied in interactions, and changing the likelihood of interaction for different types of people".

treatment), we inform participants both about the externality and a shared community affiliation (same village of residence) with the externality recipient.

In line with Social Identity Theory, our results reveal significant parochial honesty. In the No Externality and the Externality/No Identity treatments, the average reported outcome is approximately 11% higher than the expected outcome in the absence of misreporting. In contrast, participants do not inflate payoffs when informed that a resident of their own community would be negatively affected by them inflating their own payoff. Furthermore, we find that participants who operate in the traditional economy – and thus are less exposed to impersonal market institutions – exhibit much more pronounced parochial honesty. Depending on the proxy employed to define participation in the traditional economy, this group of participants exaggerate reporting by 16.7% or 28.4%, respectively, in the treatment conditions that do not involve ingroup interactions. Conversely, we find no evidence of misreporting when facing an ingroup member.

The present paper provides insights on the determinants of (dis)honest conduct and on the co-evolution of market integration and prosocial conduct. We complement previous work (Henrich et al. (2001, 2010); Pan and Houser (2013); Baldassarri (2020)) as well as expand on the Market Integration Hypothesis by showing that individual market participation predicts average prosociality as well as group differentiation. Our empirical approach entails several advantages. First, while previous studies have relied on between-society variation, we exploit the stark contrasts in market exposure *within* Greenlandic villages, and are thus able to abstract from potentially confounding factors at the community level. Moreover, we use data contained in our survey to rule out that differences between market and traditional economy participants in terms of socio-economic status, language and identity, exposure to religious and political institutions, kinship structure, as well as media consumption, can account for the findings. Finally, we find that pre-determined characteristics that may affect the selection in the market economy – namely, birth village and birth village of parents – do not explain differences in moral decision-making after controlling for individual market participation. This tends to suggest that exposure to different economic organizations, rather than selection in market participation based on personal traits, explain differences in parochial honesty. Although

these empirical exercises are suggestive of a causal relationship between market participation and parochialism in moral decision-making, there might still exist unobservable differences between participants in the market and traditional economy that we are not able to control for, and we thus refrain from using a causal language when referring to the results on market participation and parochial honesty.

The paper is structured as follows. In Section 2, we outline the empirical setting. Section 3 details the sampling procedure as well as the Dice Experiment. The results and corresponding robustness tests are shown in Section 4 and in Section 5 we investigate a potential alternative interpretation of the findings. Section 6 concludes.

2 Empirical setting

Greenland provides an ideal setting for the study of parochialism. The Greenlandic population resides in relatively small towns and settlements[4], which are isolated from each other in the sense that there are no interconnecting roads between localities. Instead, marine and air traffic constitute the means of inter-community transportation, making traveling both time-consuming and expensive. Consequently, life is organized at the village level and most Greenlanders identify strongly with their village of residence.[5] The salience and everyday relevance of the local community provides a natural demarcation between in- and outgroup, namely people from the village versus people from outside the village. We use this clear distinction to study the nexus between group identification and honest conduct.

The Greenlandic context is equally well-suited for testing the Market Integration Hypothesis, due to substantial variation in individual market participation. The Inuit

[4]Statistics Greenland classifies villages as either towns or settlements. The threshold distinguishing towns from settlements is approximately 500 inhabitants. The localities in our sample had a median population size of 856 in 2018, with a maximum of 17796 and a minimum of 71.

[5]Local identification is even reflected in the language: Greenlandic contains a suffix to indicate "a sense of identity from" a given town or settlement. A sense of local identity is expressed by the suffix -susseq (identity), so Qeqertarsuarmiut (person from Qeqertarsuaq) can have Qeqertarsuarmiussuseq, a sense of identity as Qeqertarsuarmiut (Nuttall (2001)).

peoples that populated Greenland historically relied on hunting and fishing, as well as the associated food sharing practice, for subsistence (Dahl (1989); Nuttall (1991)). These subsistence activities were organized in local networks that demanded constant interactions with community members, and little (if any) contact with non-community members (Dahl (1989); Nuttall (1991)). In the mid-twentieth century, Danish authorities initiated a modernization and assimilation process, whereby rapid population growth and urbanization transformed much of Greenland (Rasmussen (2000)). Today many Greenlanders operate in the market economy in which actors frequently interact with, and rely on, outsiders.[6] Yet, the traditional way of life remains a vital part of society, and subsistence activities provide the livelihood for a substantial share of the population.[7]

Participants in the traditional economy rely on their own as well their communities' catch for subsistence.[8] While hunters and fishermen sell their produce, these transactions tend to be personalized, often going through local markets called *kalaalimineerniarfik* (translated as "the place where Greenlandic foods are sold") or exchanged between households in the local village (Marquardt and Caulfield (1996)). Food exchanges are typically confined to "networks of close social association" (Nuttall (2000)) and sustained by interpersonal reciprocity and trust (Rasmussen (2000)). Food sharing serves as a communal welfare system, and, in doing so strengthens the bonds between participants and their respective communities (Appadurai (1995)).

Market economy participants operate in a different economic environment. Their subsistence, rather than obtained from nature or personalized transactions, requires market transactions governed by rules that apply equally to everyone (Poppel (2006)). Market norms rely on generalized principles and differ from norms fostered by traditional economic institutions, in which personal relationship information is crucial to determining

[6] All towns and settlements are serviced by at least one supermarket and feature work opportunities in the private and public sectors.

[7] 4 out of 5 households in the settlements at least complement their food consumption by means of fishing or hunting (Poppel (2006)).

[8] As emphasized by e.g. Marquardt and Caulfield (Marquardt and Caulfield (1996)), "non-monetized patterns of sharing and exchange within and between families and communities [that] continue to be important in Greenlandic society".

appropriate actions (Henrich et al. (2010)). Moreover, occupations in the market economy, in contrast with traditional occupations, typically entail interactions with people from outside the local village and thereby promote intergroup dependence as well as cooperation. In sum, participants in the market economy are exposed to generalized principles and interact with distant people, whereas participants in the traditional economy are exposed to norms based on personal relationships and interact mainly with locals. As a consequence, we should expect traditional and market economies to produce different moral codes, manifested by a higher degree of parochial behavior among traditional economy participants relative to market integrated participants. In the following section, we describe the experimental design employed to test this prediction.

3 Experimental design

To study parochial honesty, we collected data from 13 localities across Greenland during July-September 2018.[9] In order to ensure a geographically dispersed and demographically varied set of locations, we first stratified Greenland into 6 strata based on municipality borders[10], and sampled at least one settlement and one town from these strata. From this set of villages, the Statistical Agency of Greenland randomly selected participants such that the sample sizes of each locality approximately correspond to the population weight of the strata they represent. Appendix Section A details the sampling strategy. The sampled localities are mapped in Figure 1.

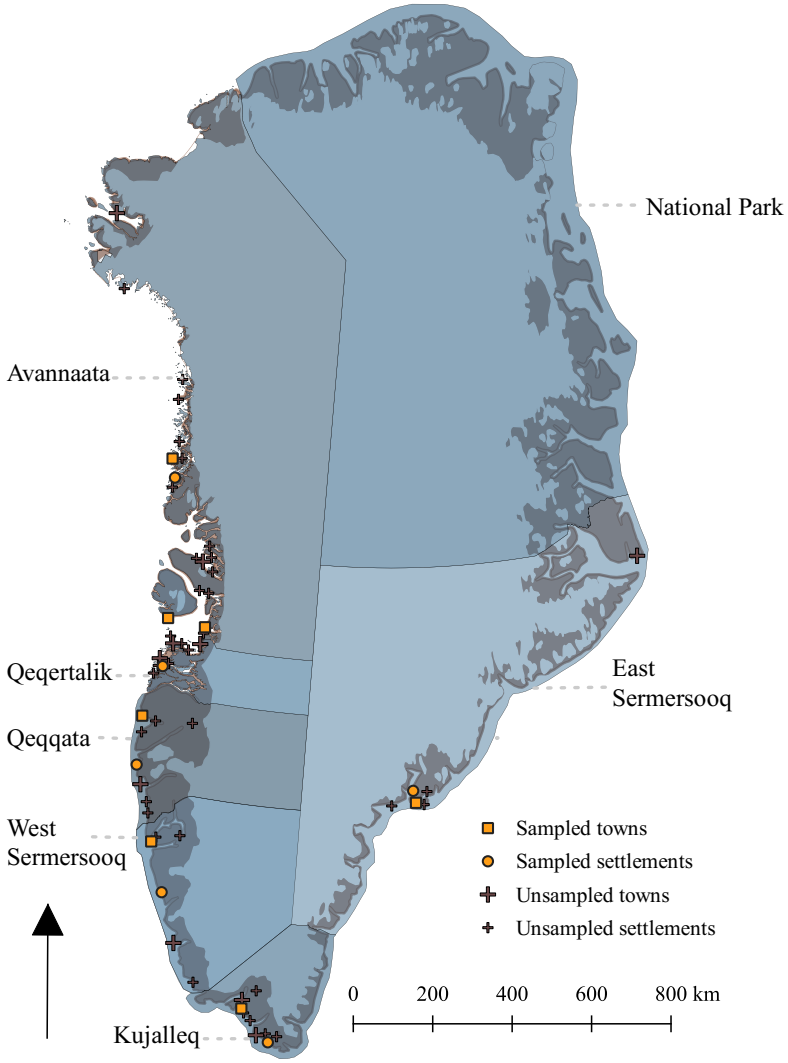
Randomly selected individuals were invited to complete a survey and participate in the Dice Experiment in field laboratories set up in schools and town halls in the

[9]Prior to starting the survey and the Dice Experiment, participants were informed that the research project was supported by the University of Copenhagen and the University of Greenland, and that it was undertaken in all regions of Greenland. The project was approved by the Scientific Ethical Committee for Health Sciences Research in Greenland and participation was based on informed consent. We followed the protocol of the Danish Data Protection Agency, based on the Danish law of personal data and the GDPR. The data analysis was registered with the University of Copenhagen.

[10]We made one exception to this rule by splitting the most populous and heterogeneous municipality, Sermersooq, into West- and East Sermersooq.

sampled localities. We incentivized participation both by lottery enrollment and the monetary payoff of the economic games. In order to increase the response rate, participants who did not show up at the field sessions were visited by research assistants and completed the survey and Dice Experiment in their homes. Our final sample comprises 543 Greenlandic residents[11], out of which 210 participated in the field sessions. We control for experimental environment in the main specifications to ensure that it does not influence the findings.

Figure 1: Map showing the sampled towns and settlements covered by the survey.



[11]The gross sample was 1400 and the response rate thus 39%.

Our experimental measure of honesty is the standard Dice Experiment (Fischbacher and Föllmi-Heusi (2013)), in which participants privately roll a die to determine their payoffs (1=10 DKK/$1.5; 2=20 DKK/$3; 3=30 DKK/$4.5; 4=40 DKK/$6; 5=50 DKK/$7.5; 6=60 DKK/$9)[12]. The Dice Experiment was completed in a shielded space, such that nobody except participants themselves observed the outcome of the die roll. Since all outcomes of the six-sided die were equally likely, participants had the opportunity to cheat with no risk of disclosure. This feature ensures that reputational concerns and fear of punishment did not impact behavior. By abstracting from these alternative motives, we are able to study decision-making regulated solely by internal motivations. Although our measure is derived from a lab-in-the field setting, the external validity of the Dice experiment (Fischbacher and Föllmi-Heusi (2013)) has been supported by a number of studies showing that it predicts behaviors in real life settings (Benz and Meier (2008); Potters and Stoop (2016); Kröll and Rustagi (2017); Cohn and Maréchal (2018)).

We introduced an externality in the Dice Experiment by passing the residual money – the maximum possible outcome (60 DKK) subtracted by the reported outcome – to another participant in the experiment. To study how group identity of the interaction partner regulates behavior, we experimentally varied information about the residual money. The first treatment, denoted the No Externality treatment, did not provide participants any information about the residual money. The second treatment informed participants that the residual money would be passed on to "another person taking the survey", but left out any reference to the local community (labeled Externality/No Identity). In the third treatment, participants were informed that the residual money would be passed on to a resident from their own town or settlement. We label this the Externality/Ingroup Identity treatment, since it informed participants that inflating their payoff would harm the material interests of an ingroup member. Our experimental design thus builds on subtle but important changes in relationship information to capture parochial behavior. In the design of the "Externality/ No Identity" treatment, we purposefully refrain to refer to a specific outgroup, following closely the idea developed in Henrich et al. (2010) that market integration should affect behaviors in "situations lacking relationship

[12] 10 Danish Krone (DKK) approximately corresponds to 1.6 US Dollar (denoted $).

information". The full game instructions are provided in Appendix Section B.

Participants were assigned treatment conditions by means of a randomized block design, ensuring that treatments were proportionally distributed both within and between villages. Appendix Table A2 reports balance tests showing that the vast majority of relevant covariates are balanced as a consequence of randomization. Only with respect to age and a dummy for conducting the Dice Experiment at home do we observe imbalances between treatment groups. To ensure that these differences do not bias the results, both age and conducting the game at home are controlled for in all main specifications.

In order to investigate how market participation predicts rule breaking and differentiation, we construct two proxies for market participation. The first proxy, the "Diet proxy", is similar to the operationalization in (Henrich et al. (2010)) and indicates whether participants' food consumption is "wild foods-based" or "market-based". Participants are defined as having a wild foods-based diet if 50% or more of their food consumption is obtained by traditional subsistence methods such as hunting, fishing, gathering or sharing, and market-based if more than 50% of their food consumption comes from the market. In the coding of this variable, 9 participants were excluded due to missing data. 240 participants (44.94%) were coded as having a wild foods-based diet and 294 (55.06%) were coded as having a market-based diet.

The second proxy, the "Employment proxy", closely aligns with the distinction between workplace organizations operated by (Gneezy et al. (2016)), and indicates whether a participant works in the "traditional" or "market" sector. Participants are coded as working in the market sector if they indicated banking and finance, education, farming, fish production (industry), handicraft and design or retailing, health services, information technology, mining, public sector, transportation, tourism or "other employment" as current occupation. These occupations are characterized by frequent interactions with, and dependency on, external actors. Participants are labeled as working in the traditional sector if their occupation is fishing, hunting or boating. Traditional sector jobs typically entail a high degree of self-sufficiency. As formulated by Dahl (1989)): "Each individual hunter controls the primary process of production (hunting, fishing)

and also the means of production, among which the most important are boats".[13] In this proxy, 198 participants were excluded due to ambiguous occupation (students, unemployed and retirees) or because of missing data; 104 (30.14%) were coded as having a "traditional occupation"; 241 (69.86%) were coded as working in the market sector.

Appendix Section E outlines the survey items used to construct the Diet and the Employment proxies and Appendix Figure A4 displays correlations between the two proxies. The only occupations that positively and significantly correlate with the Diet proxy are those coded as traditional occupations. In order to further validate our variables on market participation, we link the survey data with Greenlandic register data on individual hunting licenses. Among the participants in our sample with a professional hunting license, 95.45% are coded as working in the traditional sector, whereas this is the case for only 23.1% of those who do not hold a professional hunting license (difference is statistically significant in a one-sided t-test, p-value< 0.001, N $= 264$). Similarly, while 91.7% of the participants with a professional hunting license are coded as having a wild foods-based diet, the share is 39.5% among the participants that do not hold a hunting license (difference is statistically significant in a one-sided t-test, p-value< 0.001, N $= 416$).

4 Results

In this section we present the experimental results on parochial honesty. We start by outlining how behavior in the Dice Experiment is contingent upon treatment status, and then turn to heterogeneous treatment effects based on participation in market institutions.

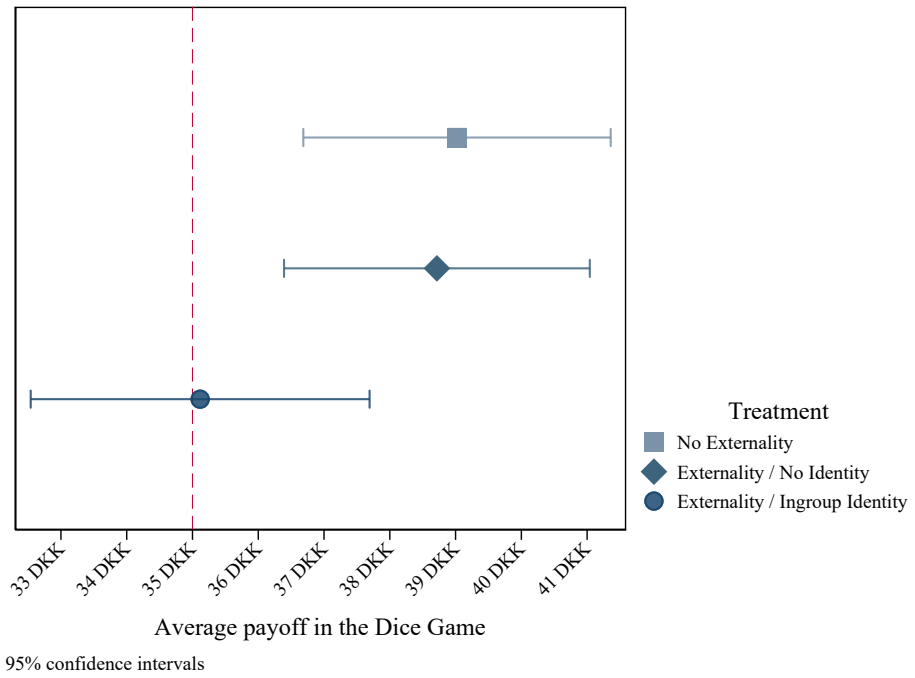
4.1 Parochial honesty

We first document parochial honesty in the full sample (N=543). In Figure 2, we plot the average reported die rolls in each treatment. Participants over-reported their outcomes in the No Externality and the Externality/No Identity treatments. The average payoffs were 39 DKK in the No Externality treatment and 38.7 DKK in the Externality/No Identity

[13](see also Rasmussen (2000))

treatment, respectively 11.4%[14] and 10.6%[15] higher than the expected average under no exaggerated reporting (35 DKK). We can thereby confidently conclude that participants over-reported in the treatments where exaggeration did not entail negative consequences for ingroup members. Meanwhile, the average reported outcome was 35.1 DKK[16] in the Externality/Ingroup Identity treatment, a result which indicates that participants in this treatment on average reported outcomes truthfully. This is further supported by the distributions of reported die rolls shown in Appendix Figure A5. Whereas the distribution of outcomes is uniform for the Externality/Ingroup Identity treatment, participants are twice as likely to report the high (4, 5, 6) relative to the low (1, 2, 3) outcomes in the No Externality and the Externality/No Identity treatments.

Figure 2: Coefficient plot showing the average payoffs in the different treatment conditions with corresponding 95% confidence intervals based on robust standard errors. The vertical dashed line represents the expected group average in the absence of misreporting.



We formally test for behavioral differences between the Externality/ Ingroup

[14]The difference is statistically significant in a one-sided t-test, p-value< 0.001, N $= 184$.
[15]The difference is statistically significant in a one-sided t-test, p-value< 0.001, N $= 187$.
[16]Statistically indistinguishable from 35 DKK, one-sided t-test, p-value$= 0.465$, N $= 172$.

Identity treatment condition and the other treatment conditions in Ordinary Least Square (OLS) regressions presented in Appendix Table A4, and by means of Randomization Inference tests (Appendix Figure A6). All specifications confirm that participants report lower die rolls when misreporting affects an ingroup member. The difference is statistically significant at conventional levels in bivariate specifications as well as when controlling for the factors that were imbalanced between treatments (Age and Game done at home). Meanwhile, participants do not report lower outcomes in the Externality/No Identity treatment compared to the No Externality treatment (coefficient $= -0.305$, p-value $= 0.873$, N $= 370$, in a bivariate regression), a result which suggests that participants in the Externality/Ingroup Identity treatment refrain from over-reporting due to the ingroup aspect, and not because of a mere externality awareness.

A host of candidate explanations can potentially account for the fact that participants misreport frequently but refrain from doing so when the interaction partner is from the ingroup. Participants may anticipate that ingroup members are less likely to cheat them back, and this sense of expected mutual fairness treatment could moderate reported die rolls when matched with the ingroup (Houser et al. (2012)). Another potential explanation is that ingroup favoritism is driven by intrinsic preferences for benefiting ingroup members (Balliet et al. (2014)), or, in other words, that ingroup utility enters positively in individual utility functions. In this paper, we do not conclude on the psychological mechanisms behind parochialism. Instead, we explore how it responds to the institutional environment participants are exposed to. In particular, we investigate whether economic organizations that differentially affect the costs and benefits of ingroup favoritism[17] predict parochial behavior in moral decision-making.

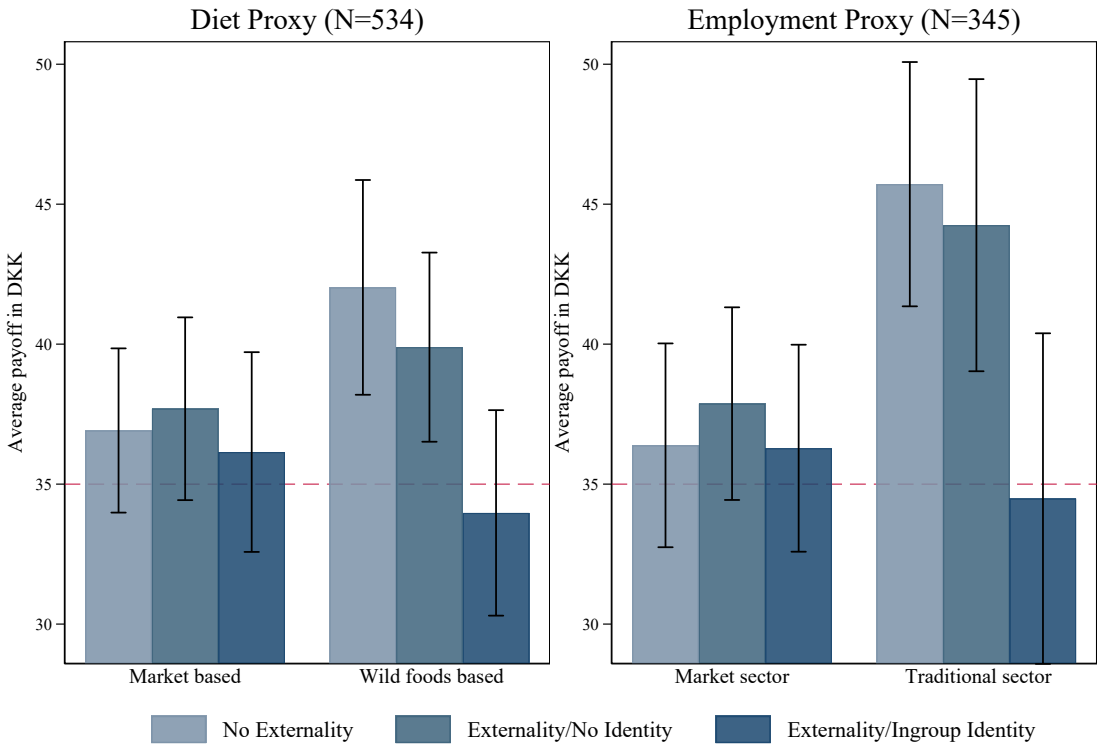
4.2 Market participation and parochial honesty

In this subsection, we test how the degree of parochial honesty is contingent upon the economic institutions in which participants operate. According to the Market Integration Hypothesis (Henrich et al. (2010)), market institutions promote prosocial behavior toward

[17] Recent market integration reduces ingroup dependence (Gurven et al. (2015)).

more socially distant people. We should thus expect less market-integrated participants to report higher outcomes in the outgroup treatments and to differentiate more between the in- and outgroup. To test these propositions, we leverage individual level variation in market participation, and are thereby able to conduct analyses keeping village-level factors constant. We later complement the baseline results with robustness checks to alleviate concerns of variable coding and differences in individual characteristics between participants in the market and in the traditional economy affecting the results. In Section 5, we consider the role of exposure to other institutions that correlate positively with market integration, and show that our results cannot be explained by pre-determined characteristics that may affect selection into market participation.

Figure 3: Average payoff in the Dice Experiment by treatments displayed separately for each category in the two proxies with corresponding 95% confidence intervals. The horizontal dashed lines represent the expected group average in the absence of misreporting.



In Figure 3 we plot average payoffs by treatment status, separately for traditional

and market sector participants. The figure displays substantial behavioral differences between traditional and market-integrated participants. Participants classified as having wild foods-based diets and working in the traditional sector report substantially higher outcomes in the outgroup treatments relative to the ingroup treatment. While their payoffs are significantly higher than 35 DKK (the expected payoff in the absence of cheating) in both the No Externality and the Externality/No Identity treatments, their payoffs are indistinguishable from 35 DKK in the Externality/Ingroup Identity.[18] Market based participants, on the other hand, do not inflate their payoffs regardless of whether they interact with ingroup or outgroup members. In other words, the parochial honesty documented for the full sample is entirely driven by participants in the traditional economy. Market-integrated participants display generalized honesty, in that they neither misreport against the ingroup nor against the outgroup.

In Table 1, we formally test the behavioral differences using OLS regressions. Since market exposure is not independent of village characteristics, we include village fixed effects and report village cluster–robust standard errors using the wild-bootstrap approach, which allows for a small number of clusters (Cameron et al. (2008); Roodman et al. (2019)). In Panel A, market participation is proxied by a dummy indicating if at least 50% of a participant's diet is based on wild foods. In Panel B, market participation is proxied by a dummy indicating whether participants work in the traditional sector (hunting, fishing, or boating and shipping).

[18]Traditional occupation + No Externality treatment: Average payoff=45.7 DKK, p-value$<$ 0.0001; N=35; Traditional occupation + Externality/No Identity treatment: Average payoff=44.3 DKK, p-value$<$ 0.001; N=40; Wild foods based diet + No Externality treatment: Average payoff=42 DKK, p-value$<$ 0.001; N=74; Wild foods based diet + Externality/No Identity treatment: Average payoff=39.9 DKK, p-value$<$ 0.01; N=93.

Table 1: Market participation and parochial honesty

Panel A **Sample:** **Diet proxy**	Market-based diet	Wild foods-based diet	Full sample				
Dep. Var.: Dice Experiment Payoff	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Externality/Ingroup Identity	-1.127	-6.866	-1.127	-1.243	-1.032	-1.057	-0.939
	(0.717)	(0.015)	(0.717)	(0.698)	(0.725)	(0.826)	(0.843)
Wild foods-based diet			3.566	3.340	3.508	3.345	3.290
			(0.029)	(0.031)	(0.032)	(0.025)	(0.027)
Externality/Ingroup Identity			-5.739	-5.556	-6.284	-5.804	-5.911
× Wild foods-based diet			(0.035)	(0.030)	(0.019)	(0.013)	(0.013)
Woman					-0.745	-0.345	-0.381
					(0.640)	(0.833)	(0.807)
Age						0.008	0.006
						(0.860)	(0.874)
Game done at home							1.168
							(0.348)
Village F.E	No	No	No	Yes	Yes	Yes	Yes
Surveyor F.E	No	No	No	No	Yes	Yes	Yes
Observations	294	240	534	534	534	504	504
R^2	.006	.036	.02	.04	.06	.058	.059
Mean of D.V.	36.905	38.75	37.734	37.734	37.734	37.5	37.5
Panel B **Sample:** **Employment proxy**	Market sector	Traditional sector	Full sample				
Dep. Var.: Dice Experiment Payoff	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Externality/Ingroup Identity	-0.835	-10.451	-0.835	-0.363	-0.241	0.061	0.125
	(0.792)	(0.013)	(0.792)	(0.906)	(0.948)	(0.987)	(0.973)
Traditional occupation			7.817	8.008	7.890	7.760	7.805
			(0.003)	(0.003)	(0.007)	(0.010)	(0.012)
Externality/Ingroup Identity			-9.616	-11.220	-11.531	-11.898	-11.961
× Traditional occupation			(0.021)	(0.006)	(0.007)	(0.004)	(0.004)
Woman					-0.329	0.306	0.284
					(0.884)	(0.888)	(0.894)
Age						0.039	0.038
						(0.535)	(0.537)
Game done at home							0.609
							(0.773)
Village F.E	No	No	No	Yes	Yes	Yes	Yes
Surveyor F.E	No	No	No	No	Yes	Yes	Yes
Observations	241	104	345	345	345	328	328
R^2	.001	.086	.046	.084	.099	.107	.107
Mean of D.V.	36.846	42.019	38.406	38.406	38.406	38.201	38.201

Notes: Table 1 reports OLS regressions with reported payoffs as dependent variable (in Danish Kroner (DKK)) and the interactions between the Externality/Ingroup Identity treatment and the market participation proxies as explanatory variables of main interest. In columns 1 and 2, the effect of the Externality/Ingroup Identity treatment is showed separately for market-integrated and non market-integrated participants. In columns 3 to 7, exposure to market institutions is interacted with the Externality/Ingroup Identity treatment. In all specifications, the No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

First, we show in column 1 and 2 of Panel A in Table 1 that wild foods-based participants receive 6.9 DKK (16.9%) less in payoffs when exposed to the Externality/Ingroup Identity treatment relative to wild foods-based participants in the Externality/No Identity and No Externality treatments. Similarly, in column 1 and two of Panel B participants employed in the traditional sector are shown to obtain 10.5 DKK (23.4%) less when exposed to the Externality/Ingroup Identity treatment compared to when subject to the other treatment conditions. Market-integrated participants, on the other hand, appear to be applying the same code of conduct regardless of treatment status. In columns 3 to 7 we proceed to investigate whether these differences are statistically significant by introducing an interaction term between the Externality/Ingroup Identity treatment and our two proxies for market participation. The results confirm that – relative to market integrated participants – participants in the traditional economy exhibit significantly stronger parochialism in moral decision-making. When village fixed effects are included, and we thereby compare traditional and market-integrated participants from the same village, the estimated coefficients remain of similar magnitude and and statistically significant. Finally, the findings are shown to be robust to controlling for gender, age and the experimental environment.

4.3 Robustness analysis

In what follows, we corroborate the link between market participation and parochial honesty through a number of robustness checks. First, we conduct several alterations to the proxy operationalizations of market participation to ensure that the findings are not sensitive to variable coding. In Appendix Table A5, we show that the magnitude of the Diet proxy coefficient is larger when using only participants who do not obtain any food from subsistence hunting, fishing or gathering as the comparison group. In Appendix Table A6, we demonstrate that the general insight remains when employing the Diet proxy as a continuous measure ranging from (1) *no food consumption based on wild foods* to (4) *most/all food consumption based on wild foods*. We also consider alternative definitions of the Employment proxy (Appendix Table A7). As should be expected, the magnitudes of the estimated coefficients are generally larger when we drop the most ambiguous em-

ployment categories (handicraft and design, fish production (industry), transportation, farming, boating and shipping and the residual job-category).

Next, we consider the risk of omitted variable bias. Traditional participants differ from market-integrated participants in a range of ways other than market exposure (see Appendix Table A3), e.g. in terms of educational attainment and income. In order to ensure that differences in economic organization – and not differences in other factors – explain why participants in the traditional economy display parochial honesty whereas market-integrated participants do not, we proceed to rule out potentially confounding influence from these factors. We include an extensive set of control variables in the regression analyses in Appendix Tables A8 and A9, adding fixed effects for education, income, perceived income status, financial resilience, language and national identity, as well as corresponding interaction terms with the Externality/Ingroup Identity treatment dummy. Overall, the precision of the estimates increases when we add controls, indicating that underlying differences between market and traditional participants do not confound the analysis.

5 Alternative explanations

First, we consider four institutional factors which previously have been linked with moral decision-making, namely religion, kinship structure, past exposure to political institutions, and globalization (proxied by media consumption). Religion has been claimed to promote prosocial behavior toward socially distant co-religionists (Purzycki et al. (2016, 2018a); Lang et al. (2019)); kinship tightness to influence moral behavior toward ingroup and outgroup differentially (Enke (2019)); political institutions to shift behavioral patterns by altering incentives (Lowes et al. (2017); Becker et al. (2016)); and globalization to reduce moral barriers between ingroup and outgroup (Buchan et al. (2009); Hruschka and Henrich (2013)). As shown in Appendix Table A3, participants in the traditional economy are more religious, have tighter kinship networks[19], have been less exposed to Danish political institutions, and are less likely to spend time on the Internet. In Appendix Table A10

[19]This finding aligns with the study of Colleran (2020) on market integration and network structures.

and A11, we progressively rule out confounding influence of each of these institutional factors, and show that market participation remains the strongest predictor of generalized honest conduct.

Second, we explore whether pre-determined characteristics that affect selection in the traditional economy, reduce the effect of the Diet and Employment proxies in our results. We construct two variables: whether the participant was born in a settlement or a town (*B.V. Settlement*) and whether her parents were born in a settlement or a town (*Parents B. V. Settlement*). In this analysis, we only use the participants for which we have information on where they and their parents were born (N=496). Settlements are small villages with less than 500 inhabitants, and are characterized by strong adherence to traditional norms and practices (Nuttall (2000)). In towns, the population ranges between 500 and above 15000 inhabitants, and urbanization and modern market institutions are more developed (Poppel (2006)). Our analysis relies on the intuition that, if selection plays an important role in our estimates of market participation, the inclusion of these pre-determined variables and their interactions with the Externality/ Ingroup Identity treatment should reduce the magnitude of the market participation estimates.

In Table 2, we show the correlations between market participation and birth place and parental birth place (columns 1 and 2), and include these variables and their interactions as controls in our main regression results (columns 3 to 5). Columns 1 and 2 show that being born in a settlement or having parents born in a settlement correlates positively with wild foods-based diet and working in the traditional sector. Column 3 shows that participants whose parents are born in a settlement i) cheat more in the outgroup treatments and ii) further reduce their reported outcome in the Externality/ Inroup identity treatment. However, both coefficients are reduced by half and become statistically unsignificant when we include market participation. In contrast, the estimated effects of having a wild foods-based diet and working in the traditional sector display the same magnitude and statistical significance as the coefficients displayed in Table 1. While these results should be interpreted with caution, they tend to suggest that exposure to different economic organizations, rather than selection into market participation caused by pre-determined variables, explain our results.

Table 2: Social background and parochial honesty

Dep. Var.:	Wild foods -based diet	Traditional sector	Dice Experiment Payoff		
	(1)	(2)	(3)	(4)	(5)
B.V. Settlement	0.170	0.199	-0.009	-1.034	-0.244
	(0.025)	(0.072)	(0.992)	(0.432)	(0.905)
Parents B.V. Settlement	0.141	0.113	3.096	1.833	3.035
	(0.018)	(0.273)	(0.026)	(0.217)	(0.104)
B.V. Settlement			-1.346	0.327	-0.538
× Externality/Ingroup Identity			(0.686)	(0.930)	(0.890)
Parents B.V. Settlement			-4.849	-2.204	-1.417
× Externality/Ingroup Identity			(0.137)	(0.517)	(0.704)
Wild foods-based diet				3.900	
				(0.012)	
Wild foods-based diet				-6.181	
× Externality/Ingroup Identity				(0.023)	
Traditional occupation					7.429
					(0.004)
Traditional occupation					-9.992
× Externality/Ingroup Identity					(0.042)
Observations	496	321	458	451	286
R^2	.062	.067	.013	.026	.058
Mean of D.V.	.48	.327	37.795	37.849	38.776

Notes: Table 2 displays OLS regressions. In columns 1 and 2, the outcome variables are, respectively, having a wild foods based-diet and working in the traditional sector. In columns 3-5, the outcome variable is payoffs in the Dice Experiment. B.V. Settlement is a dummy variable for being born in a settlement. Parents B.V. Settlement is a dummy indicating whether both parents were born in settlements. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

6 Conclusion

The unique blend of market-based and traditional economic organizations characterizing Greenland today enabled us to study how within-community variation in market participation links with moral decision-making in a Dice Experiment. Our findings render support to – as well as expand on – the Market Integration Hypothesis. We document a positive relationship between market integration and honest conduct, and thereby corroborate previous studies showing that market exposure increases average prosociality (Henrich et al. (2001, 2004, 2010); Baldassarri (2020)). In addition, we show that market participation predicts group differentiation in moral decision-making, in that participants in the traditional economy act more honestly toward the ingroup than toward the outgroup, whereas market-integrated participants behave equally honest regardless of group identity of the interaction partner. In sum, our findings suggest that economic integration is conducive to social integration and cross-community cooperation.

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Appendix

A Sampling strategy

The population of Greenland is small, widely dispersed, and displays strong regional clustering. In order to obtain a sample that reflects well these demographic patterns, we stratified the universe of localities in Greenland prior to sampling. Stratified sampling generally decreases sampling bias (Deaton (1997)) and accounts for regional heterogeneity by ensuring that each stratum is "represented" in the final sample. In order to mitigate concerns of "convenience sampling", we used the official administrative units operated by Statistics Greenland[20] for stratification. The sampling of participants was conducted by means of the following four steps:

- First, Greenland was divided into geographic strata. In 2018, there were 5 municipalities in Greenland: Sermersooq, Avannaata, Kujalleq, Qeqertalik and Qeqqata. The municipalities generally capture much of the intra-national differences in terms of e.g. culture and economic structure. The exception is Sermersooq, which covers both the East and West coasts, and where the coastal regions differ substantially from each other.[21] In order to ensure the inclusion of participants from both coasts of Sermersooq, we decided to split this municipality into East and West. The resulting 6 geographic regions served as the first level of stratification.

- Second, the urban/rural-divide was accounted for by stratifying localities based on Statistics Greenland's categorization of villages as "settlements" (typically smaller than 500 inhabitants) or "towns" (typically larger than 500 inhabitants). Each geographic strata contain at least two towns and a number of smaller settlements. We

[20] The statistical agency of Greenland.

[21] Exemplifying this division is the fact that different dialects of Greenlandic are spoken in West and East. Kalaallisut - or West Greenlandic - is spoken on the West coast, whereas Tunumiit Oraasiat - or East Greenlandic - is spoken on the East coast. West Greenlandic is however taught in schools also on the East Coast, and most of the inhabitants master it well.

only considered localities with at least 50 inhabitants. Combining the two layers of stratification yield 12 strata.

- Third, we sampled localities by randomly drawing one settlement and one town from each geographic strata. In order to ensure a comprehensive final sample, we made two exceptions to the within-stratum randomization. Due to the political, economic and demographic weight of the capital Nuuk, we decided to fix its inclusion in the final sample, and therefore did not randomly select a town from Sermersooq West. Furthermore, to account for the vast geographic reach of Avannaata, we also fixed the inclusion of Upernavik (a northern town of the municipality) in the final sample, in addition to the randomly selected locality, Ilulissat. The other 11 villages were randomly drawn from their respective strata.

- Fourth, Statistics Greenland randomly selected participants from the universe of adult residents (aged 18 and above) in each locality. The sample size of respective locality was determined by the relative adult population size of the stratum which the locality represented. Settlements were slightly oversampled, in order to ensure statistical power in these relatively smaller subpopulations.

The gross sample consisted of 1,400 adult residents. 543 of of these completed both the Dice Experiment and the survey, yielding a response rate of 38.8%. We exploited Greenlandic register data to validate the representativeness of our sample based on two relevant variables: age and professional hunting licenses. In the adult population of Greenland, the median age is 44 (mean 44.17) and 4.96% have a professional hunting license. In our sample, the median age is 48 (mean 46.23) and 5.32% are professional hunters. The fact that the age profile in our sample closely resembles that of the total adult population suggests a successful random sampling. Moreover, that the share of hunters in our sample approximates the share of hunters in the population at large shows that people in the traditional economy were no more difficult to recruit than market integrated participants.

B Experimental instructions

Both the survey and Dice Experiment were undertaken in Greenlandic, English or Danish depending on respondents' preferences. The Dice Experiment was conducted after completion of the survey. The translated instructions are written in italics below:

For participating in this questionnaire you will receive a small additional payoff. However, this payoff is not the same for every participant. You determine your own payoff by throwing your die once. The throw decides how much you receive. You can see the exact payoff from the following table:

Number thrown	*1*	*2*	*3*	*4*	*5*	*6*
Resulting payoff	*10*	*20*	*30*	*40*	*50*	*60*

[The next sentence(s) varied by treatment.]

[No Externality treatment:]

The maximum amount you can receive is 60 DKK.

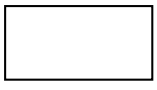
[Externality/No Identity treatment:]

The maximum amount you can receive is 60 DKK. If your payoff is lower than 60 DKK, the remaining amount will be given to another person taking the survey. You will not know who this person is, and he or she will not know who you are.

[Externality/Ingroup Identity treatment:]

The maximum amount you can receive is 60 DKK. If your payoff is lower, the remaining amount will be given to another person from your town or settlement taking the survey. You will not know who this person is, and he or she will not know who you are.

If you have any questions, please contact the surveyor. If you are ready, please roll the die. Please indicate the outcome of your die-roll below:



C Survey items

Table A1: Variable definitions

Label	Survey item	N
Woman	What is your gender? (**Female**; Male; Other)	543
Age	What is your age?	512
Game Done At Home	Enumerator indicates if survey was taken at a field session (0) or at participant's **home** (1)	543
Education	What is the highest level of education that you have achieved?	522
	(No education; Some years of primary school; Primary school; Currently at high school;	
	High School; Vocational Training; Currently at the University; Bachelor; Master; Ph.D.)	
Household income	What is your total annual household income, from all sources, before taxes?	511
	(0 - 100 000 DKK; 100 000 - 200 000 DKK; 200 000 - 300 000 DKK; 300 000 - 400 000 DKK;	
	400 000 - 500 000 DKK; 500 000 - 1 000 000 DKK; $>$ 1 000 000 DKK)	
Perceived Inc. Status	Please imagine a ten-step ladder where on the first step stand the poorest people in Greenland	517
	and on the highest step, the tenth, stand the richest people in Greenland.	
	On which step of the ten is your household today? (1-10)	
Financial Resilience	If, for one reason or another, you suddenly no longer receive earnings and/or transfers, how long	476
	would your household be able to get by before you run into financial problems?	
	(Less than one week; Less than two weeks; Less than four weeks; Less than two months;	
	Less than six months; Six months or more)	
Language	Which language(s) do you speak? (Greenlandic; Danish; English; Other)	542
Identity	What do you identify yourself as? (Greenlandic; Both Greenlandic and Danish; Danish; Other)	534
Attend Church	How often do you go to church?	527
	(Never; Once a month or less; **2-3 times a month**; **Once per week**; **More than once a week**)	
Traditional Beliefs	Are Inuit or Inughuit spiritual beliefs an important part of your life?	523
	(**Extremely important**; Very important; Somewhat important; Not too important; Not at all important)	
Kinship tightness	Ratio of the number of relatives living in the local village to total village population.	332
	Relatives encompass all first and second degree relatives contained in the Greenlandic register data.	
Lived in DK	Have you ever lived in Denmark? (No (0); **Yes** (1))	531
Close relatives in DK	Do any of your family members live in Denmark now?	533
	(**Yes, parents**; **Yes, siblings**; **Yes, children**; Yes, other; No)	
Media: Internet	Which one of these news sources do you use the most to get your information?	537
	(Family and friends; **The Internet on a computer**; **The Internet on a mobile phone**,	
	Local newspaper, Magazine, National newspaper, People in your community, Radio, TV)	
Media: TV and radio	Which one of these news sources do you use the most to get your information?	537
	(Family and friends; The Internet on a computer; The Internet on a mobile phone,	
	Local newspaper, Magazine, National newspaper, People in your community, **Radio**, **TV**)	
B.V. Settlement	In which town or settlement were you born? (Town; **Settlement**)	556
Parents B.V.	In which town or settlement was your mother/father born and raised? Please indicate the location	520
Settlement	Where he/she spent the most of his/her childhood (Town; **Settlement**) [= 1 if indicated both from Settlement]	

D Balance table

Table A2: Balance table

	Full sample			No Externality			Externality/ No Identity			Externality/ Ingroup Identity			Ingroup – No Externality	Ingroup – No Identity
Variable	N (1)	Mean (2)	S.d. (3)	N (4)	Mean (5)	S.d. (6)	N (7)	Mean (8)	S.d. (9)	N (10)	Mean (11)	S.d. (12)	Difference (13)	Difference (14)
Woman	543	.527	.5	184	.505	.501	187	.578	.495	172	.494	.501	-0.011	-0.083
Age	512	46.23	15.048	174	48.753	15.135	177	44.87	14.85	161	45	14.913	-3.753**	0.130
Game Done At Home	543	.613	.487	184	.63	.484	187	.652	.477	172	.552	.499	-0.078	-0.100*
Primary School	522	.477	.5	172	.5	.501	183	.481	.501	167	.449	.499	-0.051	-0.032
High School/ Professional	522	.379	.486	172	.372	.485	183	.366	.483	167	.401	.492	0.029	0.035
University Degree	522	.144	.351	172	.128	.335	183	.153	.361	167	.15	.358	0.022	-0.003
HH Earnings < 200K	511	.429	.495	168	.44	.498	180	.444	.498	163	.399	.491	-0.042	-0.046
HH Earnings 200 - 500 K	511	.368	.483	168	.381	.487	180	.367	.483	163	.356	.48	-0.025	-0.011
HH Earnings > 500 K	511	.204	.403	168	.179	.384	180	.189	.393	163	.245	.432	0.067	0.057
Wild foods-based diet	534	.449	.498	181	.409	.493	184	.505	.501	169	.432	.497	0.023	-0.073
Traditional occupation	345	.301	.46	118	.297	.459	120	.333	.473	107	.271	.447	-0.026	-0.062
Perceived Inc. Status	517	5.064	1.823	171	4.988	1.828	179	5.017	1.778	167	5.192	1.869	0.203	0.175
Attend Church	527	.186	.389	179	.207	.406	181	.177	.383	167	.174	.38	-0.033	-0.003
Traditional Beliefs	523	.098	.297	178	.073	.261	177	.107	.31	168	.113	.318	0.040	0.006
Lived in Denmark	531	.392	.489	181	.381	.487	183	.415	.494	167	.377	.486	-0.004	-0.038
Close relatives in Denmark	533	.411	.492	181	.409	.493	183	.383	.487	169	.444	.498	0.035	0.061
Media: Internet	537	.678	.468	183	.661	.475	184	.674	.47	170	.7	.46	0.039	0.026
Media: TV and radio	537	.777	.417	183	.765	.425	184	.788	.41	170	.776	.418	0.011	-0.012

Notes: Table A2 displays number of observations, sample means and standard deviations for relevant variables, as well as balance tests across treatments. The definitions of all variables are detailed in Table A1. Columns 1 to 3 report statistics for the full sample, columns 4 to 6 for the No Externality treatment group, columns 7 to 9 for the Externality/ No Identity treatment group, and columns 10 to 12 for the Externality/Ingroup Identity treatment group. Using bivariate regressions, we test for co-variate differences between the Externality/Ingroup Identity treatment and the No Externality treatment in column 13, and between the Externality/Ingroup Identity treatment and the Externality/No Identity treatment in column 14. * ($p<0.10$), ** ($p<0.05$), *** ($p<0.01$).

E Market participation proxies: definitions

Figure A1: Diet proxy: dichotomous

If a participant replied 3 or 4 to at least one of the following two questions, she is coded as having a wild foods-based diet.

How much of your family's diet comes from wild foods you hunt, fish, or gather for yourselves?

1. None of it.
2. Some of it.
3. **Half of it.**
4. **Most or all of it.**

How much of your family's diet comes from wild foods that other people in your town or village share with you?

1. None of it.
2. Some of it.
3. **Half of it.**
4. **Most or all of it.**

Figure A2: Diet proxy: 4-point scale

The categories are defined as follows:

- **Wild foods-based diet (none)**: participant answered 1 to both items in Figure A1.
- **Wild foods-based diet (some)**: answered 2 (but not higher) to 1 of the items in Figure A1.
- **Wild foods-based diet (half)**: answered 3 (but not higher) to 1 of the items in Figure A1.
- **Wild foods-based diet (most/all)**: answered 4 to 1 of the items in Figure A1.

Figure A3: Employment proxy

Occupations in bold text are coded as traditional, in normal text as in the market sector and the occupations in italics were excluded due to their ambiguous categorization.

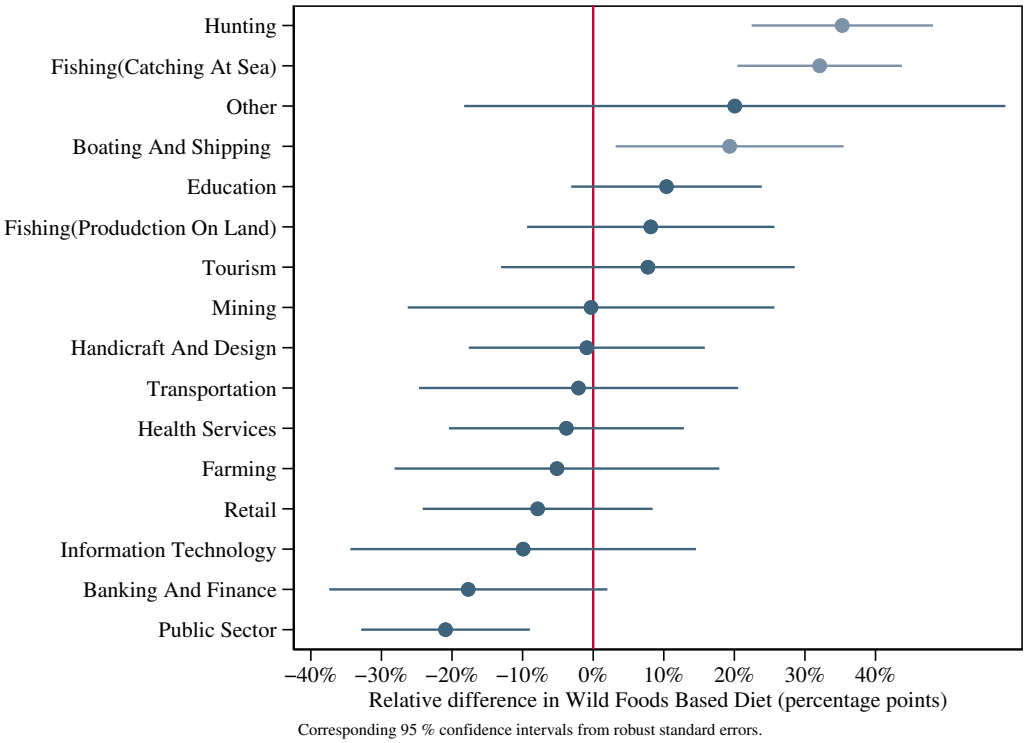
What best describes your current occupation?

- **Boating and shipping**
- Banking and finance
- Education
- Farming
- **Fishing (catching at sea)**
- Fishing (production on land)
- Handicraft & design
- Health services
- **Hunting**
- Information technology (IT)
- Mining
- Public Sector
- *Retired or pensionist*
- Retail
- *Student*
- Tourism
- Transportation
- *Unemployed*
- Other

F Proxy correlations

We proceed to show correlations between the proxies on market participation. Although the proxies capture different types of market exposure, namely consumption- and production-based exposure, respectively, we should expect a positive correlation between the two variables. To investigate this, we plot differences in the likelihood of having a wild foods-based diet for all occupations. The coefficients are estimated by means of bivariate OLS regressions. Dice Experiment participants with non-missing data for both the Diet and the Employment proxies are included (N=345). The estimates are plotted in Figure A4.

Figure A4: Coefficient plot of the relative probability of having a Wild Foods-based diet by occupation.



G Market-integrated and traditional participants

Table A3: Differences between market integrated and traditional participants

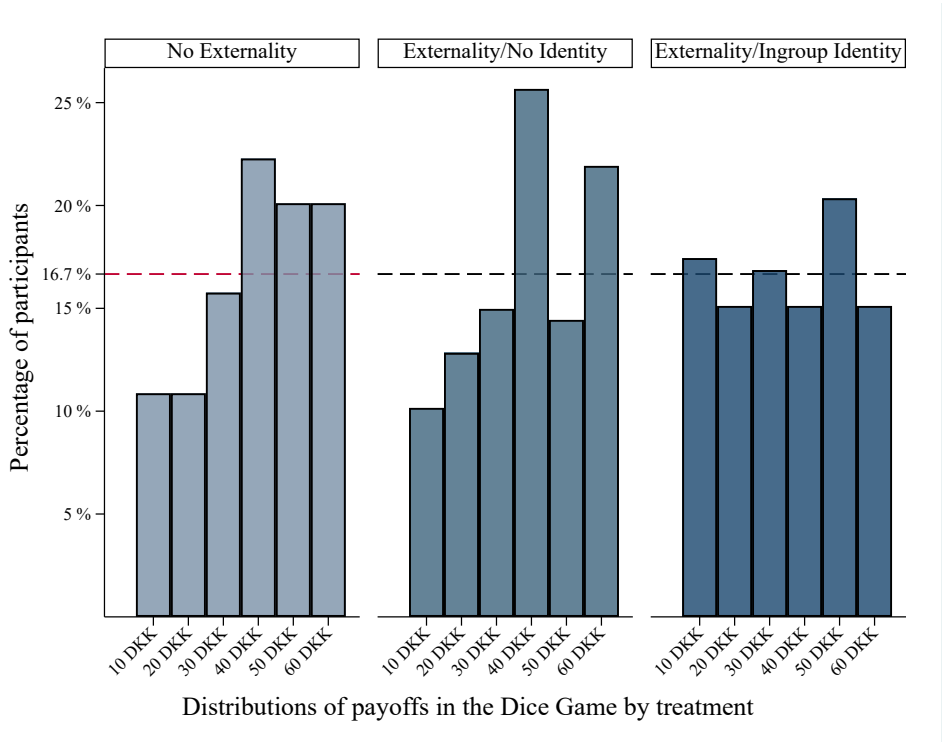
Variable	Market Sector (1)	Traditional Sector (2)	Difference (3)	Market based diet (4)	Wild foods based diet (5)	Difference (6)
Woman	0.560	0.269	0.291***	0.503	0.554	-0.051
	(0.497)	(0.446)	(0.057)	(0.501)	(0.498)	(0.043)
Age	44.96	46.53	-1.569	45.45	47.15	-1.698
	(12.37)	(15.21)	(1.598)	(14.31)	(15.47)	(1.328)
Game Done At Home	0.585	0.654	-0.069	0.551	0.688	-0.136***
	(0.494)	(0.478)	(0.057)	(0.498)	(0.464)	(0.042)
Primary School	0.294	0.709	-0.415***	0.415	0.552	-0.136***
	(0.457)	(0.457)	(0.054)	(0.494)	(0.498)	(0.044)
High School/ Professional	0.479	0.252	0.227***	0.422	0.328	0.095**
	(0.501)	(0.437)	(0.057)	(0.495)	(0.470)	(0.043)
University Degree	0.227	0.0388	0.188***	0.163	0.121	0.042
	(0.420)	(0.194)	(0.043)	(0.370)	(0.326)	(0.031)
HH Earnings $<$ 200 K	0.237	0.485	-0.248***	0.377	0.487	-0.110**
	(0.426)	(0.502)	(0.054)	(0.485)	(0.501)	(0.044)
HH Earnings 200 - 500 K	0.461	0.347	0.115*	0.395	0.338	0.057
	(0.500)	(0.478)	(0.06)	(0.490)	(0.474)	(0.043)
HH Earnings $>$ 500 K	0.302	0.168	0.133**	0.228	0.175	0.053
	(0.460)	(0.376)	(0.052)	(0.420)	(0.381)	(0.036)
Perceived Inc. Stat	5.595	4.515	1.080***	5.129	4.975	0.154
	(1.686)	(1.770)	(0.202)	(1.730)	(1.922)	(0.161)
Language: only Greenlandic	0.212	0.510	-0.298***	0.221	0.487	-0.266***
	(0.409)	(0.502)	(0.052)	(0.416)	(0.501)	(0.040)
Language: Greenlandic and Danish/ English	0.685	0.471	0.213***	0.680	0.496	0.184***
	(0.466)	(0.502)	(0.056)	(0.467)	(0.501)	(0.042)
Language: only Danish/ English	0.104	0.0192	0.085***	0.0986	0.0167	0.082***
	(0.306)	(0.138)	(0.031)	(0.299)	(0.128)	(0.021)
Identity: Greenlandic	0.802	0.961	-0.159***	0.820	0.941	-0.121***
	(0.400)	(0.194)	(0.041)	(0.385)	(0.236)	(0.029)
Identity: Greenlandic and Danish	0.131	0.0291	0.102***	0.114	0.0506	0.064***
	(0.338)	(0.169)	(0.035)	(0.319)	(0.220)	(0.024)
Identity: only Danish	0.0675	0.00971	0.058**	0.0657	0.00844	0.057***
	(0.251)	(0.0985)	(0.026)	(0.248)	(0.0917)	(0.017)
Attend Church	0.112	0.284	-0.172***	0.135	0.248	-0.113***
	(0.316)	(0.453)	(0.043)	(0.342)	(0.433)	(0.034)
Traditional Beliefs	0.0708	0.121	-0.050	0.0623	0.141	-0.079***
	(0.257)	(0.328)	(0.033)	(0.242)	(0.349)	(0.026)
Kinship tightness	0.007	0.025	-0.018***	0.008	0.023	-0.015***
	(0.019)	(0.051)	(0.004)	(0.029)	(0.047)	(0.004)
Lived in Denmark	0.535	0.194	0.341***	0.478	0.289	0.189***
	(0.500)	(0.397)	(0.056)	(0.500)	(0.454)	(0.042)
Close relatives in Denmark	0.441	0.385	0.057	0.440	0.377	0.063
	(0.498)	(0.489)	(0.058)	(0.497)	(0.486)	(0.043)
Media: Internet	0.780	0.635	0.145***	0.720	0.637	0.083**
	(0.415)	(0.484)	(0.051)	(0.450)	(0.482)	(0.040)
Media: TV and radio	0.768	0.827	-0.059	0.785	0.775	(0.040)
	(0.423)	(0.380)	(0.048)	(0.412)	(0.418)	(0.036)

Notes: Table A3 displays variable means and differences between market integrated and traditional participants on relevant characteristics. All variables are described in Table A1. The tests are conducted by means of bivariate OLS regressions. In columns 1, 2, 4 and 5, standard deviations are reported in parentheses. In columns 3 and 6, standard errors are reported in parentheses.
* ($p<0.10$), ** ($p<0.05$), *** ($p<0.01$).

H Parochial honesty: baseline results

The distributions of reported die rolls in the three treatments are depicted in Figure A5. In the absence of misreporting, we should see uniform distributions with each outcome reported approximately 16.7% of the time. In the No Externality treatment and the Externality/No Identity treatment, participants were almost twice as likely to report the high outcomes as they were to report the low outcomes (two-sided binomial tests confirm that the likelihood of 4, 5 or 6 being reported is significantly higher than 50% in the No Externality treatment (62.50%, p-value$<$0.001, degrees of freedom=183) and in the Externality/No Identity treatment (62.03%, p-value$<$0.01, degrees of freedom=186). Conversely, the flat distribution of outcomes reported in the Externality/Ingroup Identity treatment strongly suggests that participants in this treatment reported their outcomes truthfully.

Figure A5: Histograms showing the distribution of reported outcomes by treatment. The dashed horizontal lines indicate the expected percentage of each outcome in the absence of misreporting.



In Table A4, we test the treatment effect of the Externality/Ingroup Identity treatment when evaluated against No Externality treatment (columns 1-2), Externality/No Identity treatment (columns 3-4), and a pooled sample of the No Externality treatment and the Externality/No Identity treatment (columns 5-6).

Table A4: Treatment effect

Dep. Var.: Dice Experiment Payoff	Reference: No Externality		Reference: Externality/No Identity		Reference: Pooled sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Externality/Ingroup Identity	-3.905	-3.883	-3.600	-3.028	-3.752	-3.573
	(0.027)	(0.034)	(0.041)	(0.099)	(0.016)	(0.027)
Age		0.053		0.021		0.010
		(0.363)		(0.731)		(0.831)
Game done at home		1.640		2.714		1.769
		(0.385)		(0.156)		(0.248)
Observations	356	335	359	338	543	512
R^2	0.014	0.020	0.012	0.016	0.011	0.014
Mean of D.V.	37.135	37.075	36.992	36.627	37.680	37.461

Notes: Table A4 displays OLS regressions of the Externality/Ingroup Identity treatment effect on reported payoffs (in Danish Kroner (DKK)). In columns 1 and 2, the comparison group is the No Externality treatment. In columns 3 and 4, the comparison group is the Externality/No Identity treatment. In columns 5 and 6, both the No Externality treatment and the Externality/No Identity treatment constitute the reference group. "Age" indicates participants' age, "Game done at home" is a dummy variable equal to 1 if the Dice Experiment was conducted at participants' homes, and 0 if it was played at one of the field sessions. P-values based on robust standard errors are reported in parentheses.

I Randomization Inference

We next demonstrate the robustness of the estimates to Randomization Inference[22], a non-parametric technique which relaxes the assumption of normally distributed errors invoked in standard regressions (see Gerber and Green (2012) for a detailed description). Randomization Inference randomly assigns "placebo treatments" to participants and estimate the placebo treatment effect. This exercise is repeated 10,000 times (permutations) so that we obtain distributions of the placebo treatment effects. The number of placebo treated participants in each permutation corresponds to the number of participants in

[22]We execute the Randomization Inference test using the Stata package ritest.

the Externality/Ingroup Identity treatment. In the same manner as the actual treatment assignment, the placebo treatments are block randomized at the village level.

The probability of obtaining the *actual* treatment effect by chance is calculated by comparing the absolute size of our estimated treatment effects with the absolute size of placebo treatment effects. The p-value derivation is expressed mathematically as:

$$\frac{k}{10,000}, \tag{1}$$

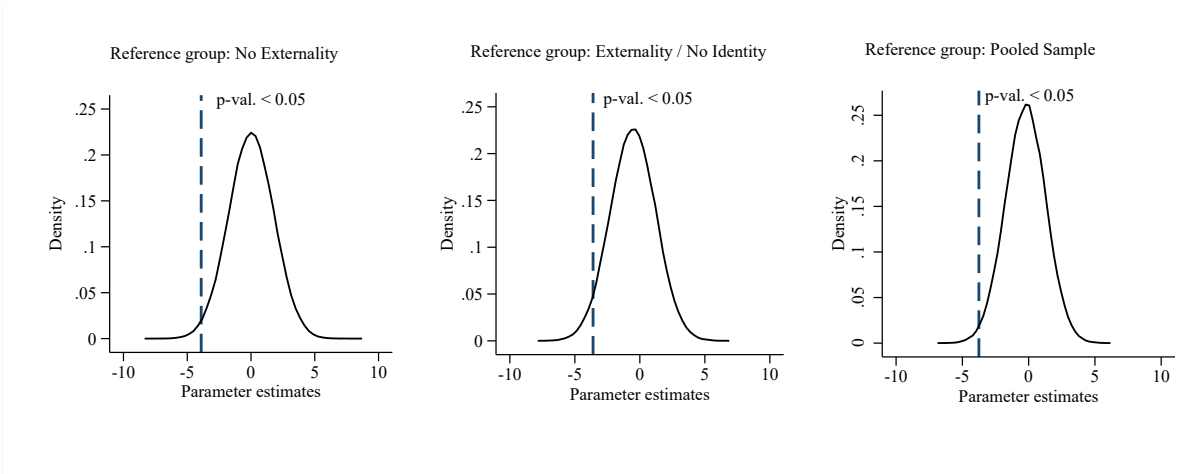
where

$$k = \sum_{m=1}^{10,000} 1(|TE_i^{placebo}| \geq |TE_i^{actual}|) \tag{2}$$

In words, k over 10,000 is *the proportion of times that the absolute values of the placebo treatment effects are larger than the absolute value of the actual treatment effect*.

Figure A6 displays distributions of parameter estimates from 10,000 permutations of placebo treatments (the colored normal distributions). The vertical lines represent the actual treatment effects. The p-values from two-sided Randomization Inference simulations are almost identical to the p-values based on standard regressions (Reference No Externality treatment: p-value=0.025, N=356; Reference Externality/No Identity treatment: p-value=0.045, N=359; Reference Pooled Sample: p-value=0.015, N=543).

Figure A6: Randomization Inference



J Robustness analysis

J.1 Diet proxy: alternative specifications

Table A5 shows interaction effects between the Diet proxy and the Externality/Ingroup Identity treatment for different definitions of market integrated participants. In column 1, all participants obtaining less than 50% of their food consumption from traditional methods are defined as market integrated and thus serve as the comparison group. Column 2 displays results when the comparison category is participants that sometimes obtain their food by means of traditional methods (N=232). In column 3, only participants never obtaining food from traditional methods serve as the comparison group (N=60).

Table A5: Diet proxy: alternative specifications

	Participants with wild foods-based diet compared with:		
Dep. Var.: Dice Experiment Payoff	Full sample	Participants sometimes using traditional methods	Participants never using traditional methods
	(1)	(2)	(3)
Externality/Ingroup Identity	-0.939	-2.310	3.824
	(0.843)	(0.607)	(0.160)
Wild foods-based diet	3.290	2.675	5.731
	(0.027)	(0.056)	(0.031)
Externality/Ingroup Identity	-5.911	-4.679	-10.346
$\times$ Wild foods-based diet	(0.013)	(0.036)	(0.050)
Woman	-0.381	-0.114	-4.085
	(0.807)	(0.945)	(0.065)
Age	0.006	-0.000	0.000
	(0.874)	(0.994)	(0.999)
Game done at home	1.168	0.590	1.713
	(0.348)	(0.736)	(0.401)
Village F.E	Yes	Yes	Yes
Surveyor F.E	Yes	Yes	Yes
Observations	504	448	285
R^2	.059	.064	.117
Mean of D.V.	37.5	37.746	37.789

Notes: Table A5 reports OLS regression estimates of the effect of the Externality/Ingroup Identity treatment for participants with a wild foods-based diet (i.e if at least 50% of food is obtained from traditional methods) compared to participants obtaining less than 50% of their food from traditional methods (column 1), participants obtaining some food from traditional methods (column 2), and participants never obtaining food from traditional methods (column 3). Both the No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

J.2 Diet proxy: intensive margin

Table A6 shows interaction effects of the Externality/Ingroup Identity treatment and alternative operationalizations of the Diet proxy. Based on the survey items on food consumption obtained from traditional methods, we divide participants into four categories (see also Figure A2): (1) participants who do not obtain any food from traditional methods (N=60); (2) participants who obtain some food from traditional methods (N=232); (3) participants who obtain half of their food from traditional methods (N=106); (4) participants who obtain most or all of their food through traditional methods (N=134).[23] We employ the measure as categorical in columns 1 and 2 and continuous in columns 3 and 4.

[23]The 4-point scale measure includes two fewer observations than the dichotomous Diet proxy because of missing data on one of the items outlined in Table A1.

Table A6: Diet proxy: intensive margin

Dep. Var.:	Categorical specification		Continuous specification	
Dice Experiment Payoff	(1)	(2)	(3)	(4)
Externality/Ingroup Identity	3.107	4.195	3.267	3.539
	(0.191)	(0.052)	(0.183)	(0.217)
Wild foods-based diet: some	2.343	3.250		
	(0.220)	(0.074)		
Externality/Ingroup Identity	-5.020	-6.316		
× Wild foods-based diet: some	(0.253)	(0.174)		
Wild foods-based diet: half	6.048	6.601		
	(0.106)	(0.087)		
Externality/Ingroup Identity	-13.865	-13.788		
× Wild foods-based diet: half	(0.063)	(0.042)		
Wild foods-based diet: most or all	5.202	5.738		
	(0.137)	(0.107)		
Externality/Ingroup Identity	-7.654	-8.773		
× Wild foods-based diet: most or all	(0.080)	(0.031)		
Wild foods-based diet (continuous)			1.729	1.644
			(0.086)	(0.091)
Externality/Ingroup Identity			-2.689	-2.770
× Wild foods-based diet (continuous)			(0.034)	(0.022)
Woman		-0.234		-0.462
		(0.878)		(0.771)
Age		0.007		0.009
		(0.860)		(0.841)
Game done at home		1.426		0.841
		(0.249)		(0.491)
Village F.E	Yes	Yes	Yes	Yes
Surveyor F.E	Yes	Yes	Yes	Yes
Observations	532	502	532	502
R^2	.07	.07	.05	.05
Mean of D.V.	37.707	37.47	37.707	37.47

Notes: Table A6 reports OLS regressions with reported payoffs as dependent variable (in Danish Kroner (DKK)) and the interactions between the Externality/Ingroup Identity treatment and the 4-point scale measure of the Diet proxy as explanatory variable of main interest. The No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

J.3 Employment proxy: alternative specifications

Table A7 shows the interaction between the Externality/Ingroup Identity treatment and exposure to market institutions through employment for several alternative definitions of traditional and market sector occupations. In each column, we drop or add one job category at the time. In columns 1 to 5, we exclude the arguably most ambiguous job categories coded as market sector occupations in the main regressions. In column 6, students – which are coded as missing in the main regressions – are defined as participants in the market sector. In column 7, participants employed in boating and shipping are coded as

missing (they are included in the traditional sector in the main regressions).

Table A7: Employment proxy: alternative specifications

	Market sector job: alternative def.						Traditional job: alternative def.
	− Handicraft & Design	− Fishing (prod. on land)	− Transport.	− Farming	− Other	+ Students	− Boating & shipping
Dep. Var.: Dice Experiment Payoff	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Externality/Ingroup Identity	0.563	-0.697	-0.269	-0.178	-0.051	-0.819	-0.138
	(0.899)	(0.902)	(0.968)	(0.974)	(0.991)	(0.814)	(0.973)
Traditional occupation	8.243	7.721	7.953	7.741	7.869	7.474	7.241
	(0.011)	(0.008)	(0.012)	(0.010)	(0.009)	(0.012)	(0.094)
Externality/Ingroup Identity	-12.505	-10.847	-11.935	-12.011	-11.535	-10.759	-11.848
× Traditional occupation	(0.004)	(0.008)	(0.006)	(0.007)	(0.003)	(0.010)	(0.033)
Woman	1.891	1.027	0.209	-0.062	-0.156	0.064	0.306
	(0.251)	(0.623)	(0.941)	(0.973)	(0.943)	(0.982)	(0.887)
Age	0.044	0.015	0.036	0.039	0.034	0.036	0.062
	(0.400)	(0.832)	(0.563)	(0.531)	(0.581)	(0.448)	(0.450)
Game done at home	0.779	0.789	0.598	0.695	0.949	1.365	0.059
	(0.804)	(0.665)	(0.764)	(0.767)	(0.664)	(0.540)	(0.959)
Village F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surveyor F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	300	315	321	324	323	344	314
R^2	.12	.11	.11	.11	.11	.1	.1
Mean of D.V.	38.4	38.254	38.01	38.241	38.05	38.140	37.994

Notes: Table A7 reports OLS regressions with reported payoffs as dependent variable (in Danish Kroner (DKK)) and the interactions between the Externality/Ingroup Identity treatment and the alternative definitions of the Employment proxy as explanatory variable of main interest. The No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

J.4 Additional controls

In this analysis, we rule out several potentially confounding factors by including a more extensive set of controls. In columns 1 to 6 of Tables A8 and A9, we successively include the following variables and their respective interactions with the Externality/ Ingroup Identity treatment: sex, age, and experimental condition (column 1), education fixed effects (column 2), income fixed effects (column 3), perceived income status (column 4), language (column 5), and national identity (column 6). In column 7 all control variables are included.

Table A8: Diet proxy: additional controls

Dep. Var: Dice Experiment Payoff	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Externality/Ingroup Identity	-8.432	3.906	4.281	-3.063	-0.346	-1.182	0.301
	(0.032)	(0.433)	(0.296)	(0.618)	(0.908)	(0.436)	(0.963)
Wild foods-based diet	3.644	3.955	4.096	3.707	3.428	3.733	4.316
	(0.019)	(0.020)	(0.041)	(0.019)	(0.030)	(0.013)	(0.030)
Externality/Ingroup Identity	-7.680	-7.525	-6.985	-5.994	-6.484	-6.307	-8.874
$\times$ Wild foods-based diet	(0.004)	(0.003)	(0.002)	(0.017)	(0.018)	(0.020)	(0.000)
Sex, age & home + interactions	Yes	No	No	No	No	No	Yes
Education F.E + interactions	No	Yes	No	No	No	No	Yes
Income F.E + interactions	No	No	Yes	No	No	No	Yes
Perceived income + interactions	No	No	No	Yes	No	No	Yes
Language + interactions	No	No	No	No	Yes	No	Yes
Identity + interactions	No	No	No	No	No	Yes	Yes
Village F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surveyor F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	504	521	510	516	534	526	461
R^2	.075	.103	.115	.062	.064	.062	.186
Mean of D.V.	37.5	37.735	37.784	37.674	37.734	37.833	37.679

Notes: Table A9 reports OLS regressions with reported payoffs as dependent variable (in Danish Kroner (DKK)) and the interactions between the Externality/Ingroup Identity treatment and Wild foods-based diet as explanatory variable of main interest. The No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

Table A9: Employment proxy: additional controls

Dep. Var: Dice Experiment Payoff	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Externality/Ingroup Identity	1.043	0.463	4.500	5.300	3.244	0.127	12.557
	(0.836)	(0.957)	(0.517)	(0.454)	(0.454)	(0.949)	(0.152)
Traditional occupation	8.437	8.320	7.967	8.081	8.368	8.351	8.889
	(0.006)	(0.007)	(0.022)	(0.013)	(0.003)	(0.003)	(0.032)
Externality/Ingroup Identity	-13.351	-11.977	-11.357	-12.581	-13.238	-12.153	-16.266
$\times$ Traditional occupation	(0.016)	(0.005)	(0.051)	(0.015)	(0.025)	(0.006)	(0.017)
Sex, age & home + interactions	Yes	No	No	No	No	No	Yes
Education F.E + interactions	No	Yes	No	No	No	No	Yes
Income F.E + interactions	No	No	Yes	No	No	No	Yes
Perceived income + interactions	No	No	No	Yes	No	No	Yes
Language + interactions	No	No	No	No	Yes	No	Yes
Identity + interactions	No	No	No	No	No	Yes	Yes
Village F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surveyor F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	328	341	333	340	345	340	306
R^2	.117	.152	.157	.101	.104	.102	.238
Mean of D.V.	38.201	38.446	38.468	38.382	38.406	38.559	38.464

Notes: Table A9 reports OLS regressions with reported payoffs as dependent variable (in Danish Kroner (DKK)) and the interactions between the Externality/Ingroup Identity treatment and Traditional occupation as explanatory variable of main interest. The No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

J.5 Institutional factors

In this subsection, we consider a set of institutional factors which co-vary with market participation and potentially could confound the analysis.

- **Religious institutions:** According to a growing literature, religion – and in particular moralistic high gods – have promoted an extension of moral behavior toward distant others (Purzycki et al. (2016, 2018a); Lang et al. (2019)). In our data, religion is unlikely to be a confounding element, since participants in the traditional economy in fact are relatively more religious; they are both more Christian and more likely to adhere to traditional Inuit Beliefs (Table A3).

- **Kinship structure:** Differences in kinship structure (Enke (2019)) could also influence parochial behavior in the Dice Experiment. Exploiting administrative register data on relatives and their respective residence, we compute the share of local population who are family members, and denote this measure 'kinship tightness' (see Table A1 for a detailed description). Participants in the traditional economy share family membership with a relatively larger share of the local population (Table A3), and might consequently exhibit more parochial honesty as not to negatively affect a family member.

- **Past political institutions:** Previous exposure to political institutions could also affect behavior and preferences (Lowes et al. (2017); Becker et al. (2016)). Since participants in the market economy are more likely to having lived in Denmark (Table A3), and somewhat more likely to have family there, differential exposure to Danish institutions could potentially confound the findings. Accordingly, we account for this factor as well.

- **Media consumption:** Market and traditional participants differ in their media consumption. Market sector respondents are more likely to spend time on the Internet (Table A3), and thus potentially more exposed to outsiders through this media. We control for media consumption in order to ensure that these underlying differences do not confound the findings.

In Tables A10 and A11, we progressively rule out that underlying differences in (1) religious institutions, (2) kinship structure, (3) past political institutions, and (4) media consumption influence the findings. In columns 2 to 4 we control for whether the participant regularly visits church and adhere to traditional Inuit beliefs; in column 5 we control for kinship tightness; in columns 6 to 8 we include controls for whether the participant lived in Denmark and whether he/she has close relatives living in Denmark; in columns 9 to 11 we control for whether the participant uses the Internet and TV or radio as news sources. In column 12 we control for all these potentially confounding factors except for kinship tightness[24].

[24]Kinship tightness is calculated based on Greenlandic register data. Because of missing identifying data, we lose a significant amount of observations in this exercise, and therefore do not account for kinship tightness in this specification.

Table A10: Diet proxy: institutional factors

Dep. Var: Dice Experiment Payoff	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Externality/Ingroup Identity	-0.755	-1.591	-1.522	-2.352	-0.719	-0.600	-0.802	-0.725	2.868	-0.442	3.015	-0.433
	(0.760)	(0.557)	(0.612)	(0.399)	(0.790)	(0.776)	(0.665)	(0.795)	(0.364)	(0.832)	(0.285)	(0.920)
Wild foods-based diet	4.271	4.288	4.169	4.262	4.402	3.866	4.462	4.082	4.313	4.082	4.237	3.816
	(0.016)	(0.012)	(0.013)	(0.013)	(0.017)	(0.020)	(0.014)	(0.015)	(0.017)	(0.016)	(0.018)	(0.038)
Externality/Ingroup Identity	-6.548	-6.930	-6.624	-7.024	-6.677	-6.568	-6.755	-6.630	-6.961	-6.469	-6.947	-6.984
× Wild foods-based diet	(0.001)	(0.009)	(0.004)	(0.012)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.005)
Woman	-0.171	0.095	-0.459	-0.295	-0.161	0.170	0.043	0.312	-0.059	0.038	0.039	0.512
	(0.922)	(0.953)	(0.816)	(0.882)	(0.942)	(0.919)	(0.977)	(0.862)	(0.961)	(0.977)	(0.982)	(0.836)
Age	0.020	0.063	0.019	0.059	0.018	0.035	-0.007	0.003	0.033	0.011	0.018	0.034
	(0.727)	(0.376)	(0.787)	(0.438)	(0.784)	(0.651)	(0.909)	(0.963)	(0.549)	(0.859)	(0.759)	(0.727)
Game done at home	0.958	0.788	1.013	0.723	0.828	0.537	0.653	0.355	0.999	0.937	0.933	0.037
	(0.413)	(0.555)	(0.443)	(0.625)	(0.438)	(0.655)	(0.585)	(0.781)	(0.418)	(0.492)	(0.505)	(0.993)
Attend church		-5.439		-6.437								-6.442
		(0.086)		(0.058)								(0.051)
Externality/Ingroup Identity		4.622		5.773								5.220
× Attend Church		(0.450)		(0.370)								(0.367)
Traditional beliefs			-2.308	-1.203								0.288
			(0.600)	(0.761)								(0.945)
Externality/Ingroup Identity			8.278	7.040								4.666
× Traditional beliefs			(0.134)	(0.176)								(0.242)
Kinship tightness					0.832							
					(0.343)							
Externality/Ingroup Identity					-0.809							
× Kinship tightness					(0.605)							
Spent time in Denmark						-3.591		-3.891				-4.948
						(0.155)		(0.110)				(0.064)
Externality/Ingroup Identity						0.050		-0.228				1.102
× Spent time in Denmark						(0.996)		(0.985)				(0.884)
Close relatives in Denmark							2.371	2.771				3.287
							(0.268)	(0.169)				(0.208)
Externality/Ingroup Identity							0.072	0.083				-1.911
× Close relatives in Denmark							(0.993)	(0.984)				(0.690)
Media consumption: Internet									2.348		2.180	0.315
									(0.373)		(0.405)	(0.918)
Externality/Ingroup Identity									-4.955		-4.917	-3.021
× Media consumption: Internet									(0.261)		(0.262)	(0.518)
Media consumption: TV and Radio										3.157	3.022	2.994
										(0.032)	(0.034)	(0.143)
Externality/Ingroup Identity										-0.503	-0.236	1.068
× Media consumption: TV and radio										(0.792)	(0.887)	(0.650)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surveyor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	474	469	464	461	332	471	470	468	473	473	473	455
R^2	.106	.118	.11	.125	.126	.114	.114	.125	.111	.112	.116	.153
Mean of D.V.	37.595	37.633	37.586	37.592	37.169	37.707	37.617	37.692	37.632	37.632	37.632	37.692

Notes: Table A10 reports OLS regressions with reported payoffs as dependent variable (in Danish Kroner (DKK)) and the interactions between the Externality/Ingroup Identity treatment and Wild foods-based diet as explanatory variable of main interest. In all specifications, both the No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.

Table A11: Employment proxy: institutional factors

Dep. Var: Dice Experiment Payoff	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Externality/Ingroup Identity	-0.759	-1.128	-0.863	-1.357	-0.580	2.572	0.756	3.154	3.728	-0.356	3.760	3.106
	(0.880)	(0.844)	(0.863)	(0.836)	(0.911)	(0.411)	(0.759)	(0.409)	(0.164)	(0.957)	(0.358)	(0.603)
Traditional occupation	7.646	8.436	8.655	9.545	7.898	8.538	7.873	8.612	7.944	7.315	7.635	10.068
	(0.021)	(0.013)	(0.005)	(0.008)	(0.018)	(0.011)	(0.013)	(0.010)	(0.014)	(0.021)	(0.014)	(0.008)
Externality/Ingroup Identity	-10.494	-11.047	-11.681	-12.292	-11.134	-11.905	-10.932	-11.986	-11.188	-10.848	-11.710	-13.825
× Traditional occupation	(0.019)	(0.017)	(0.003)	(0.002)	(0.008)	(0.008)	(0.005)	(0.008)	(0.008)	(0.013)	(0.006)	(0.003)
Woman	0.942	1.097	0.482	0.695	0.968	1.252	1.150	1.467	0.952	0.893	0.929	1.536
	(0.664)	(0.612)	(0.832)	(0.747)	(0.662)	(0.584)	(0.601)	(0.536)	(0.649)	(0.672)	(0.639)	(0.486)
Age	0.049	0.071	0.051	0.074	0.038	0.044	0.037	0.026	0.041	0.035	0.024	0.013
	(0.715)	(0.566)	(0.707)	(0.551)	(0.789)	(0.749)	(0.870)	(0.891)	(0.779)	(0.832)	(0.890)	(0.950)
Game done at home	1.294	1.162	1.441	1.259	1.277	1.285	1.134	1.205	1.453	1.168	1.332	1.156
	(0.563)	(0.611)	(0.548)	(0.629)	(0.533)	(0.564)	(0.630)	(0.599)	(0.531)	(0.628)	(0.588)	(0.711)
Attend church		-5.328		-6.804								-7.919
		(0.291)		(0.192)								(0.167)
Externality/Ingroup Identity		2.345		3.754								1.638
× Attend Church		(0.832)		(0.730)								(0.871)
Traditional beliefs			-2.437	-3.061								-0.190
			(0.623)	(0.561)								(0.957)
Externality/Ingroup Identity			3.560	3.641								-1.027
× Traditional beliefs			(0.646)	(0.658)								(0.893)
Kinship tightness					0.886							
					(0.468)							
Externality/Ingroup Identity					0.230							
× Kinship tightness					(0.884)							
Spent time in Denmark						-0.001		-0.531				-0.932
						(0.999)		(0.812)				(0.744)
Externality/Ingroup Identity						-6.770		-6.353				-6.547
× Spent time in Denmark						(0.736)		(0.630)				(0.584)
Close relatives in Denmark							2.110	2.094				3.376
							(0.254)	(0.213)				(0.029)
Externality/Ingroup Identity							-3.044	-1.577				-2.444
× Close relatives in Denmark							(0.894)	(0.769)				(0.695)
Media consumption: Internet									-0.710		-0.799	-3.423
									(0.783)		(0.752)	(0.130)
Externality/Ingroup Identity									-5.338		-5.785	-1.279
× Media consumption: Internet									(0.327)		(0.266)	(0.732)
Media consumption: TV and Radio										3.892	3.805	3.002
										(0.181)	(0.217)	(0.496)
Externality/Ingroup Identity										-0.382	0.627	2.199
× Media consumption: TV and radio										(0.899)	(0.848)	(0.676)
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surveyor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	314	312	308	307	219	313	311	310	314	314	314	303
R^2	.156	.164	.167	.179	.171	.167	.165	.176	.161	.163	.17	.223
Mean of D.V.	38.312	38.301	38.247	38.241	38.265	38.403	38.296	38.387	38.312	38.312	38.312	38.317

Notes: Table A11 reports OLS regressions with reported payoffs as dependent variable (in Danish Kroner (DKK)) and the interactions between the Externality/Ingroup Identity treatment and Traditional occupation as explanatory variable of main interest. In all specifications, both the No Externality treatment and the Externality/No Identity treatment constitute the reference group. P-values based on village level cluster-robust standard errors using the wild-bootstrap procedure (Cameron et al. (2008); Roodman et al. (2019)) are reported in parentheses.